

**FINANCIAL DEVELOPMENT, ECONOMIC GROWTH AND POVERTY IN
KENYA**

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DECLARATION

This thesis is my original work and has not been presented for a degree award in any other university.

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DEDICATION

To my faithful God and my parents, Mr and Mrs Edward Waiyaki.

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Despite all this able assistance, the views expressed in this thesis are solely those of the author and do not represent the views of any of the recognized person(s) or institution(s). I therefore bear the full responsibility for any errors and/or omissions. Delighted to have put this thesis together, I am confident that it will hone ongoing debate on financial development, growth and poverty.

ABSTRACT

It is evident that the financial sector in Kenya has grown rapidly in the last decade. However, the economy has had a low fluctuating growth and poverty levels have remained rampantly high. The effect of financial development on economic growth and poverty and especially the efficiency and quality aspects of financial sector development have been ignored. Again, Kenya's financial sector is more advanced compared to other African countries but the factors explaining this disparity have not been examined. This study, therefore, aimed at filling this research gap. The core objectives of the thesis were to determine the drivers of financial development and to determine the effect of financial development on economic growth and poverty. The novelty of the study findings arise from controlling for financial innovations, using appropriate measures of financial development and poverty incorporating the efficiency and quality aspects of financial development. Autoregressive Distributed Lag Model, Granger causality, cointegration analysis and Vector Error Correction Model were used for analysis using quarterly time series data for the period 2000 to 2014.

This study found that credit to private sector model which shows level of intermediation in the financial sector supported the openness hypothesis indicating the importance of trade openness for financial development. The non-performing loans model which captures the quality of credit and efficiency in the financial sector supported the economic institutions hypothesis by stressing the importance of institutional quality for financial development. Other key determinants were GDP, political economy and mobile technology.

Further findings showed that financial development incorporating the efficiency and quality aspects as indicated by non-performing loans and interest rate spread had a positive effect on economic growth. Still, financial development directly reduces poverty in Kenya while it also indirectly reduces poverty through economic growth thus confirming the trickle down hypothesis of growth on poverty reduction. Additionally, the recent financial innovations were found to increase growth and also reduce poverty. The main channels through which financial innovation contributed to growth and poverty reduction included the transfer, credit and savings channels. Financial development was predominantly seen to granger-cause economic growth thus supporting the supply leading hypothesis.

Based on the findings, the study made the following policy recommendations. There should be improvement in the quality of legal, economic and political institutions by the government. A more democratic environment with a system of political checks and balances should be maintained. The government should have trade policies to grow the volume of trade. Growth of financial innovations should be supported by creating a conducive environment by the regulatory bodies, government and other institutions. The efficiency and quality of the financial sector should be improved with interest rate reforms to reduce the interest rate spread and reduction of non-performing loans. This ought to include policies to monitor credit to private sector. Finally, economic growth should be targeted through innovations and other measures like maintaining a good macro economic environment while encouraging a more inclusive growth to reduce poverty.

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LIST OF ABBREVIATIONS AND ACRONYMS

ADF:	Augmented Dickey-Fuller
AERC:	African Economic Research Consortium
AFC:	Agricultural Financial Corporation
AIMS:	Alternative Investment Market Segment
ARDL:	Autoregressive Distributed Lag
CBK:	Central Bank of Kenya
CMA:	Capital Markets Authority
CPS:	Credit to Private Sector
DCP:	Domestic Credit to Private Sector
EABS:	East African Building Society
EAC:	East African Community
ECT:	Error Correction Term
ECM:	Error Correction Model
ECB:	Equatorial Commercial Bank
FI:	Financial Intermediation
FD:	Financial Development
FIMS:	Fixed Income Market Segment
FSD:	Financial Sector Deepening
GOK:	Government of Kenya

GDP:	Gross Domestic Product
GCC:	Gulf Cooperation Council
GLS:	Generalized Least Squares
GMM:	Generalized Method of Moments
ICDC:	Industrial and Commercial Development Corporation
IDB:	Industrial Development Bank
IMF:	International Monetary Fund
IRA	Insurance Regulatory Authority
IRF:	Impulse Response Functions
KIHBS:	Kenya Integrated Household Budget Survey
KNBS	Kenya National Bureau of Statistics
MDG:	Millenium Development Goals
MIMS:	Main Investment Market Segment
MKT:	Market Capitalization
MLE:	Maximum Likelihood Estimation
MNO:	Mobile Network Operator
MSE:	Micro and Small Enterprises
NBFI:	Non-Bank Financial Institution
NPEP:	National Poverty Eradication Plan
NPL:	Non-Performing Loans

NSE: Nairobi Securities Exchange

OECD: Organization for Economic Cooperation and Development

OLS: Ordinary Least Squares

PCA: Principal Components Analysis

PP: Phillip-Perron

PRSP: Poverty Reduction Strategy Paper

SACCO: Savings and Credit Co-operative Society

SAP: Structural Adjustment Program

VAR: Vector Auto-regressive

VECM: Vector Error Correction Model

DEFINITION OF TERMS

Financial Development: The creation and expansion of financial institutions and instruments, growth in financial services as well as enhancement in the policies that improve intermediation, stability and efficiency. This is extended to include the qualitative and efficiency aspects.

Financial Innovation: The introduction of new financial instruments and products or the implementation of new ideas or financial technologies for the betterment of a system.

Economic Growth: An increase in output or GDP of a country over time.

Poverty: Inability to meet life's basic needs.

