

**RELATIONSHIP BETWEEN FINANCIAL DEEPENING AND ECONOMIC
GROWTH IN KENYA**

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**A Research Project Presented to the School of Business in Partial Fulfillment of the
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and Investment) of KCA University.**

OCTOBER, 2016

DECLARATION

I declare that this dissertation is my original work and has not been previously published or submitted elsewhere for award of a degree. I also declare that this contains no material written or published by other people except where due reference is made and author duly acknowledged.

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ABSTRACT

Financial deepening has been found to promote economic growth by its ability to mobilize more investments thereby making financial resources readily available, and hence raises productivity. They are found important as they play intermediation role, by channeling funds from surplus units (savers) to deficit units (investors). The aim of this study investigated the relationship between financial deepening and economic growth from 1994 to 2015. The objectives of the study were to determine the relationship between commercial banks liquid liabilities and the economic growth in Kenya, establish the relationship between credit to the private sector by commercial banks and the economic growth in Kenya, establish the relationship between commercial and central banks' asset ratio and the economic growth in Kenya, determine the relationship between commercial bank deposits and the growth of economy in Kenya and to determine the causal linkage between financial deepening and economic growth in Kenya. The research design was a causal and longitudinal research designs. The target population was all the 44 commercial banks in Kenya excluding bank under receivership. Due to the manageability of the population, the researcher did a census study. The study used secondary data collected from published documents of the Kenya Bureau of Statistics and Central Bank of Kenya. The study employed cointegration test to determine the long run relationship between the variables and the study established that there was cointegrating relationship between the financial deepening indicators and economic growth, meaning there was a significant relationship between the financial deepening on economic growth in the long run. The study concluded that financial deepening propels economic growth because the variables of financial deepening were more significant in explaining economic growth, therefore supporting the supply leading hypothesis. The study recommended that the monetary authorities to bridge the gap existing between lending rate and deposit rate, foster a moderate rise in nominal rates and stabilize inflationary pressures, need to sustain a higher level of macroeconomic stability in Kenya, reduce the high incidence of non performing credits ensure that private sector credits are channeled to the real sector of the economy and the monetary authorities should continue with the policy reforms to consolidate the emerging confidence in the financial system.

Key words: Financial Deepening, Economic Growth, Liquid liability, Deposit, Credit, CCBA

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DEDICATION

I dedicate this work to my brothers and sisters, my loving husband and our children

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LIST OF ABBREVIATION AND ACRONYMS

ATM:	Automatic Teller Machine
CBD:	Commercial Bank Deposits
CBK:	Central Bank of Kenya
CCBA:	Commercial-Central Bank Assets
CPS:	Credit to Private Sector
FSDI:	financial sector development index
GDP:	Gross Domestic Product
M2:	Broad Money
MFI:	Microfinance institutions
NIC:	Newly Industrialized Countries
NSE:	Nairobi Securities Exchange
OLS:	Ordinary Least Squares
SACCO:	Savings and Credit cooperative Societies
SACU:	Southern African Customs Union
SAP:	Structural Adjustment Programmes
TSLS:	Two-Stage Least Squares
USA:	United States of America
VAR:	Vector Auto Regressive
VEC:	Vector Error Correction
VECM:	Vector Error Correction Model (

DEFINITION OF OPERATIONAL TERMS

Financial Deepening:	refers to the increased provision of financial services with a wider choice of services geared to all levels of society.
Economic growth:	refers to increase in the output that an economy produces over a period of time, the minimum being two consecutive quarters.
Broad Money:	refers to the measure of the money supply that includes more than just physical money such as currency and coins (also known as narrow money).
Liquid Liability:	refers to those liabilities or debt obligations which a firm has to pay within a year.
Bank Credit:	refers to the aggregate amount of credit available to a person or business from a banking institution.
Bank Deposits:	refers to money placed into banking institutions for safekeeping

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Many countries both developed and developing suffer simultaneously from high rates of inflation, low per capita growth rates and underdeveloped financial sectors. For instance, between the 1960 and 1995, Bolivia' had an average inflation rate of 50% and a paltry per capita growth rate of 0.36% and a financial sector as a share of GDP which was about 5 times smaller than the share of the US financial sector (Syed & Nousheen, 2014). During the same period, Argentina's average inflation rate was 90%, its per capita growth rate 0.62%, and its financial sector as a share of GDP was about 4 times smaller than the share of the US financial sector (Sindani, 2013).

Answers to the questions as to why countries grow, how to achieve long-run growth rate and the causes of steady growth rate have been in existence to many researchers since the emergence of the growth theory (Tigabu, 2009). There is a widespread agreement among economist that prolonged periods of high rates of inflation are caused by weak monetary institutions. In contrast, some economists view a poorly developed financial sector as a result of a weak real economy; others propose that a strong real economy requires a strong financial sector (Levine 2004; Karim, 2010; Al-Jarrah, 2012).

From the foregoing debate, various economic studies have demonstrated the role played by the financial sector in the economy with more focus across various European countries, USA and now the developing countries. Studies have attempted to address whether economic growth enhances the process of financial intermediation. Al-Jarrah *et al* (2012 citing Bagehot, 1873) argued that for rapid industrialization, financial deepening was crucial for England in the 19th century. This marked the genesis of the concept of financial deepening and its importance to the growth of the economies.

1.1.1 Financial Deepening

Financial deepening is defined as the effectiveness of financial institutions in mobilizing savings for the investment purposes. This is due to the fact that growth of domestic savings crucial for diversification of financial claims. As such it is the increased ratio of money supply to Gross Domestic Product (Nzott, 2004). According to Shaw (1973) financial deepening involves specialization in financial functions, organized domestic financial institution and markets gain relation to foreign markets. An increase in monetary system will enhance profitability of other institutions as well.

Financial deepening may promote economic growth by its ability to mobilize more investments thereby lifting returns to financial resources, and hence raises productivity. Financial markets are important as they play intermediation role, by channeling funds from savers to investors (Ghani, 1992). With efficiency and without repression, the outcome of financial deepening is usually a well-developed financial sector with a sustainable economic growth. However, where there is no developed financial deepening also called “financial shallowness” the growth of the economy is not guaranteed (Tigabu, 2009). From the foregoing debate, a competitive and well-developed financial sector must be an important contributor to economic growth.

Well-functioning financial institutions will lead to economic efficiency, expanded liquidity, mobilized savings, capital accumulation and the transfer of resources from non-growth sectors to the more growth-inducing sectors. Besides, financial deepening encourages a competent entrepreneur response in these growth induced economies. Financial deepening has been found to enable the financial intermediaries to effectively perform their functions into productive capital (Ndege, 2012).

Financial deepening is measured in terms of broad money, liabilities of non-bank financial intermediaries, treasury bills, value of shares in stock market and money market

funds. Indicators of financial deepening differ from countries to countries. In Kenya according to Mukundi (2013), some of the indicators of financial deepening include liquid liabilities, private sector credit, market capitalization and value of shares traded and GDP. Different financial markets have different levels of financial deepening as while some have lower financial deepening ratios, others have higher financial deepening ratios.

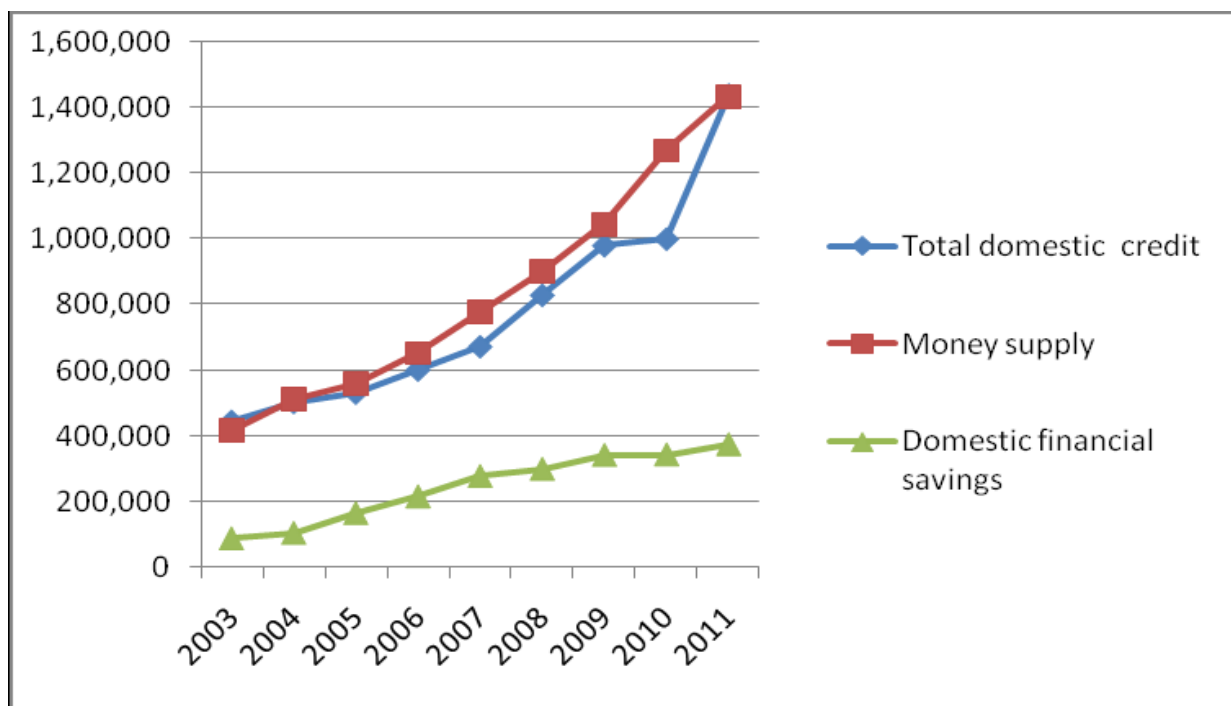
According to Sanusi (2009), financial systems are known globally to play significant role in the economic development of nations. It mobilizes and allocates savings for productive use. Secondly, it provides structures for monetary management and finally, it is the basis for managing liquidity in the system. It has also been found to assist in the reduction of risks faced by firms in their productive processes while at the same time improving the portfolio diversification and the protection of the economy from the globalization and international economic changes (Ardic & Damar, 2006). Economists like Robinson (1952) argue that financial development follows economic growth. Economic development has been found to create demand for unique type of financial arrangements where the financial system will respond automatically to demand. It is simply a bi-product of the growing economy. As put by Robinson, “enterprise first then finance (Robinson, 1952 cited in Levine, 2004). The other schools of thought believe that financial deepening is a consequence, and not a cause, of economic growth. According to this school of thought, economic growth increases the demand for complex financial instruments which will in turn lead to the growth in financial sector. This is what Patrick (1966) referred to demand-following hypothesis as a possible causality between financial deepening and economic growth.

The increasing deepening of the financial system is expected to expand the financial instruments in both the banking subsector and the capital market. Availability of a variety of financial institutions is expected to deepen the financial system. Financial deepening is

measured using ratios of growth rate of broad money (M2) to that of the gross domestic product; Total banking assets to GDP and Gross Savings to GDP. The more deepened the financial system the more expanded the level of output and the rate of growth of output are supposed to be (Levine, 2004).

Figure 1.1 shows financial deepening in Kenya between 2003 and 2011. The figure show that, there was steady growth between in the domestic credit and money supply which imply that as the money supply increased, so did the demand for credit in the domestic market. The figure shows that, over the periods, the savings grew gradually. However, the growth did not match that of money supply and domestic credit.

FIGURE 1
Financial Deepening Measures in Kenya



Source: Andele (2013)

1.1.2 Overview of Economic Growth in Kenya between 1963 - 2014

The Kenyan economy has experienced mixed economic growth with the first decade of independence (1964 –1973) experiencing impressive performance (Andele, 2013). At independence, the commodity prices were generally high. The country enjoyed significant

foreign exchange reserves left by the colonialists after independence which stabilized the economy. The gross domestic product (GDP) grew by 6.6 per cent per year over the period, which compared favourably with some of the newly industrialized countries (NICs) of East Asia. The savings and investment were relatively high for its per capita income. This remarkable performance was attributed to consistency of economic policy, emphasis on the importance of smallholder agricultural farming, high domestic demand and expansion of market for domestic output within the East African region (Magahema, 2015).

While the first ten years of independence in Kenya are sometimes referred to as the "Golden Years", marked with an impressive record of economic growth, the period 1980-1990 is sometimes referred to as the "lost decade" characterized by severe external and internal difficulties and challenges that began in 1973 (Rono, 2002). The imprudent fiscal and monetary management resulted into slow and persistent economic decline. Since the increase of oil prices in 1973, the living conditions of the Kenyan people, as those of most African countries, have moved from bad to worse. In addition to the increase of oil prices the 1970s presented Kenya's economy with challenges and hardships as a result of the world recession that followed the economic crisis of 1970s. These included the fluctuating prices of the country's major exports, drought and famine, high population growth, the collapse of the East African Community and high rates of urbanization, increasing debt, widespread poverty, disease and ignorance (Magahema, 2015). These had a negative impact on the country's economy. The gross domestic product per capita fell to 5.2 per cent over the period, followed by food shortages and declining standards of living.

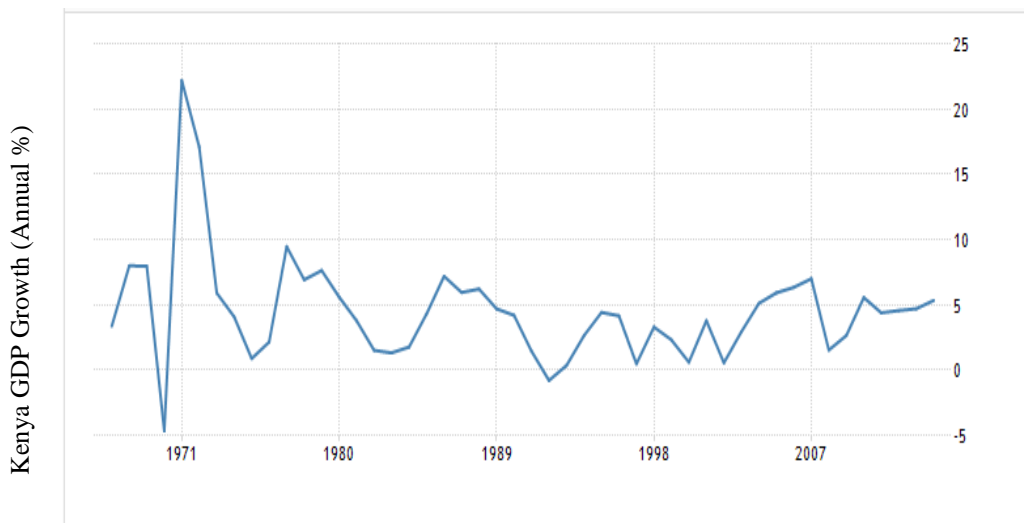
In the third decade, the effects of expansionary fiscal policy of the previous decade. The most notable change in the management of the Kenyan economy was the implementation of the structural adjustment programmes (SAPs) that began to be introduced during the 1980/81 fiscal years. However, SAPs did not become an important part of economic

management until after the publication of the Sessional Paper No. 1 of 1986 (Rono, 2002). Despite the changes in the economic policies, the poor performance of the economy continued. The budget deficits continued to increase, exports and imports fell, and the average real GDP fell to below 4.2% over the period. This downward spiral continued to early 2000. Poor fiscal and monetary policy regime together with the external and internal shocks resulted in the worst economic performance in the short history of independent Kenya. The average real GDP fell to a low of 2.2 percent and 1.4 percent in 1990 and 2002 respectively (Odero, Reeves & Kipyego, 2015).

In the fourth decade, the government of Kenya has continued with its fiscal policy reforms aimed at strengthening the financial sector performance in the country. Recently the CBK executed a financial sector reforms aimed at raising the capital base of financial institutions for effective intermediation and to secure customer savings from loss (M'Amanja and Morrissey, 2005). As a result of the continued reforms, there has been increased growth in the economy in the last decade rising to near 7.0 per cent in 2007 but declined due to the post election violence of 2007/2008. The GDP growth remained robust in 2013 at 5.7% based on rebased statistics and stood at 4.4%, 5.8% and 5.5% in the first three quarters of 2014 compared with 6.4%, 7.2% and 6.2% in comparable quarters of 2013 (Odero, Reeves & Kipyego, 2015). According to the central bank's economic monthly review of November 2014, growth was mainly supported by expansion in construction, manufacturing, finance and insurance, information, communications and technology, and wholesale and retail trade.

FIGURE 2:

Current Kenya GDP Per Capita: 1,358.26 USD



Source: Kenya Bureau of Statistics (2015); Odero, Reeves and Kipyego, 2015

1.1.3 Banking Industry in Kenya

On 30 June 2015, the Kenyan banking sector comprised of 43 commercial banks, 1 mortgage finance company, 6 deposits taking microfinance institutions, 2 credit reference bureaus, 3 representative offices and 124 foreign exchange bureaus (CBK, 2014). In the last two decades (1990-2010), the Kenyan financial sector has undergone tremendous changes. Misati, Njoroge, Kamau and Ouma (2010) for instance, document that financial products have increased, activities and organizational forms have also improved and the overall efficiency of the financial system has increased (CBK, 2010). Commercial banks branch network has grown from 530 in 1999 to 1,102 branches by end of June 2011, ATMs increased from 262 to 2,021, number of deposit accounts from approximately 1million with 16,673 staff to 12.8million with 28,846 staff over the same period (CBK, 2011). Total assets increased from Ksh. 387,371 million in December 1999 to Ksh. 1.9 trillion in June 2011 while customer deposits from Ksh. 235billion to Ksh. 1.4 trillion in June 2011 (CBK, 2013).

The financial sector development in Kenya can be reviewed in three phases (Misati, Njoroge, Kamau and Ouma, 2010). The periods 1970s to early 1980s saw the financial sector

largely dominated by the banking sector and which was characterized by financial repression. The government was the key player in the allocating credit to investments as it utilizing direct instruments of monetary policy which included the interest rate controls, exchange rate controls and allocation of credit to priority sectors among others (Misati et al., 2010). The second phase characterized the Structural Adjustment Programmes and liberalization policies in the late 1980s and early 1990s. This period was characterized by the relaxation of the interest rate, exchange rate and capital accounts controls. The financial sector reforms were meant to trigger narrow interest rates spreads, increase the availability of financial resources through increased savings, to enhance the efficiency in credit allocation and to increase the overall investments.

The third phase is the late 1990s to date and can be classified as the era of financial innovation and emerging financial instruments. This period was characterized by the emergence of new products such as Islamic banking, automatic teller machines (ATMs), the plastic money and electronic-money (e-money) amongst others within the banking sector (Misati et al., 2010).

1.2 Statement of the Problem

Scholars and researchers (e.g. Schumpeter 1911; McKinnon, 1973; Shaw, 1973) have recognized the importance of financial development in productivity and growth enhancing. It has been argued to affect the economic growth by broadening its resource base, raising the capital needed to stimulate investment through savings and credit, and hence boost the overall productivity. Countries including Kenya are therefore formulating policies that are aimed at increasing financial deepening with the aim of improving economic growth. Developed financial system in Kenya include banking, insurance, pension funds, capital markets, Microfinance institutions (MFIs), Savings and Credit cooperative Societies (SACCOs) among others (Uddin, Sjö and Shahbaz, 2013).

However, despite the development in financial deepening, studies on the role of financial deepening on economic growth point towards contrasting results. Studies have shown that financial deepening only leads to economic growth up to a certain level after which it becomes an obstacle to growth. It has also been argued that too much finance may be harmful to the economy (Andele, 2013). In Kenya despite have one of the best developed financial systems, the cost of borrowing is beyond reach for the majority of Kenyans. The banks prefer lending the government than to lending the general publics. Only a few people have access to credit in Kenya which imply that investment is only left for the few (Mukundi, 2013). This raises the question as to the effectiveness of financial deepening economic growth.

Several studies have been done in Kenya on financial deepening. Andele (2013) did a study on the financial deepening and the profitability of commercial banks in Kenya using explanatory research to target commercial banks. He found that financial deepening affects bank profitability positively. In another study, Mukundi (2013) looked at the relationship between financial deepening and growth in GDP of listed firms at Nairobi Securities Exchange (NSE) using time series regression analysis between 1993 to 2012. He found that economy would still grow at 6.18% regardless of market capitalization, liquid liabilities and private credit from banks and stock turnover. Muli (2008) exploring the causal link between the level of financial development and economic growth between 1967 to 2006 found causality between financial deepening and economic growth, however, he fell short of explaining the nature of the relationship.

While these studies highlighted the relationship between financial deepening and economic growth, they were either focused in particular sectors of the economy or employed different methods. For instance, the studies were done on profitability of banks only and not the entire economy. Secondly, they were limited to banks listed at the NSE and not the entire

banking sector. Thirdly, the periods under study by Muli (2008) is a long time and many developments have taken place which calls for a more current study, hence research gaps. This study therefore sought to determine the relationship between financial deepening and economic growth in Kenya from 1990 to 2015 to fill in the gaps.

1.3 Objectives of the Study

1.3.1 General Objective

The general objective of the study was to model the relationship between financial deepening and economic growth in Kenya.

1.3.2 Specific Objectives

1. To determine the relationship between commercial banks liquid liabilities and the economic growth in Kenya.
2. To establish the relationship between credit to the private sector by commercial banks and the economic growth in Kenya.
3. To establish the relationship between commercial and central banks' asset ratio and the economic growth in Kenya.
4. To determine the relationship between commercial bank deposits and the growth of economic in Kenya.
5. Determine the causal linkage between financial deepening and economic growth in Kenya.

1.4 Research Questions

1. What is the relationship between commercial banks liquid liabilities and the economic growth in Kenya?
2. What is the relationship between credit to the private sector by commercial banks and the economic growth in Kenya?

3. What is the relationship between commercial and central banks' asset ratio and the economic growth in Kenya?
4. What is the relationship between commercial bank deposits and the growth of economy in Kenya?
5. What is the causal linkage between financial deepening and economic growth in Kenya?

1.5 Significance of the Study

This study could be of significance to commercial bank managers to be able to understand the importance of financial deepening. To the regulators like CBK, the study will help in formulating policies that promote financial sector deepening and ensure continued growth of financial sector in Kenya and even beyond.

The findings could also be important to investors when making their investment decisions on how best to construct investment portfolios within the banking industry. The study will add to the existing literature on the subject of financial deepening and economic growth. It will assist researchers who want to carry out further studies in the area of financial deepening and economic growth.

1.6 Scope of the Study

The scope of this study was limited to the secondary data from the Central Banks of Kenya and the Kenya Bureau of Statistics. The GDP which was the measure of economic growth was done annually for the periods between 1990 and 2015.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter provides the literature review of this study. The chapter discusses four theories behind the relationship between financial deepening and economic growth. These theories are: Supply Leading Hypothesis; Demand Following Hypothesis; Bidirectional Causality Hypothesis and The Independent Hypothesis. Further, the chapter discusses past empirical studies concerning the relationship between financial deepening and economic growth.

2.2 Theoretical Review

Four theories are used as the base of this study to explain the connection between financial deepening and economic growth. The theories include Supply Leading Hypothesis, the demand-following hypothesis the bi-directional causality hypothesis and the neo-classical growth theory. The theories are discussed below.

2.2.1 Supply Leading Hypothesis

This theory was authored by Schumpeter (1911) and later adopted by scholars such as McKinnon (1973); Shaw (1973); Gupta (1984); Fry (1988); Greenwood and Jovanovich (1990) and Bencivenga and Smith (1991). This theory postulates that financial development in any country causes economic growth. In an economy with no friction in the transaction, information and monitoring costs, no financial intermediaries are needed. According to the theory, if transaction, information and monitoring costs are sufficiently high, then, no exchange among economic agents is necessary. These desires led to the emergence of financial institutions and markets that make up the financial sector.

According to this theory, a well-developed financial sector will ensure reduced transaction, information and monitoring costs thereby increasing the efficiency of

intermediation. The theory postulates that a well-developed financial intermediary facilitates the development of the economy through mobilization of savings, facilitation of trading and the diversification of risks among others. These important services lead to efficient allocation of resources; a more rapid accumulation of physical and human capital; and a faster technological innovation which eventually leads to a faster and long-term economic growth (Schumpeter, 1911). This theory fits this study since it provides one of the possible explanations of how development in the financial sector affects economic growth. This relationship is the core of this study.

2.2.2 Demand Following Hypothesis

Moving away from the neo-classical state equilibrium analysis, to a highly developed financial system, consisting of financial intermediaries, leads to a ‘demand following’ phenomena (Patrick, 1960). Under this, in response to the demand from real economy, there is the development of modern financial institutions, their financial assets and liabilities, and related financial services. This model postulates that the developments of the real economy will in itself induce increase in demand for financial services. The increase demand for financial services will spontaneously generate or lead to the introduction of new financial institutions and markets which will satisfy that increased demand for financial services. This Theory is important to this study as it provides a different view that the developments in financial deepening does not necessarily lead to economic growth. It also provides an alternative explanation suggesting that economic growth drives deepening of the financial sector.

The evolutionary development of the financial system is a continuous result of the pervasive, widespread process of economic development. The financial system is influenced by economic environment, institutional framework and also by individual motivations, attitudes, tastes and preferences. The demand for financial services is a function of growth of

real output, commercialization, monetization of agriculture and other traditional subsistence sectors. The faster the growth in real national income, the greater will be the demand for external funds by enterprises.

According to this theory, financial intermediation therefore plays a vital role, as internal funds generated are not sufficient for firms to finance expansion. The theory is thus applicable in this study since it postulates that finance intermediaries are important but only as a passive and permissive to growth process.

2.2.3 Bidirectional Causality Hypothesis

The model first developed by Greenwood and Jovanovic (1990), got support from Saint-Paul (1992); Berthelemy and Varoudakis (1996); and Harrison, Sussman and Zeira, (1999). The bi-directional causality hypothesis marries the supply-leading and demand following hypotheses. According to this model, financial deepening and economic growth are mutually or bi-directionally causal. Financial deepening gradually induces economic growth and this, in turn, causes feedback and induces further financial deepening. This theory is important to this study since it points the relationship that exists between the financial deepening and economic growth. However, it suggests that the two variables affect each other simultaneously.

2.2.4 Neo Classical Growth Theory

The model of Solow (1956) and Swan (1956) has been the backbone of economic growth theories in the recent past. The Solow-Swan growth model as it is sometimes called, predicts that in steady-state equilibrium the level of per capita income is a function of prevailing technology, the rates of saving, population growth, and technical progress, all assumed to be exogenous. Since these rates differ across countries, the Solow-Swan model yields different predictions about how differing saving rates and population growth rates might affect different countries' per capita income. Other held constant, countries with higher saving rates

tend to have higher levels of per capita income and vice versa. Recently, the Solow-Swan model has been substituted with “endogenous growth” models which assume constant or increasing returns to capital. This is because the standard neoclassical model has been accused of failing to explain observed differences in per capita income across countries.

The difference in the two growth models have in the recent years sparked empirical review. A major concern of this work has been whether one should see a long-run tendency toward convergence of per capita income levels across countries. The empirical evidence against unconditional convergence is in tandem with the implications of the neoclassical growth model. Mankiw, Romer, and Weil (1992) contend that using a cross-sectional approach, the Solow-Swan model’s predictions are consistent with the empirical evidence. However, human capital is not accounted for in the model, the quantitative implications of different saving and population growth rates are biased, since human capital is positively correlated with both saving and population growth.

Solow’s model takes the rate of savings, population growth and technological progress as exogenous. There are two input, capital and labour which are paid their marginal products. Assuming a Cobb Douglas production function, production at time t is given by:

$$Y(t) = K(t)^{\alpha} (A(t) L(t))^{\beta} \quad \alpha < 1, \beta < 1$$

Y= Output, K= Capital, L= Labour, A= Level of technology.

2.3 Empirical Review

2.3.1 Liquid Liabilities and Economic Development

This is an indicator of the size of the banking system, measured in terms of the size of the financial intermediaries relative to the size of the economy. It is also referred to as the measure of financial deepening. This ratio is used to measure the degree of monetization in

the economy in relation to the depth of the banking sector. It also shows an expansion of payments and saving functions. This ratio is used to determine the ability of the banking system to increase lending. The liquid liabilities ratio is represented as $M2 -$ which also means broad money supplied (currency plus demand and interest bearing liabilities of banks and non-bank financial intermediaries) divided by GDP.

The higher the liquid liabilities ratio the larger banking sector that is the size of the banking system is positively related to the provision of financial services which leads to growth (World Bank, 2004). Therefore, a positive relationship is expected between liquid liabilities ratio and growth in economy. Studies by Agu and Chukwu (2008); Aslam (2008); and Aziakpono (2008) have confirmed that there exists a positive relationship between liquids liabilities ratio and economic growth.

In another study conducted by Caporale, Rault, Sova, and Sova, (2009) to establish the relationship between financial development and economic growth in ten new European Union countries using panel data between 1994-2007 found that stock and credit markets in these countries were still underdeveloped and therefore their contribution to economic growth was limited due a lack of financial depth. The Granger causality test proved that financial development affected economic growth as causality ran from financial development to economic growth. It was therefore evident that from the study there was a positive relationship between financial depth and economic growth.

Moshabesha (2010) undertook a study to determine the relationship between financial deepening and growth in Southern African Customs Union (SACU) countries of Botswana, Lesotho, South Africa and Swaziland between 1976 and 2008. The independent variable included the ratio of credit to the private sector provided by commercial banks and the ratio of liquid liabilities of commercial banks to GDP. The dependent variable, economic growth was measured by growth in manufacturing. The results revealed a very weak and

insignificant relationship between manufacturing growth and Financial Deepening across the four countries.

In another study by Kargbo and Adamu (2010) examined the relationship between financial development and economic growth in Sierra Leone between 1970 -2008. The researchers employed financial sector development index (FSDI) to proxy development in the financial sector. They found a unique cointegrating relationship between real GDP and financial development. The results revealed that financial development posted a positive and statistically significant effect on economic growth. There was therefore a positive and significant relationship between financial deepening and economic growth.

King and Levine (1993) use the ratio of liquid liabilities of the financial system to GDP, which they termed liquid liability; ratio of deposit money bank domestic assets to deposit money bank domestic assets and central bank domestic assets termed bank. The ratio of claims on the non-financial private sector to total domestic credit termed private and ratio of claims on the nonfinancial private sector to GDP termed privy. According to the study, liquid liability represents the depth or size of the financial intermediaries and depicts their ability to provide financial services. Bank is rather controversial. This they attributed to the fact that banks are not the only institutions that provide risk management and other related services, thus the distinction between deposit money banks and central banks is not very clear. Moreover, the variable does not measure the user of the fund that the banks lend to their customers. However, they are of the opinion that it could complement liquid liability.