Head Count Ratio: The number of the poor that live below the poverty line to total population.

Poverty Line: Minimum level of income necessary for basic living and below which one is considered poor.

M3: M1 plus M2 and long term time deposits, institutional money market funds and repurchase agreements.

M2: Short term time deposits and individual money market funds.

M1: Currency in circulation and other money equivalents easily convertible to cash.

Credit to Private Sector: Credit extended by the banking industry to the private sector in an economy.

Market capitalization: Value of all outstanding shares of all companies listed at the Nairobi Stock exchange.

Non-performing Loans: Sum of loans for which the borrowers have not made payment for atleast 90 days.

CHAPTER ONE

INTRODUCTION

1.1 Background

Financial development is the creation and expansion of institutions, financial instruments and markets as well as the policies and factors that lead to efficient and effective intermediation in the growth process (FitzGerald, 2006). Further, financial innovation is a component of financial development and can be defined as the creation and advancement of financial instruments, products (product innovation), institutions (institutional innovation) and processes (process innovation). In a narrow sense, it can be defined as introduction of new financial instruments and products or the implementation of new ideas or instruments for the betterment of a system (Blach, 2011). The financial system in Kenya is developing and this chapter discusses some of the main aspects of growth in the financial system.

Moreover, the theoretical link between finance and growth shows that financial development may impact growth and poverty through the Mckinnon (1973), “conduit effect” where increase in savings increases investment. This link is further explained by the endogenous growth theories. Financial development may also impact on poverty directly or indirectly through economic growth. There is also a debate in the literature trying to confirm these relationships and this study delves into these relationships introducing new concepts. This chapter further introduces discussions on growth and poverty particularly in the recent past in Kenya using available data.

1.2 Financial Sector Developments

Kenya’s financial sector has been outstanding in its performance relative to other economies in Sub Saharan Africa (Alter and Yontcheva, 2015). The relatively well developed financial sector consists of: the Central Bank of Kenya (CBK), 43 Commercial Banks, one Mortgage Finance Company, 12 deposit taking micro finance institutions, eight

representatives of foreign banks, 86 foreign exchange bureaus, three credit reference bureaus, one Post Office Savings Bank, about 300 Savings and Credit Co-operative Societies, 38 Insurance Companies, the Nairobi Securities Exchange and Venture Capital Companies, National Social Security Fund (NSSF) and pension funds (CBK, 2014b).

The financial sector has seen a lot of innovations and developments including growth in the banking sector, capital markets, insurance industry and other financial instruments innovations. The banks have grown to 43 with some institutions changing from microfinance institutions to banks and major banks going cross-border mostly in the entire East African region. There is also more trading among banks. The Nairobi Securities Exchange has grown and it has attracted a lot of diaspora funds (NSE, 2014). In 2014, the net inflows stood at Kshs. 3.5 million which increased to Kshs. 5.7 million in 2015 (NSE, 2015).

1.2.2 Developments in the Banking Sector

The banking sector is the most advanced in East Africa to date (Alter and Yontcheva, 2015). Only about 29.2 percent of the population had access to banking services in 2013 (FSD et al., 2013). Kimenyi and Ndungu (2009) had shown that about 20 to 30 percent of the population had access to banking services in 2009 and thus the situation had not changed much by 2013.

The financial sector has experienced a number of banking crises. In 1986, Union Bank and a few Non-Banking Financial Institutions (NBFIs) like Rural Urban Credit Finance Bank Limited collapsed. To deal with the problem, eight financial institutions were taken over and merged into a state bank in 1989; Consolidated Bank of Kenya Limited. In 1993, the Exchange bank was closed due to the Goldenberg scandal (a corruption case where the government paid a company, Goldenberg international 35 percent more than their foreign currency earnings). In 1998, four banks collapsed due to poor management. They included: Trust Bank, Reliance Bank, Prudential Bank and Bullion Bank while National bank almost

collapsed as well. By then, two multinational banks-the Standard Chartered Bank and Barclays Bank of Kenya; and the locally owned banks-Kenya Commercial Bank and National Bank of Kenya dominated the banking sector. The total assets of Kenya's six largest banks (Kenya Commercial Bank Limited, National Bank of Kenya, Barclays Bank (K) Limited, Standard Chartered (K) Limited, Cooperative Bank of Kenya and Equity Bank (K) Limited) increased from US \$2.8 billion in 1997 to US \$ 12.1 billion in 2013, representing about half (51.3 percent) of the total assets of all commercial banks (CBK, 2014b). By 2015, this had increased to US \$ 18.15 billion which is about 50 percent of the total assets of all commercial banks which is still very high (CBK, 2015). The Central Bank has strengthened the supervision and inspection of banks with quarterly and annual supervision reports being produced. It has also introduced a Deposit Protection Fund which guarantees deposits of up to one hundred thousand Kenya Shillings. The initial capital for setting up financial institutions has been increased for commercial banks and "specified" NBFIs.