From the foregoing studies, the relationship between liquid liabilities and economic growth is not guaranteed but dependent upon context. There is little to link the relationship between liquid liabilities and economic growth in Kenya. This study will fill up this gap.

2.3.2 Private Sector Credit and Gross Domestic Product

According to the World Bank (2009), private sector credit is the most comprehensive indicator of the activities of commercial banks and it is calculated as the amount of domestic credit allocated to the private sector by the banking sector divided by GDP. It is the measure of the extent to which the banking sector finances the economy and private investments and private sector development for that matter. This ratio highlights the banking system size and its importance to the private sector of an economy. Domestic credit includes financial resources, purchased of non-equity securities, trade credits and other accounts receivables. The domestic credits also exclude credit extended to government and public enterprises (Beck and Levine, 2004). This measure of banking sector is important to the economic growth through poverty reduction, financing production, consumption, and capital formation (World Bank, 2008). According to Becks, Levin, Loayza (2008), this proxy is of more importance than other measures of financial intermediaries' development due to the fact that the credit to public sector is excluded and therefore a better reflection of the extent of efficient resources allocation.

One concern with data on credit to the private sector is that high levels of credit may be an indication of excess borrowing and of suboptimal allocation of credit. Especially since 2008, it is undeniable that rapid private credit build-up, caused by financial system deregulation and privatization, can have a negative impact on economic growth. Additionally, Arcand *et al.* (2013) shows that bailouts can cause the financial sector to increase beyond the socially optimum level. As such, there are limitations to the extent to which financial deepening is beneficial to growth. This has also been recognized by previous literature, such as Reinhart and Rogoff (2009); Kindleberger and Aliber (2005); and Minsky (1986). Arcand *et al.* (2012) find that financial deepening is negatively related to economic growth when the ratio of credit to GDP reaches (roughly) 100%.

Akpansung and Babalola (2010) in their study examined the relationship between the banking sector credit and economic growth in Nigeria between periods 1970-2008 with the objective of establishing the causal links between banking sector credit and economic growth using Granger causality test. They used a Two-Stage Least Squares (TSLS) in their analysis in which the Granger causality test showed unidirectional causal relationship from GDP to private sector credit. The results revealed that the private sector credit impacts positively on economic growth.

In another study Adamopoulos (2010) investigated the relationship between credit market development and economic growth for Spain during the period 1976-2007. This study aimed to investigate the short-run and the long-run relationship between bank lending, gross domestic product and inflation rate applying the Johansen cointegration analysis. Using the Vector Error Correction Model (VECM) to analyze the data, the study established that a short-run 1% increase in economic growth will result into a 0.08% increase in bank lending. From the findings, economic growth had a positive effect on credit market development.

Ayadi, Ben-Naceur, and De Groen (2013) did a study to establish the relationship between financial sector development and economic growth in northern and southern Mediterranean countries between 1985 and 2009. The results indicated that credit to the private sector and bank deposits were negatively associated with growth.

These studies indicate that the relationship between credit market development and economic growth is also highly contextual. While the study by Akpansung and Babalola (2010) and by Ayadi, Ben-Naceur, and De Groen (2013) show a negative relationship the study by Adamopoulos (2010) shows a positive relationship. The findings, therefore, makes it difficult to determine what kind of relationship exists between credit market development and economic growth in Kenya. This study will fill this research gap.

2.3.3 Commercial Bank Deposits and Economic Growth

The relationship between savings and economic growth is also investigated in the literature (Alguacil *et al.*, 2004). Solow's growth model (1956) shows the relationship between savings and economic growth. Alguacil *et al.* (2004) is noted that this model states higher savings help to contribute to the growth of the economy. Countries should create their policies to encourage savings in order to increase income. In addition, Alguacil *et al.* (2004) state that higher saving level causes capital accumulation and capital accumulation increases GDP. In their study, they use yearly figures for Mexico for 1970-2000 and granger causality tests are carried out to see the relationship between savings and growth. Empirical results of their study support the Solow's growth model (1956) that higher saving rates contributes to the economic growth that means there is a causal relationship from savings to growth in the Mexico's economy.

On the other hand, Katircioglu and Naraliyeva (2006) find that savings and growth are positively correlated and there is unidirectional causation that runs from savings to growth in the case of Kazakhstan. Odhiambo (2009) explains the importance of savings for economic growth and states that when there is an increase in savings, domestic investment grows and growth in domestic investment leads to increases in real income especially in the developing countries. Moreover, savings have very important role for growth in the developing countries where the supply of loanable funds is in short of demand. In other words, excess of demand for loanable funds means higher savings, higher domestic investment, and an increase in real income (Hubbard, 2008). Odhiambo (2009) finds bidirectional causality between domestic savings and real income growth in the case of South Africa. Bairamli and Kostoglou (2010) highlight that DS helps to increase the production in the country by domestic sources.

Bacha developed a macroeconomic model, and DeGregorio examined a panel of 12 Latin American countries during the period 1950-1985, both using OLS. A few years later

Jappelli and Pagano (1994) find that the higher the domestic saving rate, the higher economic growth. In their analysis they prove that household liquidity constraints raise the saving rate. This increase in the saving rate leads to an increase in the economic growth rate. Their sample consists of 22 OECD countries from 1960 to 1987. In that same year, Carroll and Weil (1994) present a paper in which they find that growth Granger causes saving, but not vice versa. They used data of 64 countries at the aggregate level and the effect of growth on saving is positive. Using data at the aggregate level was a reason for Attanasio, Picci and Scorcy (2000) to question the results of Carroll and Weil. Attanasio *et al.* (2000) show that the findings of Carroll and Weil are not robust and the effects found are often weak. Moreover, when moving from the five-year averages that Carroll and Weil use to annual data, significance and causation of the estimates often changes. Using annual data also leads to more precision and robustness of the estimates. In their own analysis, Attanasio *et al.* (2000) concludes that lagged saving rates are positively related to investment rates. These investment rates negatively Granger-cause growth rates. Granger-causation from growth to saving was not found by Attanasio *et al.* (2000).

Kriekhaus (2002) conducted a study to see whether there is a link between public saving and economic growth in developing countries. He used a sample of 32 countries during the period 1960-1980 and included a case study of Brazil in his research. He found evidence that suggests that more public saving leads to higher economic growth. An increase in public sector savings affects national saving and national investment, which ultimately leads to economic growth (Kriekhaus, 2002). Governments can mobilize and allocate resources to efficient industrial sectors to stimulate growth. Mason (1988) draws a similar conclusion that a higher saving rate is important for developing countries. For those countries it might be harder and undesirable to attract foreign capital, as they do not want to increase their foreign debt in the light of possible international debt crises. Again, a higher saving rate

leads to a higher investment rate, which increases the growth rate. Aghion *et al.* (2009) found that in developing countries the saving rate has a positive effect on economic growth. However, in developed countries no effect was found.

Sinha (2000) has conducted a series of empirical studies in developing countries, with the most common result that economic growth Granger-causes saving growth. This result holds in Pakistan (1998) and the Philippines (2000). Sinha and Sinha found this result in Mexico (1998) and India (2007) as well. However, the same research performed on Sri Lanka concludes that saving growth Granger-causes economic growth (Sinha, 1999). Mavrotas and Kelly (2001) also investigated India and Sri Lanka. They found no causality between income growth and private saving in India, but found bi-directional causality in Sri Lanka. Their results differ from the Sinha (1999), and Sinha and Sinha (2007) research. This may be the result of the different method that Mavrotas and Kelly used, namely the Toda and Yamamoto method, which can be seen as an augmented Granger causality test.

Saltz (1999) used a different approach while studying the causality issue. With the use of a Vector Error Correction (VEC) model and a Vector Auto Regressive (VAR) model, Saltz found that for most countries in his sample (nine out of seventeen) causality ran from economic growth rate to growth rate of saving. However, for two countries the opposite result was identified, for four countries no causality was detected, and in the remaining two countries bi-directional causality was found. Saltz argued that higher per capita income leads to both higher consumption and higher saving rates.

Baharumshah *et al.* (2003) used a VEC model to investigate the behavior of the saving rate in five Asian countries. Based on data from 1960 until 1997, only in one country the saving rate Granger-causes the economic growth rate. The same model was used by Anoruo and Ahmad (2001), who investigated the causality in seven African countries. In four of these countries, the direction goes from economic growth to domestic saving growth rate.

In Congo the opposite result was found: the domestic saving growth rate Granger caused economic growth. In Cote d'Ivoire and South Africa a bi-directional causality was found. A study performed by Katircioglu and Nartaliyeva (2006) found that domestic saving Granger-causes economic growth in Kazakhstan during the period 1993-2002.

2.3.4 Commercial-Central Bank Assets Ratio and Economic Growth

Commercial-Central Bank Assets (CCBA) is the ratio of commercial bank assets to commercial plus central bank assets. King and Levine (1993) took account of the central banks along with the commercial banks in the measurement of financial sector indicators and assessed the extent to which commercial banks channel savings into investment, monitor firms, influence corporate governance and undertake risk management, relative to the central bank (Huang, 2005). Commercial banks are expected to be more efficient and effective in allocating the savings in productive and profitable projects compared to central banks.

Commercial Bank Deposits (CBD) is the ratio of commercial banks deposits to nominal GDP that shows the liquidity of the banking sector (Levine and Zervos, 1998) as quoted by Waiyaki (2013). 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).

2.4 Summary of Literature Review

The reviewed literature highlighted the relationship that exists between the financial deepening and the economic growth. Caporale et al, (2009) found a positive relationship between financial deepening and economic growth in ten countries among the European Union members. Saltz (1999) found that for most countries in his study causality ran from economic growth rate to growth rate of saving.

Ayadi, Ben-Naceur, and De Groen (2013) established that the credit to the private sector and bank deposits were negatively associated with growth. While these studies highlighted the effect of financial deepening on the economic growth, most of these studies were done in the developed countries.

In Kenya Andele (2013) did a study on the financial deepening and the profitability of commercial banks in Kenya where he found that financial deepening affect bank profitability positively? Another study was by Mukundi (2013) who looked at the relationship between financial deepening and growth in GDP of listed firms at Nairobi Securities Exchange (NSE).

A study by Ambunya (2003) traced the impact of financial liberalization on financial deepening and growth through the increment in credit channel to the private sector following financial deregulation. In another study in Kenya Muli (2008) empirically explored the causal link between the level of financial development and economic growth in Kenya for the period 1967 to 2006. However, these studies fall short of linking financial deepening to the economic growth, hence motivation for this study.

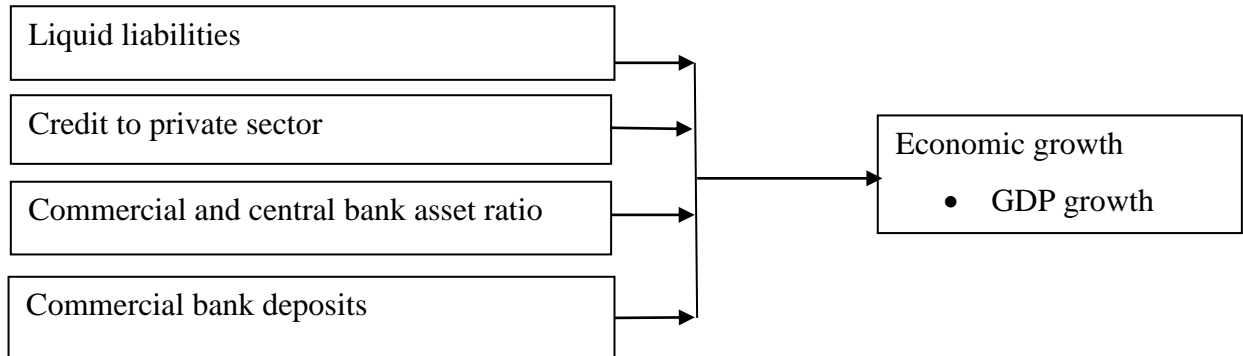
2.5 Conceptual Framework

The following is the conceptual framework of the study showing the relationship of variables

FIGURE 3:

Conceptual Framework

Relationship between variables



Source: Researcher (2016)

This study is based on the concept that financial deepening has a causal effect on the economic performance. The financial deepening is measured in terms of liquid liability, credit to private sector, CBBA ratio and savings deposit while the economic growth is measured by the rate of GDP.

2.6 Operationalization of the Variables

Variable	Description	Measurement
Bank liquid liability (BLL)	Is the measure of the size of financial intermediaries which is including measure of foreign reserves and other large demand deposits and monetary deposits referred to as M3.	$\left(\frac{\text{Total Annual Liquid Liabilities}}{\text{Gross Domestic Product}} \right)$
Credit to private sector (CPS)	Refers to the level of financial services and is employed to measure all private resources used to finance the private sector i.e it captures the channeling of funds from savers to investors in the private sector.	$\left(\frac{\text{National Annual Private Credit}}{\text{Gross Domestic Product}} \right)$
Commercial and central bank asset ratio (CCBA)	Is the comparison between commercial bank and central bank assets	$\left(\frac{\text{Total Annual CCBA Ratio}}{\text{Gross Domestic Product}} \right)$
Commercial bank deposits (CBD)	It is the ratio of commercial banks deposits to nominal GDP that shows the liquidity of the banking sector.	$\left(\frac{\text{Total Annual Savings}}{\text{Gross Domestic Product}} \right)$
Economic growth (EG)	Is the increase in the inflation-adjusted market value of the goods and services produced by an economy over time	$EG_t = \left(\frac{GDP_t - GDP_{t-1}}{GDP_{t-1}} \right)$

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter presents the methodology that will be used to conduct the study. It specifies the research design, what the target population will be, how data will be collected and the method of analysis.

3.2 Research Design

The study adopted a causal and longitudinal research designs. The researcher sought to determine the causal relationship between financial deepening and economic growth. According to Cooper and Schindler (2003) causal research design is the investigation of cause-and-effect relationships between variable under study. The design is used in preliminary and exploratory studies to allow researchers to gather information, summarize, present and interpret for the purpose of clarification. This design is also useful because it secures evidence showing the relationship between the variables under study. Longitudinal research design is concerned with multiple observations over time (Cooper & Schindler, 2003). The fact that this study involved studying data over a given period of time, the design fits the study. This study sought to determine the relationship between financial deepening and economic growth in Kenya with major focus on the commercial banks in Kenya.

3.3 Population and Sampling

The population of the study was all the 44 commercial banks in Kenya with the exclusion criteria where commercial bank under receivership was not be included, therefore 41 banks were studied (see Appendix iii). Due to the manageability of the population size the study was a census study.

3.4 Data Collection

Secondary data was used for the study. The data regarding economic growth which was measured in terms of GDP values was collected from the Kenya National Bureau of Statistics. The data regarding the annual values of liquid liabilities, national annual private credit and the commercial-central bank asset ratio and the savings and deposit was obtained from the Central Bank of Kenya. The focus was since 1990 when the government liberalized the financial sector to 2015. The data required was the GDP adjusted for inflation growth rate; the aggregate annual values of liquid liabilities; aggregate annual private credit, annual commercial-central bank's asset ratio and aggregate annual savings deposit (see appendix II) for data collection worksheet.

3.5 Data Analysis Procedures

The study used econometric models in establishing the relationship between the two variables. This was done using tests as Johansen cointegration test, Granger causality test and Vector Autoregressive model was done using STATA as the statistical software.

3.5.1 Descriptive Analysis

This was done to test the distribution of the data, whether the data fits normal distribution or not. This was done by performing various tests described below:

(i) Correlation Matrix

This is to help identify if there are any two variable with high correlation. This is done using the following tests

(ii) Ordinary Least Square Test

The researcher did a regression analysis to test the relationship between the variables (financial deepening and economic growth. The regression model taking the form below:

$$EG = \alpha + \beta_1(LL) + \beta_2(CPS) + \beta_3(CCBA) + \beta_4(CBD) + e \dots\dots\dots (1)$$

EG = GDP Growth Rate per annum

LL= Liquid Liabilities

CPS= Credit to Private Sector

CCBA= Commercial and Central Bank Assets

CBD= Commercial Bank Deposit

α = the constant i.e. it is the GDP growth rate that does not depend on LL, CPS, CCBA and CPS

β_i = The sensitivity of GDP growth rate to the independent variable β_i

e = the error term.

Residual Analysis

Durbin-Watson test was used to detect the presence or otherwise of autocorrelation. This occurs when the residuals are not independent from each other. Autocorrelation inflates t-statistics by underestimating the standard errors of the coefficients (Gujarati (2003). Normality error term was tested using histogram and a fitted normal curve. The null hypothesis is that the error terms are normally distributed. White test was used to test for heteroskedasticity which occurs when error variance is not homogeneous. The null hypothesis states that there is no heteroskedasticity and primarily check for independence of residual using residual vs. fitted plots. If the assumption is violated then the study was used time series analysis using the following procedure:

3.5.2 Time Series Analysis

A time series is a sequence of observations. The observations can generally be taken through any dimension, but are usually taken in terms of equally spaced time intervals. The study used the following analysis to achieve the objective of the study.

1. Preliminary tests

(i) Test for Stationarity

Non-stationary test leads to false results where the test statistics exhibit a significant relationship between variables even when no such relationship exists. Therefore performing a stationarity test is important to correct this anomaly which is always assumed to exist in the time-series data. In order to solve the problem of non stationarity the Augmented Dickey Fuller (ADF) (1979) test was used. The formula for ADF is given by:

$$\Delta y_t = \alpha + \beta y_{t-1} + \sum_{j=1}^k \lambda_j \Delta y_{t-j} + e_t \dots \dots \dots (2)$$

Where Δ is the difference operator, y_t is the series being tested, k is the number of lag differences and e_t is the error term. Δy_t Is the change in series under consideration with respect to the time period t , α is the constant term, β is the vector of coefficient on y_{t-1} , λ_j is the lag, Δy_{t-j} are the lagged changes. We test the null hypothesis $H_0 : \beta = 0$ which implies that y_t is non-stationary.

(ii) Choosing Lag Length

Vector autoregressive (VAR) models are widely used in forecasting and in analysis of the effects of structural shocks. A critical element in the specification of VAR models is the determination of the lag length of the VAR. Most VAR models are estimated using symmetric lags, i.e. the same lag length is used for all variables in all equations of the model. This lag length is frequently selected using an explicit statistical criterion such as the Schwarz Information Criterion (SIC), Bayesian Information Criterion (BIC) and the Akaike Information Criterion (AIC) (Keating, 1995). The researcher determined Lag lengths by evaluating Schwarz Information Criterion (SIC) given as:

$$SIC = \ln \left| \sim \sum \right| + \frac{\ln T}{T} (\text{Number of freely estimated parameters})$$

Where

$\sim \Sigma$ = estimated covariance matrix and

T = number of observations.

(iii) Cointegration Test

The cointegrating test is used to determine the long-run relationship between two variables (Hwang, 1998). This is done by integrating the results of the unit root test to same order using Johansen's procedure to determine whether there exists a cointegrating vector among the variables (Johansen, 1988). However, if the series are not integrated to order one, it's not possible to test causality using the cointegration test, (Aydemir and Demirhan, 2009). Therefore, in such a case the Toda-Yomamoto (1995) method is used in establishing the causal relationship between series. The integrating property of the series is not important in the TY method as long as the order of integration is clearly specified. Therefore causal relationship can be established between series which are integrated with different orders. Using Johansen test methodology, the cointegration test was based on the following equations:

$$EG_t = \beta FD_t + e_t \dots \dots \dots (3)$$

Where FD_t the financial deepening at time period t, β is the vector coefficient of financial deepening at time period t, EG is the GDP and e_t is the error term. The two variables are cointegrated if the error term I is stationary. The ADF test was used to check stationarity of the residual series.

(iv) Granger Causality Test

After obtaining cointegration test results, we apply a Granger causality test. Granger (1988) implies that if two time-series variables are cointegrated, then at least one-directional Granger causation exists. The Granger Causality test determines the causal relationship between the

financial deepening and the economic growth. In the absence of any cointegrating relationship between the variables, the standard Granger Causality test (Granger, 1988) is used. The granger method seeks to explain how much of a variable X (say financial deepening) can be explained by its own past values and whether adding lagged values of another variable Y (say economic growth) can explain better. It involved estimation of the following equations:

$$EG_t = \sum_{i=1}^n \alpha_i FD_{t-i} + \sum_{j=1}^n \beta_j EG_{t-j} + e_1 \dots\dots\dots (4)$$

$$FD_t = \sum_{i=1}^m \lambda_i FD_{t-i} + \sum_{j=1}^m \delta_j EG_{t-j} + e_2 \dots\dots\dots (5)$$

Where the joint hypothesis of F-test based on Wald statistics for each equation are

$$M_0 = M_1 = M_2 \dots\dots\dots M_i \dots\dots\dots (6)$$

Where EG_t is the economic growth and FD_t is the financial deepening at time period t, e is the error term. The error terms are assumed to be uncorrelated. Equation one implies that current EG is related to past FD and EG values. The second equation implies that the current FD is related to past FD and EG values. The null hypothesis for equation one is: $H_0: \beta_j = 0$, which implies there is no causation from EG to FD. The null hypothesis for the second equation $H_0: \delta_j = 0$, implying no causation from FD to EG. From the equations, we analyzed the presence of unilateral causality from EG and FD or from FD to EG, presence of bilateral causality or whether FD and EG are independent of each other. The Granger causality test is sensitive to the lag length used in the equations.

2. Model Specification

(i) Vector Auto Regression Model

If there is no cointegrating relationship between non-stationary variables, we worked with vector autoregressive model (VAR). For applying VAR model the first difference should be taken for making the variables stationary (Toda, H. Y. and T. Yamamoto 1995). To estimate this model it is necessary to identify the order, which implies the optimal lag length of variables. The order of VAR for each pair is selected by using the relevant information criterion (Akaike information criterion or Schwarz criterion). The estimated VAR model in our analysis is:

$$EG_t = \alpha + \beta_1 FD_{t-1} + \beta_2 FD_{t-2} + \dots + \beta_p FD_{t-p} + \beta_2 EG_{t-1} + \beta_2 EG_{t-2} + \dots + \beta_p EG_{t-p} + e_t \dots \dots \dots (7)$$

$$FD_t = \alpha + \beta_1 FD_{t-1} + \beta_2 FD_{t-2} + \dots + \beta_p FD_{t-p} + \beta_2 EG_{t-1} + \beta_2 EG_{t-2} + \dots + \beta_p EG_{t-p} + e_t \dots \dots \dots (8)$$

Where p is the order of the VAR, α is the constant term, e is an error term, FD denotes proxy of financial development and EG denotes economic growth. The model above explains pair-wise relationship of economic growth and the four proxies of financial development.

Vector Error Correction Model (VECM)

If there is cointegration between series then there exists a long-term equilibrium relationship between them so we apply VECM in order to evaluate the short run properties of the cointegrated series (Engle and Granger, 1987). The regression equation form for VECM is as follows:

$$\Delta Y_t = \alpha_1 + p_1 e_1 + \sum_{i=0}^n \beta_i \Delta Y_{t-i} + \sum_{i=0}^n \delta_i \Delta X_{t-i} + \sum_{i=0}^n \gamma_i \Delta Z_{t-i} \dots \dots \dots (9)$$

$$\Delta X_t = \alpha_2 + p_2 e_{i-1} + \sum_{i=0}^n \beta_i \Delta Y_{t-i} + \sum_{i=0}^n \delta_i \Delta X_{t-i} + \sum_{i=0}^n \gamma_i \Delta Z_{t-i} \dots \dots \dots (10)$$

The cointegration rank indicates the number of cointegrating vectors. That is, a rank of two shows two linearly independent combinations of the non-stationary variables will be

stationary. A negative and significant coefficient indicates that any short-term fluctuations between the independent variables and the dependent variable led to a stable long run relationship between the variables. The results from VECM model was discussed using impulse response function and variance decomposition.

CHAPTER FOUR

DATA ANALYSIS AND FINDINGS

4.1 Introduction

In this chapter, the focus is on the presentation of data and interpretation of the findings. The tools adopted for this study included descriptive statistics, the root test for stationarity using Dickey and Fuller, this was then followed by Johansen cointegration test that tests the long run relationships between variables. Post estimation tests of Impulse response were performed to establish the length that effects will last. Granger causality test was carried out to determine whether there exist any causal relationships between the variables under study. Residual autocorrelation test was carried out to find the goodness of the fitted vector error correction model.

4.2 Exploration of the Data

4.2.1 Trend Analysis

The study performed trend analysis to establish the behavior of the variables across the study period. This was done through the line graph plots presented in Figure 6 in Appendix 2. The results show that there was a steady rise in the GDP across the years from 1990 to 2015. The study findings show that between the years, the credit to the private sector showed fluctuations same as the deposits. The study findings however show that the liquid liabilities and CCBA depicted increase in the initial years before a decline.

4.2.2 Descriptive Statistics

Table 1 shows that the skewness coefficients for GDP, deposit, credit, liquidity and CCBA are respectively (0.8441), (0.1713), (0.4789), (0.0030) and (0.0004) indicating that the distribution of deposits, liquidity and CCBA are symmetrical around the mean and thus close to normal distribution. On the other hand, GDP and credit have skewness coefficients far greater than zero (0.8441) and (0.4789) respectively implying that they may not be symmetrical around the mean and thus deviating from normal distribution. The positive skewness coefficient of all the variables indicates that their distribution is slightly right skewed. GDP, deposit, credit, liquidity and CCBA's coefficients of kurtosis are respectively (0.0000) (0.1272) (0.0297) (0.7658) and (0.3001) and therefore less than 3. This means that they are flatter than a normal distribution with a wider peak. Therefore, based on the Kurtosis, none of the variables exhibit a normal distribution.

From the histograms in the appendix 1, Figure 3 shows that in the distribution of GDP, deposit and credit variables tend to have a normal distribution whereas liquidity and CCBA appears to be slightly skewed to the right. Although the descriptive statistic in table 1 indicates the data has a significant deviation from the normal distribution, our visual inspection of the data and given the size of our data indicate that this may not cause many problems to our analysis.

TABLE 1:
Descriptive Statistics for Study Variables

Variable	GDP	Deposits	Credit	Liquidity	CCBA
Mean	5.140769	.3082692	.2534615	.000949	.0001102
Std. Dev.	.9362102	.0753741	.0694201	.0012236	.000154
Min	3.71	.19	.14	7.50e-06	8.16e-07
Max	6.73	.53	.39	.0042158	.0005336
Skewness	0.8441	0.1713	0.4789	0.0030	0.0004
Kurtosis	0.0000	0.1272	0.0297	0.7658	0.3001

4.2.3 Correlation

Correlation ranges between -1 and +1 and quantifies the direction and strength of the linear association between the two variables. A correlation above 0.6 between explanatory variables signifies a high correlation of the variables. Table 2 presents the correlation matrix showing the relationship between financial deepening measures among themselves and GDP.

The result shows that GDP is highly correlated with deposit and credit (0.6251 and 0.6488 respectively). The results further show that also highly correlated are credit and deposit and (0.9496) and CCBA and liquidity (0.9952). The findings show that two financial deepening indicators are positively correlated with high values (0.6251 and 0.6488) for GDP. However, the correlation between GDP and liquidity and CCBA strong, though negative (-0.9989 and -0.9965).

TABLE 2:

Correlation Matrix

	GDP	deposit	Credit	Liquidity	CCBA
GDP	1.000				
Deposit	0.5225 0.000	1.000			
Credit	0.6008 0.000	0.9328 0.000	1.000		
Liquidity	-0.8714 0.000	-0.4808 0.000	-0.5765 0.000	1.000	
CCBA	-0.8284 0.000	-0.5050 0.000	-0.5821 0.000	0.9640 0.000	1.000

4.3 Regression Analysis

The variables were regressed to determine the causal relationship between the economic growth (GDP) and the financial deepening indicators (deposits, credit, liquidity and CCBA).

The regression model was given as:

$$GDP = \alpha + \beta_1(LL) + \beta_2(CPS) + \beta_3(CCBA) + \beta_4(CBD) + e \dots\dots\dots (11)$$

TABLE 3**Regression Analysis**

Variable	Coefficient	Std Error	t-statistic	Probability
Dependent Variable	GDP			
Deposits	1.065551	2.446978	0.44	0.665
Credit	0.981103	2.826216	0.35	0.73
Liquidity	-781.389	203.0985	-3.85	0
CCBA	1470.019	1604.924	0.92	0.364
Constant	5.143221	0.344962	14.91	0
R-Squared	0.7783			
Adjusted R-squared	0.7594			
F statistic	41.24			
Prob(F Statistic)	0			

The results of the study show that all the model coefficients are positive, except liquidity which has a negative coefficient. The results imply that a unit increase in deposits will result into a 1.065551 change in the GDP. The findings further show that a unit changes in credit will result into a 0.981103 change in GDP. The study findings show that a unit change in liquidity will result into a 781.389 in the GDP though in the opposite direction. Finally, the findings show that a unit change in CCBA will result into a 1470.019 change in the GDP. The findings mean that the all the financial deepening indicators have a positive influence on the GDP. Consequently, we sought to investigate the adequacy of the fitted regression model using model diagnostic tests.

In order to test for adequacy of the model, we check whether the assumptions of OLS estimates that residuals are random, linear relationship between dependent and independent variables, no serial correlation among the residuals and homoscedasticity of residuals have been met through use of residual analysis. The study used scatter plots to check the linearity assumption. The scatter plots in Figure 8 in Appendix 1 indicated that linearity assumption was reasonable as they formed a pattern. The linearity was confirmed by the regression analysis which showed that the correlation of the variables was close to unity which implies linearity. Using the residual plot in Figure 1, the fitted values and the residuals to inspect the

randomness of the residuals, the results shows that there is a pattern as there is a rise then decline after a short stint of stagnation. This indicates that the regression model might not be a good fit.

The study then used the Durbin Watson test to check for serial correlation of the residuals. The Durbin Watson statistic of 0.0816768 was less than 2, an indication that the in no problem of serial autocorrelation. The study then investigated the data for residual variance stability. When variances of residuals are not constant, there is a problem of heteroscedasticity. The study used the Breusch-Pagan test to test the null hypothesis that residuals have constant variance. The results of the homoscedasticity and autocorrelation tests are presented in table 5. From the results, we rejected the null hypothesis since $p < 0.05$ and concluded that the residuals were heteroscedastic. The study also tested for the multicolliniarity of independent variables using VIF. The results in Table 4 show that some of the independent variables indicate a $VIF > 5$, an indication of multicolliniarity.