Commercial banks have expanded in number and also increased their assets. The locally incorporated banks increased steadily in the 1990s with the deliberate government effort to increase local ownership of financial institutions. The locally incorporated commercial banks did not compare well with the foreign counterparts in their assets levels. Most of them had less than the average asset level as compared with foreign banks. But the local banks continued to take an increasing share in the market. To ensure competition and mitigation from failures as well as ensure that they met the core capital requirements of the CBK, banks have been merging. Typical examples include: Southern Credit and Equatorial commercial bank merged in 2007, Commercial Bank of Africa Limited merged with American Bank Kenya Limited in 2005 retaining the name Commercial Bank of Africa Limited while Biashara bank Limited was acquired by Investment & Mortgage Bank Ltd in 2003. The Banking Act, 2015 allows banks to have shareholders hold only 25 percent of their share capital. New rules which may be set for banks may see a lot of changes. There was a suggestion by the CBK to raise the core capital requirement for banks to five (5)

billion Kenya shillings up from one (1) billion Kenya shillings in 2016. Although this was not effected, if it was to be, it would affect the tier III banks with a few of tier II banks which have a core capital of less than 5 billion Kenya Shillings including K-rep bank (tier II), Habib, Oriental, Equatorial Commercial, United Bank of Africa, Guarantee Trust bank (CBK, 2014b). This would lead to an increase in mergers if the banks are not able to raise the capital by raising the shareholders funds or selling equity stakes through Initial Public Offerings (IPOs).

A lot of developments have been realized in the banking sector for the last 10 years. This has been characterized by transformations of NBFIs to bank and introduction of new products like Automated Teller Machines (ATMs). In 2004, the CBK reduced the retention ratio from 6 percent to 5 percent which released credit to the economy making loans more affordable. Over time, the CBK has controlled the amount of credit in the economy through reserves and Central Bank rate. However, banks had previously ignored the Central Bank rate in setting their base lending rates motivated by their desire to make more profits. There is the Banking amendment Act, 2016 which is being discussed by the Parliament of Kenya which proposes interest rate caps. These caps would be set at upto four percentage points above the Central Bank Rate for lending rates and minimum of 70 percent of Central Bank Rate for deposits. Banks had too many requirements for opening an account and other transactions and this kept many people financially excluded. In 2005, Equity Bank Limited which transformed into a bank from a NBFII reduced its requirements for opening accounts and accessing loans thus creating a lot of competition for the other banks and increasing financial access to the unbanked. Since 1994, many Non-Banking Financial Institutions have transformed into banks as illustrated by Table 1.1.

Table 1.1: Conversions of NBFIs into Banks

Commercial Bank	Year	Commercial Bank	Year
Universal Bank Limited	1994	Paramount Bank Limited	1995
Akiba Bank Limited	1994	National Industrial Credit Bank Limited	1995
Diamond Trust Bank Limited	1994	Euro Bank Limited	1995
Credit Bank Limited	1994	Victoria Commercial Bank Limited	1996
African Banking Corporation Limited	1994	Co-operative Merchant Bank Limited	1996
Imperial Bank Limited	1994	Investment & Mortgages Bank Limited	1996
Reliance Bank Limited	1995	Commerce Bank Limited	1996
Habib African Bank Limited	1995	Development Bank of Kenya Limited	1996
FINA Bank Limited	1995	Charterhouse Bank Limited	1998
Ari Bank Corporation Limited	1995	Fidelity Commercial Bank Limited	1999
City Finance Bank Limited	1995	K-Rep Bank Limited	1999
CFC Bank Limited	1995	Equity Bank Limited	2004
Equatorial Commercial Bank Limited	1995	EABS Bank Limited	2005
Southern Credit Banking Corporation Limited	1995	Family Bank Limited	2007
First National Finance Bank Limited	1995	Jamii Bora Bank Limited	2010
Prudential Bank Limited	1995		

Source: Author's compilation from various Banks' Websites.

Most of the NBFIs converted into banks in the 1990s. All the NBFIs needed was to ensure compliance with capital requirements as well as liquidity and assets requirements as set by the CBK. Jamii Bora Bank was the last to be converted into a bank in 2010. Over time, owing to increased competition and the need for banks to increase their customer base, most banks increased their opening hours and opening days with most of them opening on Saturdays and a few on Sundays against what was the norm. This started with Equity bank in 2004 which extended opening hours to 4 pm. Before then, most banks were opening doors from 9 am to 3 pm from Monday to Friday. Now, most banks open from 8 am to 4 pm with quite a big proportion of them having branches which open upto 6 pm or 8 pm. This has increased financial inclusion especially for the population on white collar jobs working for eight hours a day.

The banking industry has continued to grow. The introduction of Islamic banking has widened financial inclusion (Kariuki, 2015). The study shows how banks have introduced shariah compliant products. Standard Chartered Bank introduced Saadiq, an Islam product aimed at targeting the unreached. KCB and National banks have done the same with National Bank introducing National Amanah account and National Amanah asset finance facility. There are two fully fledged Islamic banks, Gulf African and First community

Banks. Both were licensed by CBK in 2007. The banks have introduced Shariah compliant banking products like Sukuks (Islamic bonds) and Muraabahah¹. Other banks have introduced Islamic banking units after being cleared by CBK. These include: Barclays Bank, Standard Chartered Bank, Chase Bank, KCB and Middle East Bank (CBK, 2014b).

Integration of ATMs by small Micro finance institutions has also seen its way in the banking sector. It involves customers withdrawing funds from any pesa pay² ATMs and not necessarily an ATM belonging to one's specific bank. This has contributed to financial depth by increasing velocity of money. In 2010, the cheque truncation project was introduced. It is a system in which cheque clearing takes one day as opposed to previous times when the process took four days. This system was operationalized in August 2011. The introduction of Credit Information Sharing (CIS) in July 2010 which has seen establishment of three credit reference bureaus has strengthened the credit appraisal standards and reduced risks of non-performing loans for banks since both negative and positive information of borrowers is shared (CBK, 2014a). So far, the non-performing loans as a percentage of total loans have remained below the 10 percent mark.