FIGURE 4
Residuals versus Fitted Values

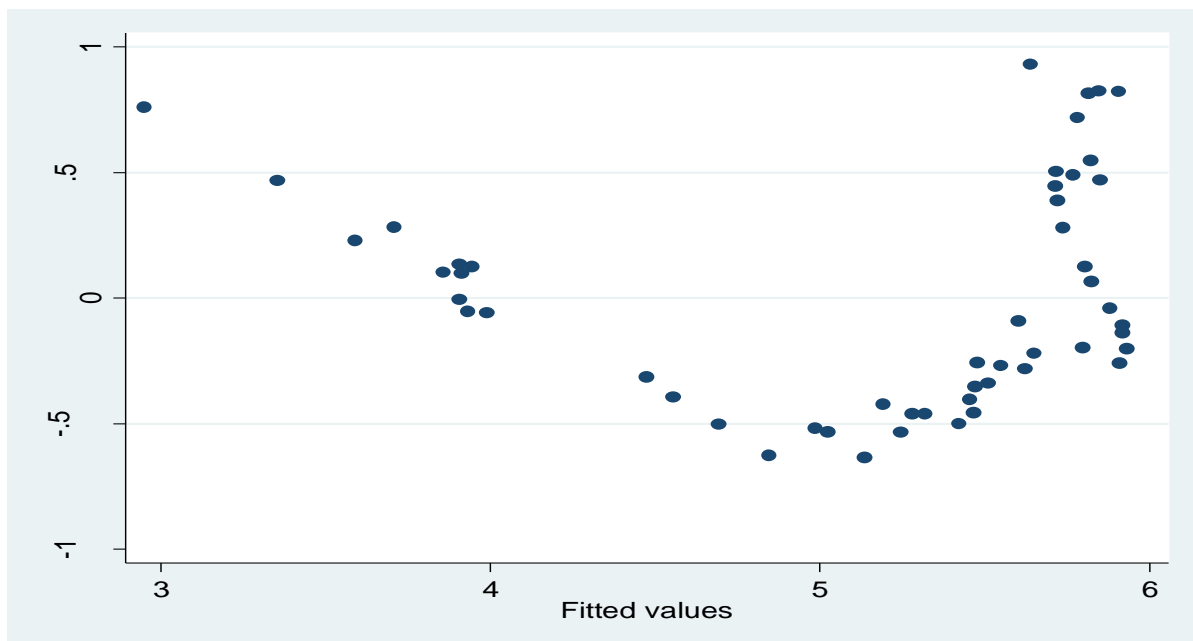


TABLE 4**Multicollinearity**

Variable	VIF	1/VIF = Tolerance
liquidity	14.94	0.066950
CCBA	14.76	0.067729
credit	9.31	0.107423
deposits	8.23	0.121555

Mean VIF 11.81

Table 5**TEST FOR SERIAL CORRELATION AND HETEROSCEDASTICITY**

Durbin Watson d-Statistic	Breusch-Pagan Test
(5, 52) = 0.0816768	Chi2(1) = 0.75 Prob > chi2 = 0.3870
H_0 : No autocorrelation.	H_0 : No Heteroscedasticity.

The results show that the p-value > 0.05. We therefore accept the H_0 of no heteroskedasticity

The CLM assumption is violated which implies that there is need to perform the time series analysis.

4.4 Test for Stationarity

The time series analysis began with the investigation of the time series properties of each variable employed in the study by using both the Augmented Dickey Fuller (ADF) test for stationarity. This is because when non-stationary time series data are used for analysis, the study may end up with spurious results because estimates obtained from such data possess non-constant mean and variance (Dimitrova, 2005). Stationarity of a time series is when the mean, variance and covariances are time invariant. The study tested to stationarity by use of time series graphs presented in Figure 4 in Appendix 1. The plot shows a possible non stationarity as they their movement exhibits a trend. The correlograms in Figure 7 in

Appendix 1 further show that a possible non stationary as they die away slowly. The researcher then performed a Augmented Dickey Fuller (ADF) unit root tests to confirm the stationarity of the time series. The study findings in Table 6 show that variables were not stationary in their original form since the since ADF statistic was less that the entire critical statistic except for liquidity. The researcher therefore differenced the data to achieve stationarity.

The results in Table 6 show the results of the ADF test after the data is differenced once. After differencing once the results show that all the variables were stationary. The data is stationary if the absolute value of ADF test statistic is greater than the critical values. In summary, all the variables in levels GDP, deposits, credits, liquidity and CCBA are found to have a single unit root and are stationary at first differences at 5% levels of significance. Presentation of the time series plots and correlogram plots (see figure 5 in Appendix 1) show stationarity after difference as they do not depict any trend and all the correlograms do not die away. The researcher then went ahead to fit multivariate time series models to the data.

TABLE 6
ADF Unit Root Test Results at Levels and First Difference

		Level 1	Level 2		First Diff	First Diff
Variables	ADF Test stat	1%	5%	ADF Test stat	1%	5%
GDP	1.124	-3.580	-2.930	-5.864	-3.587	-2.933
Deposit	-2.297	-3.580	-2.930	-5.978	-3.587	-2.933
Credit	-1.744	-3.580	-2.930	-5.018	-3.587	-2.933
Liquidity	-3.504	-3.580	-2.930	-3.922	-3.587	-2.933
CCBA	-1.390	-3.580	-2.930	-6.653	-3.587	2.933

4.5 Choosing Lag Length

To ensure that the error term is not misspecified, the researcher performed test to select an appropriate lag length. The selection criteria included Sequential modified Likelihood ratio

(LR) criterion, the Hannan-Quinn Information Criterion (HQIC), the Schwarz Bayesian Information Criterion (SBIC) the Final Prediction Error (FPE) criterion, and the Akaike Information Criterion (AIC). The model with the lowest value of information criteria is chosen. In our case lag selection information criteria are shown in table 6 below:

TABLE 7
Results of VAR Lag Selection

Selection-order criteria

Sample: 1968 - 2014

Number of obs = 47

lag	LL	LR	df	p	FPE	AIC	HQIC	SBIC
0	1034.68				6.4e-26	-43.8164	-43.7423	-43.6195
1	1097.77	126.18	25	0.000	1.3e-26	-45.4371	-44.9927*	-44.2562*
2	1119.07	42.599	25	0.015	1.6e-26	-45.2797	-44.465	-43.1146
3	1142.69	47.231	25	0.005	1.8e-26	-45.2208	-44.0357	-42.0716
4	1194.83	104.28*	25	0.000	7.0e-27*	-46.3757*	-44.8203	-42.2424

Endogenous: Dgdp deposits Dcredit Dliquidity Dccba

Exogenous: _cons

The results of the study HQIC and SBIC criterion prefer one lag while LR, FPE and AIC criterion prefer four lags. According to Brooks (2008), average variation in lag lengths from different samples within a given population will be greater in the BIC than in the AIC. This implies that AIC is more efficient than BIC. Therefore based on the efficiency property, the study chose four lag lengths to be used in this model as the optimal lag length.

4.6 Cointegration test

The study sought to determine the long run relationship between the financial deepening and economic growth. A test for series for cointegration was therefore performed. According to the Granger representation theorem, if the series are cointegrated, then there is a

corresponding error correction term which then requires an error correction model. The first step is to examine the order of integration of each variable such that if the series are integrated of order one then, the Johansen procedure used to test existence of any cointegrating vector among variables. The series are I(1), therefore proceed to test for cointegration using the Johansen cointegration test. The researcher tested the null hypothesis that there are $r=0$ cointegrating vectors against the alternate that there is at least one cointegrating vectors. Having established earlier the appropriate lag length to be four, we proceed to determine the number of cointegrating equations. When the trace statistics is less than the critical value, we accept the null hypothesis of no cointegration. From the table below, there is cointegration of order four since it's the last order where trace statistics at $r=0$ exceed critical value. We reject the null hypothesis of no cointegrating equation. Existence of cointegration is a requirement of fitting a VECM in modeling the relationship which exist between GDP growth and financial deepening.

TABLE 8

Johansen Cointegration Test

Johansen tests for cointegration					
Trend: constant			Number of obs = 49		
Sample: 1966 - 2014			Lags = 2		
				5%	
maximum			trace	critical	
rank	parms	LL	eigenvalue	statistic	value
0	30	1086.629	.	152.2330	68.52
1	39	1113.6943	0.66869	98.1024	47.21
2	46	1135.2589	0.58530	54.9731	29.68
3	51	1150.986	0.47372	23.5190	15.41
4	54	1158.7588	0.27186	7.9734	3.76
5	55	1162.7455	0.15017		

4.7 Granger Causality Test

The researcher performed a Granger causality test to investigate the direction of influence between two variables. The findings are presented in Table 9.

TABLE 9
Granger causality Wald tests

Equation	Excluded	chi2	df	Prob > chi2
Dgdp	Ddeposits	3.4935	2	0.174
Dgdp	Dcredit	.88877	2	0.641
Dgdp	Dliquidity	2.4363	2	0.296
Dgdp	Dccbba	.05505	2	0.973
Dgdp	ALL	9.4486	8	0.306
Ddeposits	Dgdp	1.7523	2	0.416
Ddeposits	Dcredit	1.7805	2	0.411
Ddeposits	Dliquidity	.81443	2	0.666
Ddeposits	Dccbba	.44837	2	0.799
Ddeposits	ALL	4.5231	8	0.807
Dcredit	Dgdp	8.2978	2	0.016
Dcredit	Ddeposits	.15265	2	0.927
Dcredit	Dliquidity	4.6022	2	0.100
Dcredit	Dccbba	.99385	2	0.608
Dcredit	ALL	9.4563	8	0.305
Dliquidity	Dgdp	4.1156	2	0.128
Dliquidity	Ddeposits	1.1859	2	0.553
Dliquidity	Dcredit	1.0585	2	0.589
Dliquidity	Dccbba	2.7484	2	0.253
Dliquidity	ALL	14.621	8	0.067
Dccbba	Dgdp	12.13	2	0.002
Dccbba	Ddeposits	1.9141	2	0.384
Dccbba	Dcredit	2.0067	2	0.367
Dccbba	Dliquidity	25.531	2	0.000
Dccbba	ALL	34.292	8	0.000

If a p - value > 0.05, we fail to reject the null hypothesis. The results of the study show that there unidirectional causality running between credits to private sector to GDP. The

study found that credit to the private sector granger cause economic growth (GDP) at 5% level of significance. This implies that any change in credit to the private sector will cause a change in GDP. Further, the study established that there was unidirectional causality between commercial central bank asset ratio to GDP, that is commercial central bank asset ratio granger cause GDP growth, thus implying that any change in the commercial central bank asset ratio will cause a similar change in GDP. Also evident from the results was the unidirectional causality between commercial and central bank asset ratio and liquid liability, in other words, commercial central bank asset ratio granger cause liquid liability which implies that a change in CCBA will cause a change in liquid liability.

Overall, the results show that there is no causation between GDP and financial deepening.

4.8 Vector Error Correction Model

The presence of cointegrating relationship between the variables implies that there exists a long term equilibrium relationship between the variables. However in the short run, there may be deviation from the equilibrium. This deviation needs correction to fix the errors using the error correction model. The study findings in Table 12 in Appendix 2 show the VEC model. The coefficients; α_1 represent the speeds adjustment of the model towards the long term equilibrium. The study findings could be integrated to mean that the long run relationship is established as a coefficient α_1 is negative and insignificant. This implies that the VECM model is below equilibrium and will adjust upwards towards at a speed of 8.1% towards the long term equilibrium. In the long run commercial bank deposit is negative and insignificant to economic growth, while credit to the private sector and liquid liability is positive and significant to economic growth in long run.

The findings in table 10 below all variables are significant as the P-values < 0.05. The table represents the speed of adjustment speed back to long run equilibriums of each individual variable.

$$Dgdp = -0.032 - 2.165Ddeposit + 2.46Dcredit + 536.9ccba - 3409.8Dccba \dots \dots \dots (12)$$

TABLE 10
Cointegrating equations

Cointegrating equations

Equation	Parms	chi2	P>chi2
_cel	4	77.81377	0.0000

Identification: beta is exactly identified

Johansen normalization restriction imposed

beta	Coef.	Std. Err.	z	P>|z|	[95% Conf. Interval]	
_cel						
Dgdp	1	.	.	.	.	.
Ddeposits	-2.165286	.688714	-3.14	0.002	-3.515141	-.8154318
Dcredit	2.463712	.8750169	2.82	0.005	.7487103	4.178713
Dliquidity	536.8995	112.8992	4.76	0.000	315.621	758.1779
Dccba	-3409.774	458.7696	-7.43	0.000	-4308.946	-2510.602
_cons	-.0324737	.	.	.	.	.

From Table 13 above, the coefficient for all financial deepening variables are significant. The equation above suggests that increase in credit to private sector and liquid liability increases Economic growth (positive relationship) whereas increase in Commercial bank deposit and commercial ,central bank asset ratio decreases economic growth(negative relationship) in the short run.

From the study, the independent variables individual adjustment speed rates back to their own long run equilibriums were found to be 216.52%, 246.37%, 53689.95% and 340977.4% for the commercial bank deposits, credit to the private sector, liquid liability and commercial central bank asset ratio respectively. This shows that commercial central bank asset responds faster towards long run equilibrium if there is disequilibrium in the short run.

4.8.1 Post Estimation Analysis

The researcher performed a post estimation analysis of the model to check for robustness of the model in modeling the relationship between the financial deepening indicators and economic growth measured by the GDP.

To check for autocorrelation in residuals of VEC model we use the Lagrange multiplier test. The result from table 11 indicates no serial correlation in the residual. The p-value > 0.05 at all lags. We therefore accept the null hypothesis of no autocorrelation.

Next, we check for the stability condition of VEC estimates. After fitting a VEC model, it is required that variables be covariance stationary. The study findings in Table 11 show that all the modulus of each eigen values is less than one. Thus, since the modulus of each eigen value is strictly less than one, the estimated VEC is stable in accordance with Gonzalo's (1994) proposal. The study plotted the eigenvalues of the companion matrix as shown in Figure 5. The graph of the eigenvalues shows that none of the remaining eigenvalues appears close to the unit circle. The stability check does not indicate that our model is misspecified.

TABLE 11**Lagrange-multiplier test**

Lagrange-multiplier test

lag	chi2	df	Prob > chi2
1	19.7196	16	0.23311
2	25.1499	16	0.06723

H0: no autocorrelation at lag order

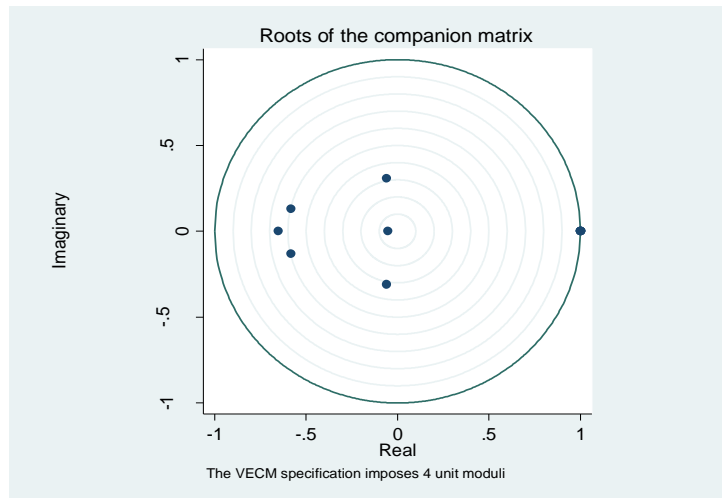
TABLE 12**Eigenvalue Stability Condition**

Eigenvalue stability condition

Eigenvalue	Modulus
1	1
1	1
1	1
1	1
-.6513774	.651377
-.5827701 + .130162i	.597129
-.5827701 - .130162i	.597129
-.05960802 + .3089893i	.314686
-.05960802 - .3089893i	.314686
-.05196135	.051961

The VECM specification imposes 4 unit moduli.