Agency banking has also been introduced into the banking industry which is a diversification strategy aimed at taking banking services closer to the people. It was introduced in May 2010 after the CBK publicized prudential guidelines on agent banking and by January 2011, banks had already started using agency banking. Agency banking allows banks to use various outlets like shopping malls, supermarkets, mobile Telco agents, petrol stations, chemists, dry cleaners and other CBK approved business to act as bank agents in areas where banks lack presence. By March 2013, agency banking transactions cumulatively stood at \$ 3 Billion (CBK, 2013b). As at that time, there were 11 commercial banks which had contracted over 18,082 agents. This has increased to \$ 3

¹Muraabahah – a product where the bank buys an asset upon request by client from a third party and resells to the client

² Cash withdrawal

Billion in 2015 (For example, KCB started KCB Mtaani³ in 2011 opening up its first agent in Embakasi area. Equity was the first bank to start agency banking while Postbank followed suit with its Postbank Mashinani⁴. Co-operative Bank of Kenya in 2013 started its Co-op kwa Jirani⁵ agencies as part of competition with other banks which had started agency banking. Other banks that have embraced agency banking include Family Bank with its Pesapap agent service and Chase Bank with chase popote⁶. Agency banking allows services like cash deposits, cash withdrawals, transfer payments, school fees payments, utility payments, balance enquiry, Mobile phone airtime top up, mini-statements and other banking services (CBK, various bank supervision reports).

Banks have also gone cross border over time looking for business in neighbouring countries in the whole of East African region. Table 1.2 shows crossborder banking.

Table 1.2: List of Banks with Crossborder Operations

Bank	Country of Operations	Year of establishment
Kenya Commercial Bank	Tanzania	1997
	South Sudan	2006
	Uganda	2008
	Rwanda	2009
	Burundi	2012
Co-operative Bank	Tanzania	2004
	Uganda	2012
Equity Bank	Uganda and South Suda	2008
	Rwanda	2011
	Tanzania	2012
NIC Bank	Tanzania	2004
	Uganda	2012
CFC-Stanbic Bank	South Sudan	2013
Commercial Bank of Africa	Tanzania	2007
	Uganda	2013
Family Bank	South Sudan	2013

Source: Author's compilation from various banks' websites.

³Mtaani – a Swahili word meaning town

⁴Mashinani – meaning deep in the village

⁵Jirani – meaning neighbour

⁶Popote – meaning everywhere

Many of the Kenyan owned banks have opened subsidiary banks mainly in the wider East African region as shown in Table 1.2. In addition, they have adopted borderless banking where customers having accounts in a bank in one country can transact in other countries in the subsidiary bank. The motivation to do cross border banking is to tap onto customers abroad and win customers who transact businesses in other countries. Cross border banking also comes with many gains including competition, increased financial deepening as well as financial stability (Beck et al., 2014). This is especially beneficial with the opening up of the East African Community removing barriers to trade. This is likely to lead to increased business for the banks.

Some other reasons why banks have gone cross-border include high competition in the local market and weak market power, low institutional quality, increased efficiency due to regional expansion and high inflation in the local market (Kodongo et al., 2012). Furthermore, most of the banks have their shares cross listed in the various securities exchanges in the region (East Africa). For example, shares of Equity Bank Limited are traded at Nairobi Securities Exchange (NSE) while cross listed at Uganda securities Exchange (USE), KCB's shares are traded at the NSE while crosslisted at USE, Rwanda Stock Exchange (RSE) and Dar es Salaam Stock Exchange (DSE).

There have also been several policy developments in the banking sector. One is the agency banking guidelines introduced in 2011 to give guidance to the operations of agency banking. Moreover, the Central bank came up with revised Prudential and Risk Management Guidelines for the banking sector to guide their operations in terms of liquidation, setting up of representative offices of foreign banks and consumer protection. This also included new guidelines on transfer risks and introduction of information technology communication.

1.2.3 Developments in the Capital Market

The capital market comprises of the stock (equity) market and the bond (debt) market. The Nairobi Securities Exchange (NSE) was incorporated under the Companies Act of Kenya in 1991 as a company limited by guarantee and without a share capital. Prior to 1991, it was registered as a voluntary association of stockbrokers under the Societies Act in 1954. Currently, fourteen (14) stockbrokers and three (3) investment banks form the membership of the NSE. NSE is categorized into three market segments: Main Investment Market Segment (MIMS) which is the main quotation market, Alternative Investment Market Segment (AIMS) which provides an alternative method of raising capital to small, medium sized and young companies (NSE, 2014).

Fixed Income Market Segment (FIMS) on the other hand provides an independent market for fixed income securities such as treasury bonds, corporate bonds, preference shares and debenture stocks. Between the years 2000 and 2010, the NSE has experienced robust activity and high returns on investment. It accounts for over 90 percent of market activity in the East African region (World Bank, 2002) and is a reference point in terms of setting standards for the other markets in the region.

The stock market in Kenya is currently the second largest in Africa after South Africa's in terms of market capitalization and it is also ranked fifth on market liquidity (World Bank, 2013b). The Nairobi Securities Exchange's (NSE) growth in the last 10 years has been phenomenon. This started with an increase in the trading hours in 2006 to 3 hours up from 2 hours and later the introduction of the Automated Trading System. In 2006 also, the NSE entered into a MOU with Uganda Securities Exchange to allow cross listing. This has allowed many companies' shares to be crosslisted not only in the two securities exchanges but also in the wider East African region securities exchanges. For example, Kenya Airways, Centum Company Limited, Uchumi Supermarket, KCB and Equity Bank are all crosslisted at Uganda Securities Exchanges.

In 2008, the Nairobi Securities Exchange All Shares Index (NASI) was introduced which is an overall indicator of market performance. In November 2009, automated trading of government bonds through the ATS was introduced. This was a way of improving the depth of capital market by increasing market liquidity (Simiyu et al., 2014). Later in November 2011, two other indices were introduced into the NSE i.e. FTSE NSE Kenya 15 Index and the FTSE NSE Kenya 25 Index as a way of enhancing diversification in the wider East African region. These are indices used for measuring the performance of the companies listed at the NSE and also the performance of the major industries and capital segments of the NSE. This was in addition to the existing indices including NSE All Share Index, NSE 20 Share Index, FTSE NSE Kenya Government Bond Index and FTSE ASEA Pan African Index (NSE, 2014).

In January 2013, NSE introduced a trading platform for SMEs, Growth Emerging Markets Segments (GEMS) thus accommodating SMEs at the stock market. GEMS allow SMEs flexible listing requirements and thus act as an alternative source of capital for SMEs instead of the expensive bank loans. This is expected to contribute to increased liquidity for the SMEs thereby improving financial inclusion with the number of SMEs growing each year (NSE, 2013).

The CMA has developed the futures markets by facilitating the NSE to develop the futures and options market. The development includes derivatives for equity and debt instruments. Some of the products for offer include interest rate futures and foreign exchange derivatives. Interest rate futures are beneficial to institutions which rely on borrowing/financing to hedge against higher interest rates while foreign exchange futures are important for sectors that rely on foreign exchange to hedge against currency risks. These foreign exchange derivatives cuts across the major macro economic sectors of the economy like sectors dealing with exports and imports.

The Electronic Trading Platform also known as the Automated Trading System (ATS) was introduced in 2012 (NSE, 2012). The ATS allows trading immobilized corporate bonds and treasury bonds. It has reduced cycle time and increased opening times for NSE and orders to be queued up properly (Simiyu et al., 2014). It has also had strong consolidation of customer accounts and CDSC avoiding poor trading at the NSE. Furthermore, it has helped registrars in rolling out dividends in the shortest time possible. With all these developments, the NSE is likely to attract a lot of diaspora funds as well as international funds due to good performance. Kenya's NSE ASI was ranked the third best performing stock exchange market indicator in the world after Venezuelan's and Egypt's (Osoro and Jagongo, 2013).

Another major development is the Kenya infrastructure bonds. The first infrastructure bond was issued in 2009 and raised 18.5 Billion shillings for roads, energy, water and irrigation sectors. Other infrastructure bonds include the 12-year twenty billion Kenya Shillings infrastructure bond issued in September, 2013 which was oversubscribed (CMA, 2013). Buying these infrastructure bonds has become easy for the general population as it is not restricted to only those with CDSC accounts at the CBK. Anyone can buy through having a CDSC account with various banks. This has opened up the infrastructure bond market and thus increased financial inclusion.

1.2.4 Developments in the Insurance Industry

Insurance penetration in Kenya is about 3.2 percent (IRA, 2015) which is considered to be high by African standards. The Kenyan insurance market has grown at an average of 16 percent for the last five years. In the last two years, the insurance market has recorded about Kenya shillings 135 Billion and 158 Billion in Gross Domestic Premiums in 2013 and 2014 respectively. The market comprises of 45 insurance companies and 140 insurance brokers hence creating high levels of competition in the industry (Insurance Regulatory Authority, 2014). Some of the developments that have happened in the insurance industry include the micro insurance schemes like the weather-index micro

insurance scheme introduced in 2009. This has seen farmers being cushioned from financial disaster arising from weather changes. A policy framework paper has been developed by the IRA micro insurance working group with regard to micro insurance and it awaits approval by government. Insurance companies have also embraced technology and work with the Mobile Network Operators in introducing new products. For example, CIC Insurance introduced a platform called M-BIMA which is an insurance package for proprietors of M-Pesa shops. In 2011, the first Islamic Shariah compliant, fully fledged insurance company was introduced, Takaful insurance of Africa launched by CIC insurance group. This has increased insurance penetration especially to the Muslim population.

1.2.5 Other Financial Sector Developments

Other developments in other financial institutions include what is commonly known as consumer to consumer (C2C) and consumer to business (C2B) or business to consumer (B2C). C2C occurs where the banks play a background role in linking consumers to other consumers (the bank acts as a collection bank). The bank links consumers to other consumers through a paybill number. The effect of this is that the banks hold onto large sums of money for overnight lending and at the same time it reduces risks such as fraud and others associated with handling cash by the institutions. The overall effect is that the number of transactions has increased where consumers do not have to actually visit the bank. Examples of these include Kenya Power and Lighting Company (KPLC) electricity bills where consumers pay their bills through a paybill number. Both the bill payer and KPLC happen to be consumers of the banking services but through the paybill number, neither has to visit the bank. Other examples include payment of Higher Education Loans Board (HELB) loans by former university students through a paybill number. C2B on the other hand is where the consumer (individuals) creates some form of value and businesses pick up or buy this value; commonly known as collected demand. This stimulates demand and consumption in the economy. In the financial sector, one example of this is the M-Pesa business which created and collected demand for money transfer.