FIGURE 5
Stability of Variance



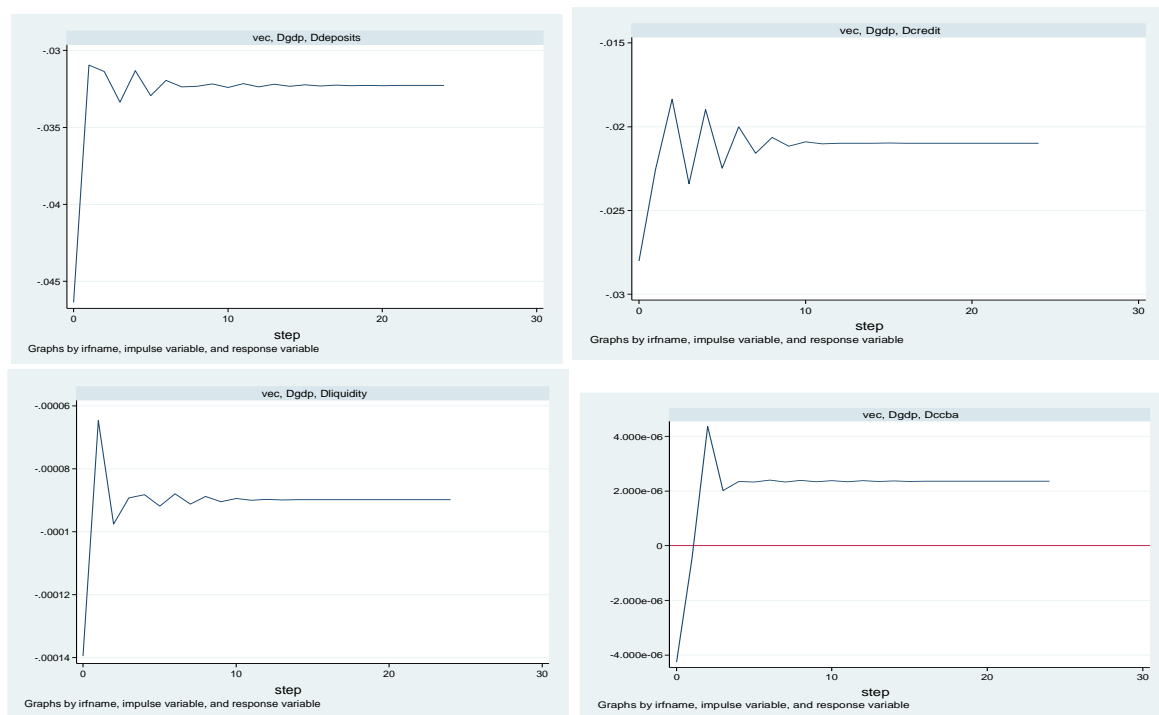
4.8.2 Impulse Response Functions

Impulse response reviews information that is not reported by causality test. It traces out responsiveness of the dependent variable in the system to shocks applied to each of the independent variables. If the model is stable, the shock should die gradually and if not, there should be persistence. The results in Figure 6 show that the effect of a shock to any of the cointegrating variables will not die out over time.

The results show a one standard deviation shock on the commercial bank deposit results into an immediate increase in the economic growth for the first period but later followed by a decrease on economic growth from second year after which it fluctuates until 15th period then forms a constant trend from the 16th period onwards which remains persistent. Persistence means the shock is permanent. The results further show that a one standard deviation shock in the credit to the private sector will result into an immediate increase in the economic growth followed by a decline in the 2nd year and thereafter fluctuations until the 11th period when it stabilizes to remain persistent implying permanent shock. The results also show that a one standard deviation shock in the liquid liabilities will result into an immediate increase in the economic growth in the first period before declining

in the second year and then continuous fluctuation until the 10th period then forms a constant trend from the 11th period which remains persistent, hence a permanent shock. Finally, the study findings revealed that one standard deviation shock in the commercial central bank asset ratio will result into an immediate increase in the economic growth then a decrease in the 2nd period the slight fluctuation up to the 8th period before being constant. This remained persistent which means permanent shock. The establishment of steady and constant positions after initial shock effects on the regressors indicated that the fitted model was stable.

FIGURE 6
Impact of Deposits, Credit, Liquidity and CCBA on GDP



Variance Decomposition

Variance decomposition examines the model dynamics by giving the proportions of the movements in the dependent variable due to their own shocks and those of other variables. A shock on a variable will affect its own course and is also transmitted to all other variables in the model. Variance decomposition determines how much of the period steps ahead, a forecast error variance of a given variable are explained by innovations of each explanatory

variables. In variance decomposition an error term of one variable is introduced to a shock while holding all other error terms constant (Brooks, 2008). The procedure breaks down variance of the forecast error for each of the variables into components such that each variable is explained as a linear combination of its own current innovations value and lagged innovation values of all the variables in the system (Hossain, 2008).

The study findings in Table 13 show that in the 4th quarter, changes in economic growth were largely due to own variations which stood at 98.3%, commercial bank deposits 51.9%, credit to private sector 42.2%, liquid liabilities 65.3% and CCBA only 3.5% changes in economic growth. During the 10th quarter, the changes in economic growth were as attributed to own variation of 98.2%, while commercial bank deposits explained 53.7%, credit to private sector 42.7%, liquid liabilities 65% and CCBA explained only 3% change in economic growth.

On the 15th quarter, economic growth change were explained by 98.1%, commercial bank deposits 54.4%, credit to private sector 43.1%, liquid liabilities 64.9% while a change in economic growth is explained by only 2.9% CCBA. The results above show that the effect of a shock to GDP on itself and on other independent variables indicates a long run relationship and a stable fitted model.

TABLE 13
Results from VEC IRF

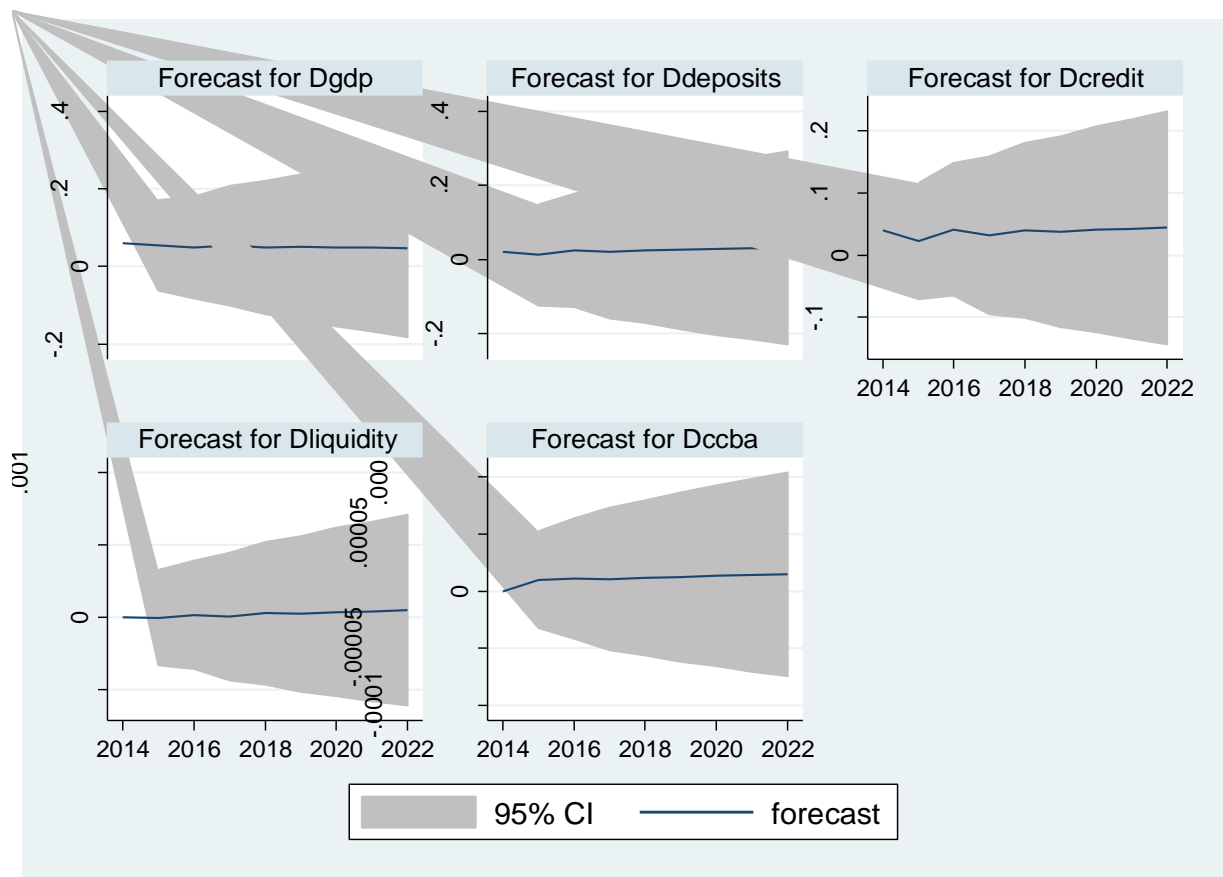
step	(1) fevd	(2) fevd	(3) fevd	(4) fevd	(5) fevd
0	0	0	0	0	0
1	1	.449051	.347067	.688538	.038552
2	.989542	.516866	.434538	.649542	.025608
3	.986941	.491303	.3881	.656118	.037013
4	.982776	.519285	.422472	.653036	.034677
5	.983027	.515896	.410691	.650733	.033008
6	.98208	.526382	.423069	.651347	.032195
7	.982097	.528176	.421014	.650086	.031446
8	.981836	.532392	.42519	.650436	.030891
9	.981786	.53484	.425783	.649845	.030435
10	.981683	.537036	.427441	.649906	.030036
11	.981624	.539038	.428417	.649638	.029737
12	.981565	.540505	.429311	.649589	.029443
13	.981516	.541996	.430144	.649451	.029223
14	.981475	.543113	.43077	.649381	.029005
15	.981437	.544227	.431408	.649296	.028833
16	.981405	.545122	.431902	.649231	.028666
17	.981375	.545981	.432392	.649169	.028526
18	.981349	.546712	.432796	.649115	.028395
19	.981326	.547396	.433183	.649067	.02828
20	.981305	.548001	.433519	.649022	.028174
21	.981285	.548562	.433834	.648982	.028078
22	.981267	.549069	.434116	.648945	.02799
23	.981251	.549538	.434378	.648912	.027909
24	.981236	.549968	.434617	.648881	.027834

- (1) irfname = vec, impulse = Dgdp, and response = Dgdp
(2) irfname = vec, impulse = Dgdp, and response = Ddeposits
(3) irfname = vec, impulse = Dgdp, and response = Dcredit
(4) irfname = vec, impulse = Dgdp, and response = Dliquidity
(5) irfname = vec, impulse = Dgdp, and response = Dccba

The variance decomposition conclusions were confirmed by irf graph presented in Figure 6.

FIGURE 7

Variance Decomposition Graphs



The results above show that all the independent variables (financial deepening) have significant effect on economic growth in Kenya as shown by the results of the variance decomposition except the CCBA which had relatively low values.

CHAPTER FIVE

DISCUSSION, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the discussions and conclusions based on the findings of the study, recommendations and areas for further research.

5.2 Summary and Discussion of the Findings

The purpose of this study was to investigate the relationship between financial deepening on economic growth in Kenya, with major focus on finding the relevance of the theories in the Kenyan economy that is whether the financial deepening leads to economic growth or whether the economic growth triggers financial deepening. The reviewed literature on the relationship between the economic growth and financial development overwhelmingly suggest as positive, first-order relationship between the two. However, an empirical study on the issue of causality between the financial development and economic growth was not very clear.

To represent economic growth, the study used GDP (Gross domestic product) and percentage change data natural logarithm was taken. Financial deepening was defined to include the commercial bank liquid liabilities, credit to the private sector by the commercial banks, commercial and central bank asset ratio (CCBA) and the causal relationship between the financial deepening and economic growth. All these were ratios to the GDP.

To attain the set objectives, the study employed the linear regression analysis to determine the relationship between the dependent and the independent variables. The study performed preliminary tests for normality, multicollinearity, autocorrelation and heteroskedasticity. The researcher further performed post analysis tests such as VECM, impulse response functions and the variance decompositions.

The study results from the impulse response analysis show that a one standard deviation shock on all the independent variables immediately caused an increase in the economic growth in the first year before declining in the second year and then stabilizing after subsequent years. These findings were confirmed by the variance decomposition results which showed that the individual independent variables largely influenced the change in economic growth except the CCBA which marginally influenced change in the economic growth. Singling out on the commercial bank savings, the results show that a change in the deposits will result into a 50% change in the economic growth. The study findings are in consistence with the views of Jappelli and Pagano (1994) who found that the higher the domestic savings rate, the higher the economic growth.

To determine the causal linkage between the financial deepening and economic growth, the granger causality test gives evidence of no causality between the financial deepening indicators and economic growth (GDP) and vice versa. The study therefore concluded that causality between the financial deepening indicators and GDP does not exist. In addition lack of causality does not persist. However, there is a unidirectional causality running from credit to private sector to GDP. In addition, the study finds that commercial central bank asset ratio granger cause GDP growth. Further, evidence from the results was the unidirectional causality between commercial and central bank asset ratio and liquid liability. This indicates that financial deepening is not an appropriate indicator to forecast the economic growth. This is consistent with Attanasio and others (2000) who also found weak causal linkage between the two variables (financial deepening and economic growth. However, contrary to our findings, some studies established bi-causal relationship or unidirectional causality. Katırcıoglu and Naraliyeva (2006) found a bicausal linkage between the savings and economic growth.

The study findings further showed that the commercial bank credit to the private sector was a stimulant to the economic growth. This was evident in the results for the impulse response analysis where the economic growth responds very fast to the change in the credit to the private sector. The result in the variance decomposition was clear that a change in the credit to the private sector will cause a change of more than 40% in the economic growth. The study findings are consistent with the arguments by Akpansung and Babalola (2010) in their study examined the relationship between the banking sector credit and economic growth in Nigeria where they found the private sector credit positively influenced the economic growth.

The findings of the study revealed that one standard deviation shock in liquid liability results into an immediate increase in the economic growth before fluctuation in the coming periods. The results in the variance decomposition which revealed that a change in the liquid liability would result into a more than 64% change in the economic growth is consistent with the views by Agu and Chukwu (2008); Aslam (2008); and Aziakpono (2008) that there exists a positive relationship between liquids liabilities ratio and economic growth.

The findings shown in the impulse response analysis was that a one standard deviation shock in CCBA will result into an immediate increase in the economic growth before fluctuations and then stability. However the variance decomposition show that the effect of the CCBA on the economic growth to be very minimal as a change in the CCBA only causes an average of 3% change in economic growth. The findings are inconsistent with Waiyaki (2013) who noted that there was a positive relationship between the CCBA and economic growth of a country.

5.3 Conclusion

The study sought to establish the relationship between financial deepening indicators and the economic growth in Kenya. From the empirical analysis the study found that there was

positive significant effect between the financial deepening on economic growth in the long run. Lending credence to the supply leading hypothesis that financial deepening cause's economic growth. Also, the private sector credit contributes positively to economic growth same as commercial bank deposit and liquid liabilities. Others with positive effect in the economic growth were the commercial bank deposits and CCBA though marginal.

From the findings therefore, even though there has been clear improvement in the financial sector in the recent past, the degree of financial intermediary development is still below the required threshold needed to spur economic growth. The implication is that the financial sector is still not able to mobilize and effectively allocate funds to the private sector. From the demand side, it was also observed that GDP had a positive and significant impact on savings, bank asset, money supply and private sector credit, thereby laying credence to the demand following hypothesis. In the Long-run, there is strong evidence that economic growth is leading financial development when bank credit to private sector is used thereby supporting the demand following hypothesis. This study concluded that financial deepening propels economic growth because the variables of financial deepening were more significant in explaining economic growth, therefore supporting the supply leading hypothesis.

5.4 Recommendations

There should be a determined effort by the monetary authorities to bridge the gap existing between lending rate and deposit rate, foster a moderate rise in nominal rates and stabilize inflationary pressures so that the people will be fully motivated to save in a bid to generate needed loanable funds for investment in Kenya.

There is an urgent need to sustain a higher level of macroeconomic stability in Kenya, reduce the high incidence of non performing credits ensure that private sector credits are channeled to the real sector of the economy, enhance the level of corporate governance in the financial system.

Based on the findings of the study, another recommendation is that monetary authorities should continue with the policy reforms to consolidate the emerging confidence in the financial system. The financial sector reforms should be intensified; this will create a sound market-oriented financial sector, leading to an increase in the level of financial savings and level of financial activities in the financial markets, which will translate to increased deepening and hence economic growth.

5.5 Limitations of the Study

The first limitation of the study was that this study was done on the commercial banks in Kenya only. However, financial deepening is not limited to commercial banks only but also others such as mutual funds, insurance companies, and co-operative societies among others. Secondly, this study used secondary data. This is a limitation because the secondary data may not have been collected with this study in mind and therefore the accuracy of the data may have been compromised.

5.6 Suggestion for Further Research

This study was done on the effect of financial deepening on economic growth in Kenya. The study suggests that further research should identify other macro-economic factors that significantly affect economic growth such as the monetary policy, Balance of Payment, inflation, fiscal policy and monetary supply.

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APPENDICES

APPENDIX 1: DESCRIPTIVE CHARACTERISTIC

Figure 8: Descriptive Characteristic

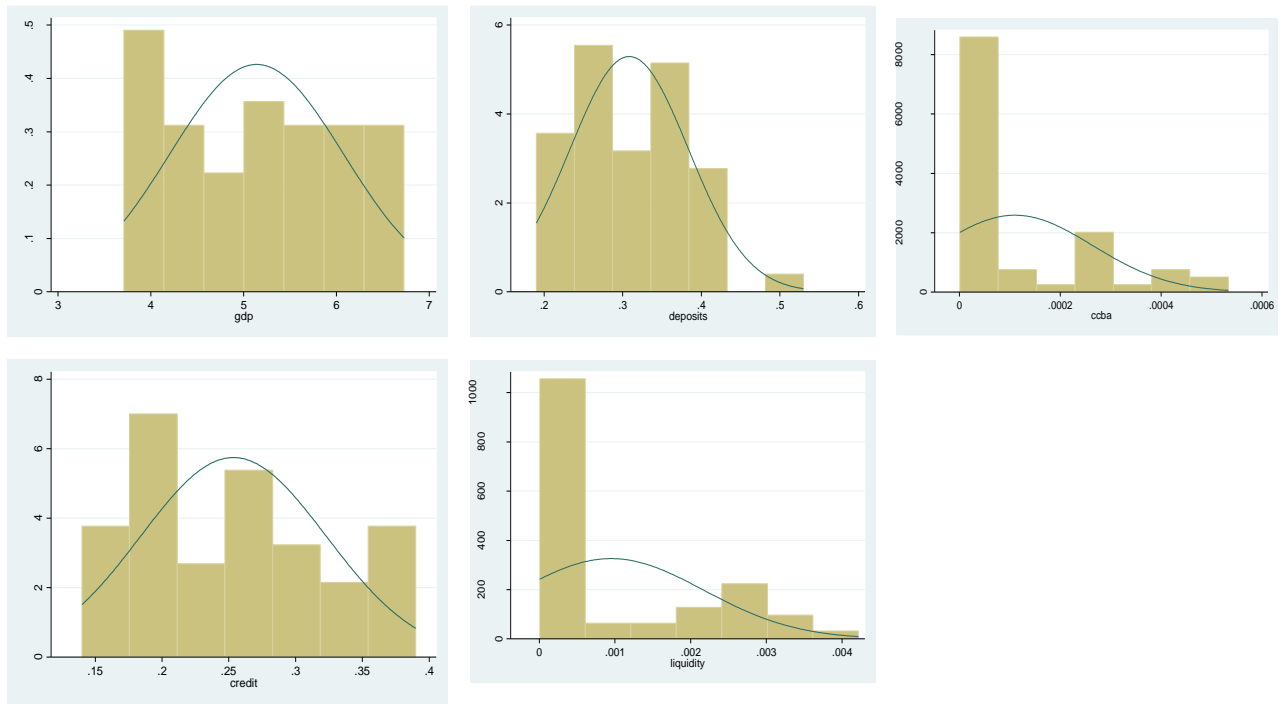
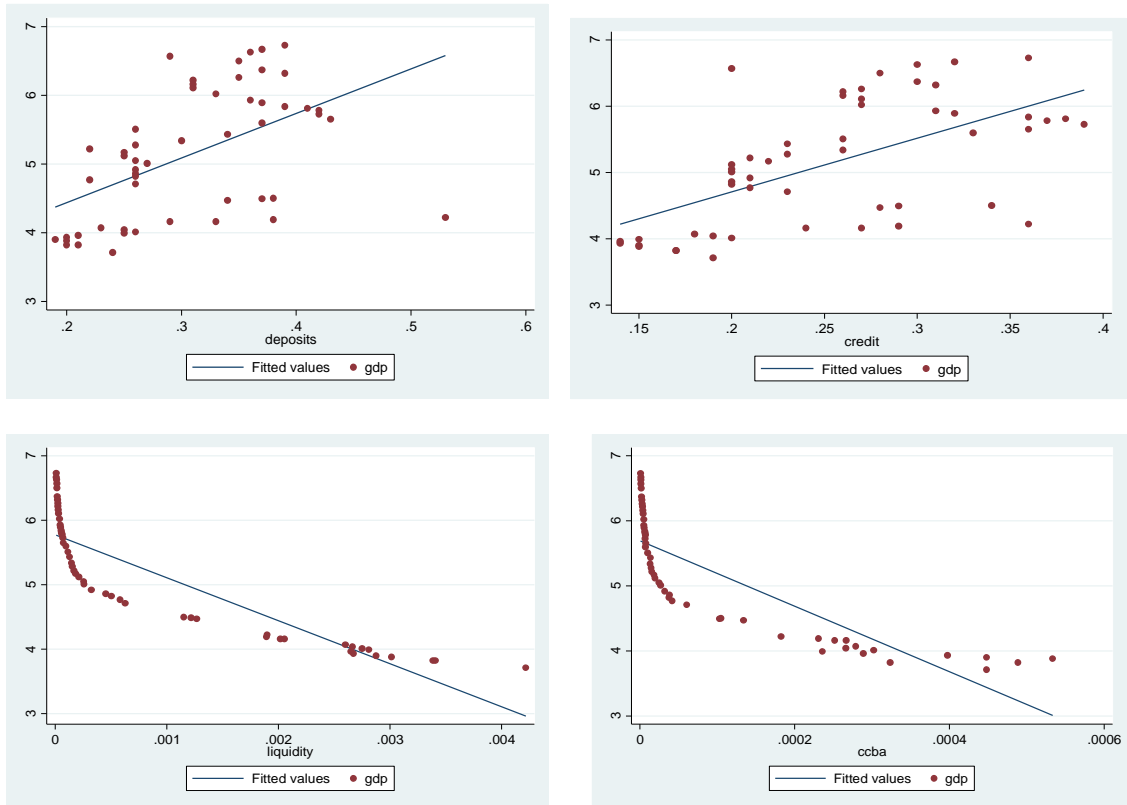