Kenya's mortgage industry has witnessed an impressive growth in the last couple of years due to a high demand for real estate. The mortgage market increased the number of houses from 7,600 houses in 2006 to 20,000 houses in 2012 (World Bank, 2013b). However, the market has been hit by the high interest rates and thus growth has been dampened. The value of mortgage loan assets outstanding increased from Kshs 122.2 billion in 2012 to Kshs 188.2 billion in December 2014 (CBK, 2014b). These mortgage loans are mainly from the four main banks (KCB, Standard Chartered bank, Barclays Bank, CFC Stanbic Bank) and a mortgage company (Housing Finance Company Limited). The activity in the mortgage market is dependent of interest rates as well as other macro-economic variables like inflation. In addition, access to long term funds is a major determinant of mortgage market growth.

1.3 Financial Innovations in Kenya

There are three types of financial innovations. They include process, product and institutional innovation. Process innovation involves the introduction of new business processes or ways of doing things which lead to increased efficiency and higher output. Institutional innovation includes creation of new financial intermediaries, new business structures as well as changes in the financial, legal and regulatory framework. Examples would include establishment of bank agents. Product innovation involves the introduction of new financial products for example, credit, hire purchase and insurance products (Blach, 2011).

Kenya has experienced a continued growth in financial innovations and financial developments in the last decade. Examples of some of the innovations include process innovation like the use of ATMs, debit and credit cards and introduction of the Kenya Electronic Payments and Settlement System (KEPSS) as well as the Automated Trading System (ATS) in the capital markets, product innovation including use of paper money like cheques, plastic money, introduction of Shariah compliant products like Sukuks (Islamic bonds) and Muraabahah and finally institutional innovation which include agency banking,

internet banking and mobile banking. These innovations have been supported by technological advancement and mobile money by the reduction of costs in telecommunication. In addition, products which suit the Islamic population have been introduced. Islamic bonds known as Sukuks were introduced in 2012 as well as new ways of purchasing and holding assets by the Muslim community known as Muraabahah.

Institutional innovation has also become evident in Kenya with introduction of mobile banking, internet banking and agency banking. With internet banking, people are able to do banking from the internet without necessarily going to the bank. This has been overtaken by mobile banking where people use their phones to do banking even without internet connection. Further, agency banking was introduced in 2010 with the aim of taking banking services closer to the people. With it came the agency banking Act, 2011 which governs the use of agency banking. Banks can use various outlets stores as agents and this has the potential of reaching more people. Many banks including Equity bank, KCB bank, Co-operative bank, Chase bank, Post bank are all using agency banking and they have used it as a competitive strategy to woo customers in the market.

One innovation which is drawing attention in Kenya and in the world at large from many stakeholders including users, countries which may want to replicate and researchers is the mobile money transfer service, M-Pesa. The system has been one of the most developed and successful systems in the world (Jack and Suri, 2011 and Buku and Meredith, 2013) and is considered the world leader in mobile money (Nyamongo and Ndirangu, 2013). Since its onset, M-Pesa has grown and has attracted a number of other competitors but it still remains the leading mobile payment system in Kenya. M-Pesa has greatly increased financial inclusion in Kenya and has been beneficial to the poor population especially in rural areas with limited access to banking services (FSD et al., 2013). M-Pesa is used by over 70 percent households in Kenya out of which 50 percent are not in the banking system while 41 percent live in the rural areas (Reed et al., 2013). Financial inclusion had

risen to 67 percent and 75 percent with growth of M-Pesa by the end of 2013 (FSD et al., 2013) and 2016 (FSD et al., 2016) respectively.

1.3.1 Mobile Money Services

Aker (2010) found that over 60 percent of Africans have access to mobile phones and this contribute greatly to the use of mobile banking. The use of mobile money in Kenya has grown with various forms of mobile payments by Mobile Network Operators (MNOs) and various banks. Various mobile money products include M-Pesa (launched in 2007) which is a mobile phone based money transfer service initiated by Safaricom Limited (a Mobile Network Operator), Airtel Money (launched in 2011) which is the equivalent of M-Pesa for Bharti Airtel Kenya Limited, an Indian Multinational telecommunications service company, Yu cash (launched in 2009), the equivalent for Essar Telecom Kenya Limited, Orange money (introduced in 2010), the equivalent for Telkom Kenya Limited and Mobikash, a mobile money service for Mobikash Kenya Limited. It is a subsidiary of Mobicom Africa Limited which offers mobile money transfer services across all networks, banks and biller merchants. The percentage of the Kenyan population with access to mobile money services was 63 percent in 2014 (Communications Commission of Kenya, 2014). Majority of Kenyans have now turned to the use of mobile phone financial services (mobile money services) as compared to the use of banking financial services. This is shown in Figure 1.1.



Figure 1.1: Comparison of Use of Banks and Mobile Phone Financial Services
Source: FSD et al. (2016)

In 2013, those using mobile phone services were 63 percent in 2013 and 71.4 percent in 2016 compared to those using banks which were 29 percent in 2013 rising to 38.4 percent in 2016 (FSD et al., 2016). Use of mobile phone services have grown at a higher rate than use of banks. The increase in bank use is attributed to mobile banking. The number of people subscribed to mobile money services has grown as shown in Figure 1.2.