Figure 9: Linearity Test



APPENDIX 2: TIME SERIES ANALYSIS

Figure 10: Time Series Plot

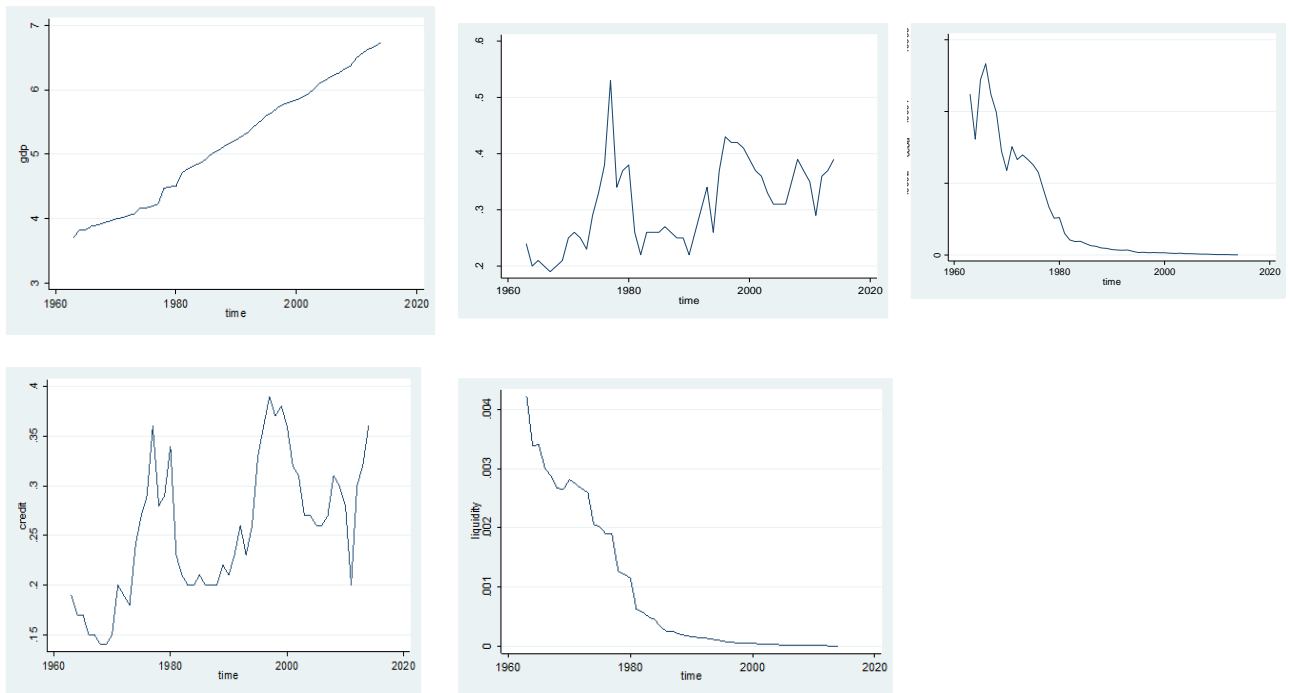


Figure 11: Time Series Plots after Differencing

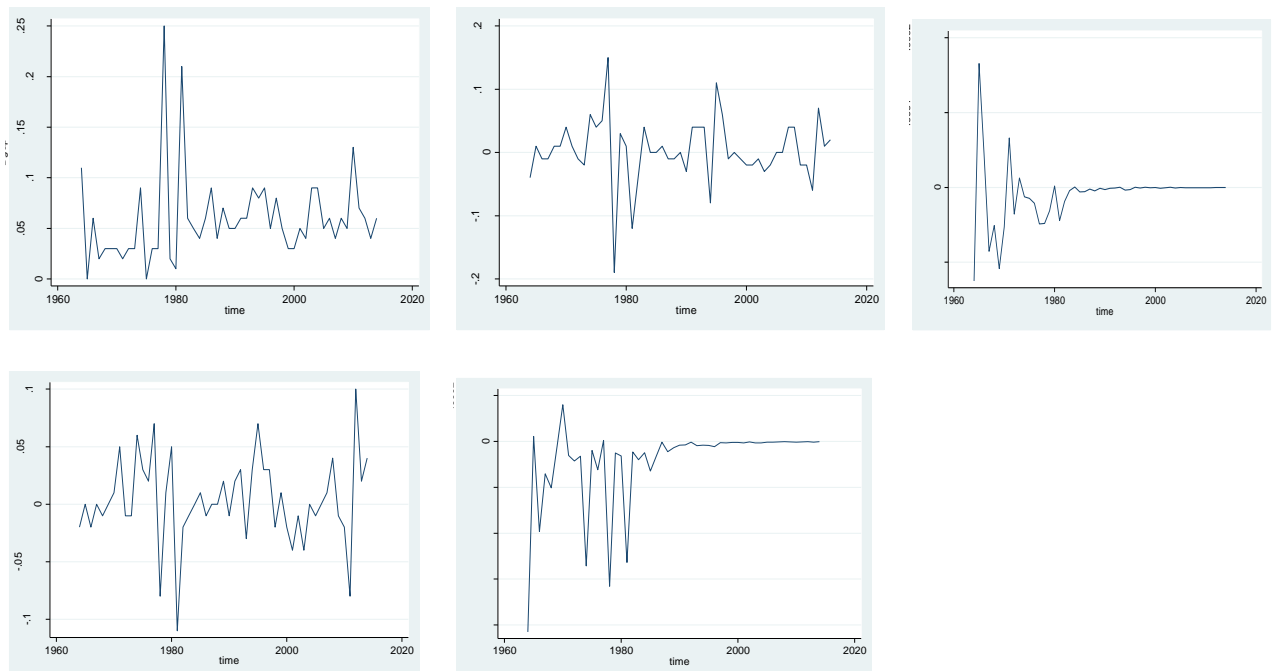


Figure 12: Correlograms Plots

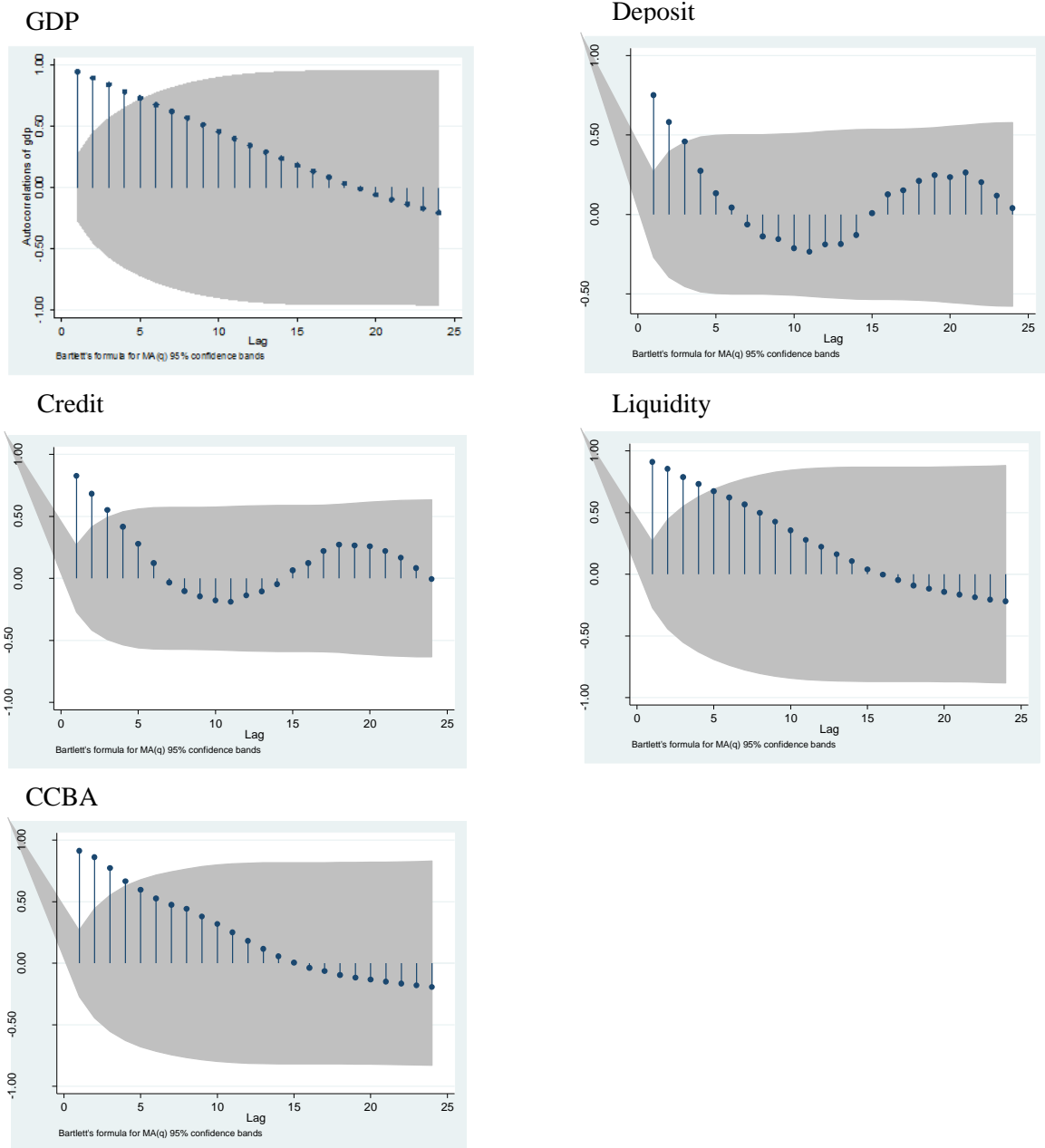
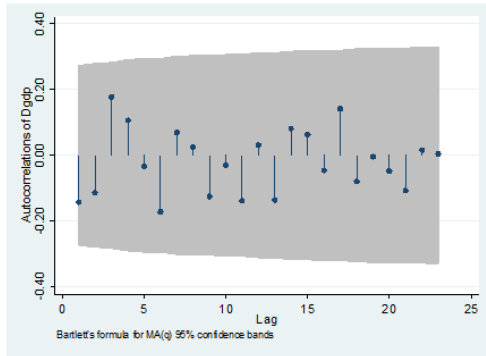
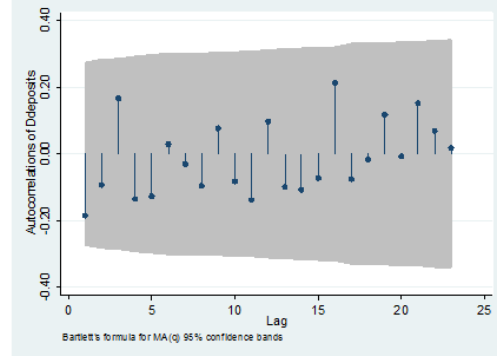


Figure 13: Correlogram Plots after First Difference

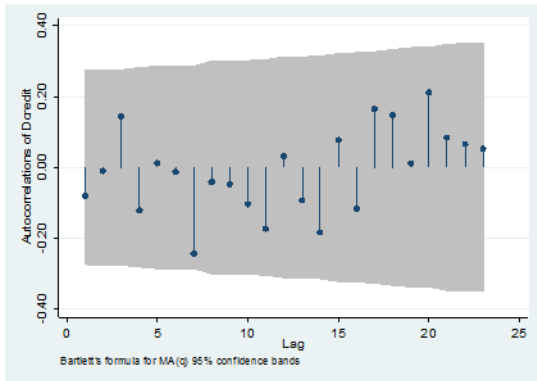
GDP



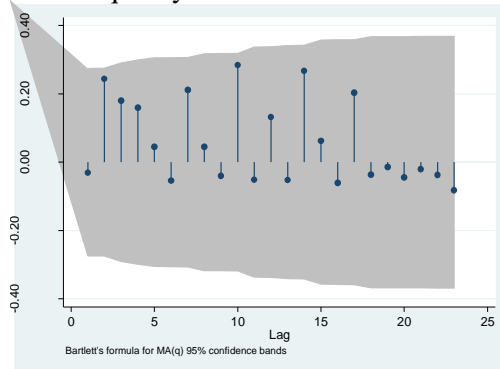
Deposit



Credit



Liquidity



CCBA

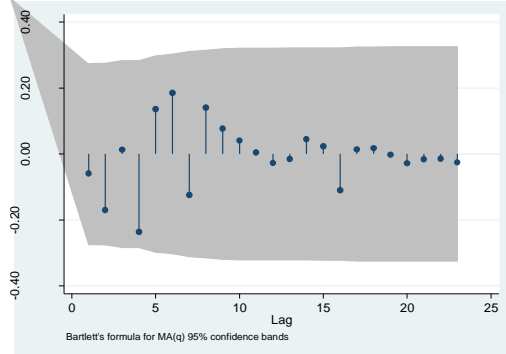


Table 14: Vector Error-Correlation Model

Vector error-correction model

Sample: 1966 - 2014

No. of obs = 49

```
AIC          = -43.86507
```

Log likelihood = 1113.694

HQIC = -43.2938

$$\text{Det}(\text{Sigma_ml}) = 1.25\text{e-}26$$

SBIC = -42.35934

Equation	Parms	RMSE	R-sq	chi2	P>chi2
D_Dgdp	7	.059228	0.2944	17.52258	0.0143
D_Ddeposits	7	.06921	0.3483	22.44643	0.0021
D_Dcredit	7	.047546	0.3619	23.82294	0.0012
D_Dliquidity	7	.000168	0.4262	31.19539	0.0001
D_Dccbba	7	.000022	0.7266	111.6241	0.0000

	Coef.	Std. Err.	z	P>|z|	[95% Conf. Interval]	
D_Dgdp						
_cel						
L1.	-.0812261	.0792039	-1.03	0.305	-.2364628	.0740107
Dgdp						
LD.	-.2458297	.2558617	-0.96	0.337	-.7473094	.2556499
Ddeposits						
LD.	-.1087926	.1868346	-0.58	0.560	-.4749817	.2573966
Dcredit						
LD.	.2804574	.2481769	1.13	0.258	-.2059604	.7668752
Dliquidity						
LD.	70.45482	72.55151	0.97	0.331	-71.74353	212.6532
Dccba						
LD.	-133.1678	214.6218	-0.62	0.535	-553.8187	287.4832
_cons	.0008103	.008547	0.09	0.924	-.0159416	.0175622

D_Ddeposits						
_cel						
L1.	.1075785	.0925531	1.16	0.245	-.0738223	.2889793
Dgdp						
LD.	-.4658116	.2989853	-1.56	0.119	-1.051812	.1201887
Ddeposits						
LD.	-.5667462	.2183242	-2.60	0.009	-.9946538	-.1388386
Dcredit						
LD.	-.0855434	.2900053	-0.29	0.768	-.6539433	.4828565
Dliquidity						
LD.	-84.83378	84.77952	-1.00	0.317	-250.9986	81.33103
Dccba						
LD.	178.8286	250.7947	0.71	0.476	-312.72	670.3771
_cons	-.0000355	.0099876	-0.00	0.997	-.0196107	.0195398
D_Dcredit						
_cel						
L1.	.0578316	.0635821	0.91	0.363	-.0667871	.1824503
Dgdp						
LD.	-.4314549	.2053968	-2.10	0.036	-.8340253	-.0288845
Ddeposits						
LD.	.0563618	.1499843	0.38	0.707	-.2376021	.3503257
Dcredit						
LD.	-.7559276	.1992278	-3.79	0.000	-1.146407	-.3654484
Dliquidity						
LD.	-79.86088	58.24182	-1.37	0.170	-194.0128	34.29099
Dccba						
LD.	101.8662	172.2909	0.59	0.554	-235.8178	439.5501
_cons	.0012041	.0068613	0.18	0.861	-.0122438	.0146519

D_Dliquidity							
_cel							
L1.	.0000953	.0002248	0.42	0.672	-.0003453	.0005358	
Dgdp							
LD.	-.0002698	.0007261	-0.37	0.710	-.001693	.0011534	
Ddeposits							
LD.	.0000985	.0005302	0.19	0.853	-.0009407	.0011378	
Dcredit							
LD.	-.0007424	.0007043	-1.05	0.292	-.0021228	.0006381	
Dliquidity							
LD.	-.5029436	.2059005	-2.44	0.015	-.9065012	-.099386	
Dccbba							
LD.	-.3636006	.6090947	-0.60	0.551	-1.557404	.8302031	
_cons	8.02e-06	.0000243	0.33	0.741	-.0000395	.0000556	
D_Dccbba							
_cel							
L1.	.0002443	.000029	8.43	0.000	.0001875	.0003011	
Dgdp							
LD.	.0000378	.0000936	0.40	0.687	-.0001458	.0002213	
Ddeposits							
LD.	.0002955	.0000684	4.32	0.000	.0001615	.0004295	
Dcredit							
LD.	-.0003606	.0000908	-3.97	0.000	-.0005386	-.0001826	
Dliquidity							
LD.	.0150272	.0265511	0.57	0.571	-.037012	.0670665	
Dccbba							
LD.	.0368446	.0785435	0.47	0.639	-.1170978	.1907869	
_cons	-6.40e-06	3.13e-06	-2.05	0.041	-.0000125	-2.73e-07	

Cointegrating equations

Equation	Parms	chi2	P>chi2
_cel	4	77.81377	0.0000

Identification: beta is exactly identified

Johansen normalization restriction imposed

beta	Coef.	Std. Err.	z	P>|z|	[95% Conf. Interval]	
_cel						
Dgdp	1	.	.	.	.	.
Ddeposits	-2.165286	.688714	-3.14	0.002	-3.515141	-.8154318
Dcredit	2.463712	.8750169	2.82	0.005	.7487103	4.178713
Dliquidity	536.8995	112.8992	4.76	0.000	315.621	758.1779
Dccbba	-3409.774	458.7696	-7.43	0.000	-4308.946	-2510.602
_cons	-.0324737	.	.	.	.	.

APPENDIX III: LIST OF COMMERCIAL BANKS IN KENYA

1. ABC
2. Bank of Africa
3. Bank of Baroda
4. Bank of India
5. Barclays
6. CfC Stanbic Holdings
7. Citi bank
8. CBA
9. Consolidated bank
10. Cooperative
11. Credit bank
12. Development Bank of Kenya
13. Diamond Trust Bank
14. Eco Bank
15. Equatorial Commercial bank
16. Equity Bank
17. Family Bank
18. Fidelity Bank
19. First Community Bank
20. Giro Commercial Bank
21. Guaranty Trust Bank Kenya
22. Guardian Bank
23. Gulf African Bank
24. Habib Bank
25. Habib Bank AG Zurich
26. Housing finance
27. I&M Bank
28. KCB
29. Middle East Bank Kenya Ltd
30. National Bank of Kenya
31. Oriental Commercial Bank
32. Paramount Universal Bank
33. Prime Bank Limited

- 34. Standard Chartered Bank
- 35. Trans National Bank
- 36. NIC Bank
- 37. Oriental Commercial Bank
- 38. Sidian Bank
- 39. Standard Chartered Kenya
- 40. United Bank for Africa
- 41. Victoria Commercial Bank

APPENDIX IV: DATA

Time	GDP	Deposits	Credit	Liquid Liability	CCBA
1963	5,181.80	1,251.00	1,007.00	21.84544	2.32312
1964	6,568.80	1,300.00	1,092.00	22.23768	2.12334
1965	6,617.20	1,392.00	1,148.00	22.54671	3.23421
1966	7,583.40	1,549.00	1,110.00	22.86326	4.046176
1967	7,929.40	1,474.00	1,195.00	22.79225	3.553421
1968	8,542.40	1,683.00	1,158.00	22.8296	3.394876
1969	9,086.60	1,927.00	1,260.00	24.0787	2.623714
1970	9,710.00	2,406.00	1,486.00	27.28665	2.289511
1971	10,268.00	2,648.00	2,061.00	28.22649	3.101041
1972	11,014.40	2,755.00	2,080.00	29.33943	2.931602
1973	11,733.20	2,699.00	2,111.00	30.4931	3.2734
1974	14,349.60	4,119.00	3,474.00	29.50038	3.823424
1975	14,523.20	4,836.00	3,882.00	29.29238	3.659553
1976	15,405.40	5,888.00	4,461.00	29.17241	3.556756
1977	16,536.00	8,758.00	6,034.00	31.38572	3.01254
1978	29,658.80	10,083.00	8,185.00	37.57915	3.973451
1979	30,894.80	11,279.00	8,981.00	37.58538	3.176363
1980	31,640.40	11,936.00	10,789.00	36.48063	3.315184
1981	51,669.00	13,208.00	11,763.00	32.33148	3.126347
1982	58,892.40	13,212.00	12,165.00	34.18111	2.463699
1983	66,332.60	17,069.00	13,392.00	33.21739	2.490737
1984	73,090.80	19,148.00	14,875.00	32.9862	2.793474
1985	82,524.00	21,707.00	16,957.00	26.56884	2.650911

1986	101,679.60	27,631.00	20,054.00	26.09621	2.684132
1987	112,998.00	29,371.00	22,921.00	28.642	2.746808
1988	131,044.00	32,654.00	26,758.00	27.41012	2.56579
1989	146,610.00	36,731.00	31,603.00	26.72203	2.683199
1990	164,138.40	36,752.00	34,652.00	27.19886	2.507051
1991	190,806.00	49,703.00	43,714.00	28.74788	2.726651
1992	219,720.00	65,821.00	57,496.00	32.34655	2.938313
1993	270,182.00	92,512.00	61,074.00	34.87841	3.704766
1994	322,238.00	82,471.00	84,324.00	36.5106	3.232725
1995	393,766.60	145,260.00	128,376.00	37.74405	2.776254
1996	447,507.60	192,283.00	162,461.00	32.43215	3.321995
1997	533,302.60	224,069.00	207,873.00	35.60467	3.500218
1998	601,698.20	252,831.00	221,140.00	36.10088	4.044154
1999	642,675.40	261,920.00	246,391.00	35.83245	4.096632
2000	685,436.20	264,456.00	248,809.00	35.15714	4.291097
2001	770,027.80	282,296.00	248,463.00	34.54838	4.031187
2002	850,910.10	310,453.00	264,198.00	36.45417	3.945896
2003	1,058,470.00	344,453.00	282,378.00	38.05214	5.120987
2004	1,286,462.00	399,494.00	347,673.00	37.85391	5.128934
2005	1,445,477.00	443,066.00	376,967.00	37.53034	5.455149
2006	1,642,405.00	515,705.00	424,600.00	38.11162	5.212126
2007	1,814,243.00	629,525.00	493,045.00	38.6341	5.052718
2008	2,107,589.00	827,639.00	643,715.00	42.00757	4.764083
2009	2,366,984.00	875,918.00	718,016.00	41.01999	4.533009
2010	3,169,301.00			45.05598	4.442932

		1,114,485.00	875,815.00		
2011	3,725,918.00	1,074,140.00	749,923.00	46.4591	3.987717
2012	4,261,151.00	1,517,204.00	1,285,887.00	47.52313	4.511169
2013	4,730,801.00	1,731,463.00	1,512,845.00	39.43341	4.353254
2014	5,357,672.00	2,100,163.00	1,910,320.00	40.16263	4.372518