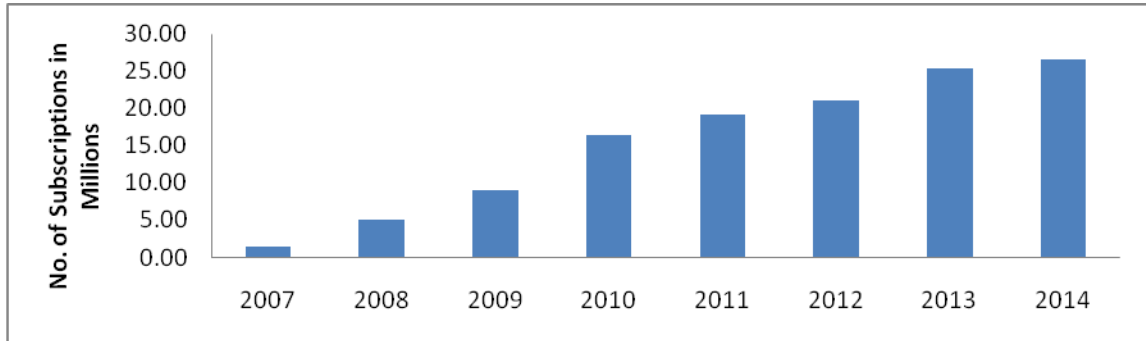


Figure 1.2: Mobile Money Subscriptions

Source: Central Bank of Kenya (2014a)

The total number of subscriptions to mobile money services had grown from one million subscribers in 2007 to about 26.6 Million subscribers in 2014. The growth of mobile money service in Kenya was made successful by the use of agents. The CBK through its Banking Act, 2013 allows agents to register and operate for example M-Pesa shops. Mobile transfer agents have grown since the introduction of M-Pesa in 2007. This is shown in Figure 1.3.

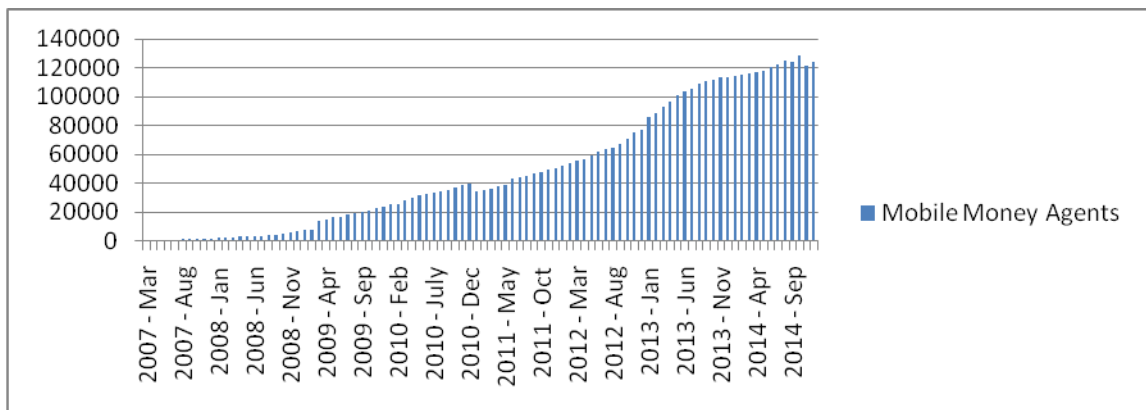


Figure 1.3: Mobile Money Agents

Source: Central Bank of Kenya (2014b)

At the onset of mobile money services, only 1,582 agents were available in December 2007. The number of agents had grown to about 123, 703 by December 2014 (CBK, 2014). This growth is an indication that people are willing to take up mobile money services as a form of banking in areas where banking services are limited or non-existent as well as use it as a form of carrying money instead of having to go to the banks in areas where banks are available. The agents were distributed among the various mobile money services as shown in Figure 1.4

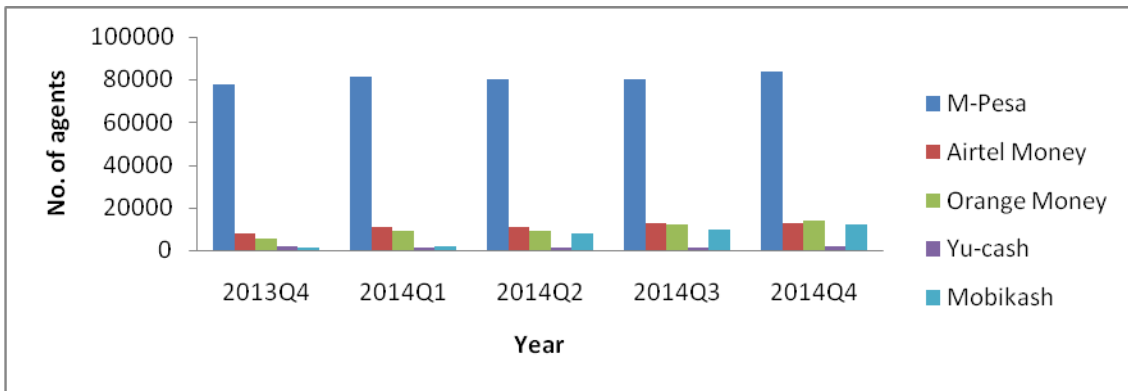


Figure 1.4: No. of Agents per Mobile Money Service

Source: Communications Authority of Kenya (2014)

Safaricom’s M-Pesa had the most agents in the country with other networks having less than 10,000 each. This shows the dominance of M-Pesa in Kenya. Figure 1.5 demonstrates how mobile money services have increased between 2007 and 2014.

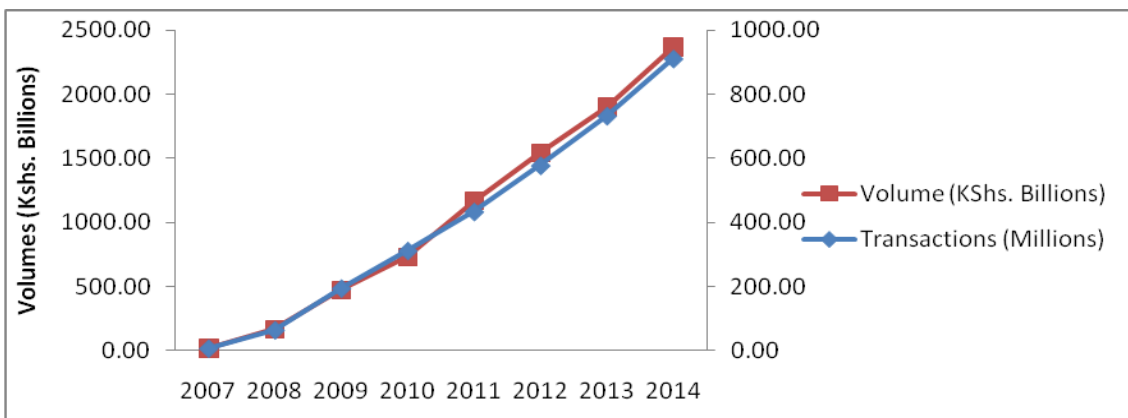


Figure 1.5: Mobile Money Transactions and Volumes

Source: Central Bank of Kenya (2014a)

Mobile money transfers grew from KShs. 5.4 Million transactions in December 2007 to Kshs 911 Million transactions by December 2014. In addition, the volume of the mobile money transfers increased from Kshs. 16.3 Billion in December 2007 to Kshs 2.37 Trillion in December 2014 (CBK, 2014).

1.3.2 The Case of M-Pesa

M-Pesa⁷ which was introduced in 2007 is a short form of Mobile Money and it is a mobile-phone based money transfer and micro financing service for Safaricom Limited, a Mobile Network Operator in Kenya (and Vodacom in Tanzania). It is an innovative payment system for the unbanked. At the moment, it is the most developed and successful mobile payment system in the world (Buku and Meredith, 2013). M-Pesa allows customers to send and receive money through their mobile phones. With M-Pesa, Safaricom Limited accepts deposits from registered users. In exchange, the users receive e-float which is held in the user's electronic account. This e-money is then used by users for various services including sending, receipt and withdrawal of funds, pay bill and buy good services under the Lipa na M-Pesa service, airtime purchase and transfer of money to bank accounts.

Other services offered include; Bank to M-Pesa where customers can withdraw money from their bank accounts by using M-Pesa and Cashless distribution for various companies (for example Coca cola). Some of the services paid through the LIPA na M-Pesa include Lipa Kodi (meaning to pay rent), utility payments and salary disbursements. This service has been one of the most useful and easiest ways of money transfer for the poor. As Aker and Mbiti (2010) puts it, M-Pesa has evolved from solely being a money transfer system into a payment system and is now part of the formal financial system. Recently, banks came up with a product which links mobile phones to bank accounts. This allows customers to access their account balances through their mobile phones as well as deposit

⁷Pesa is a Swahili word meaning money

money. With all these services being offered by M-Pesa, the number of subscriptions has increased over the years as shown in Figure 1.6.

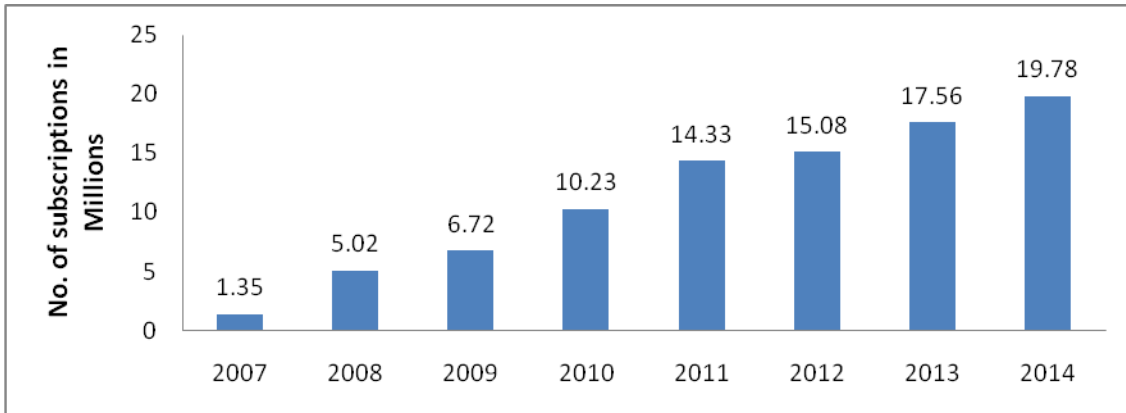


Figure 1.6: No. of M-Pesa Subscriptions
Source: Communications Authority of Kenya (2014)

At the start of M-Pesa in 2007, only about one million of the population was subscribed to M-Pesa but by June 2014, M-Pesa had 19.3 million users (Safaricom Limited, 2014) (over 70 percent of the adult population - Kenya Population and Housing Census Report, 2009). The use of M-Pesa has grown over the years with Safaricom setting up agents all over the country to increase access. Initially, agents were concentrated in Nairobi but this later changed with agents reaching the rural areas. Figure 1.7 shows the number of M-Pesa agents.

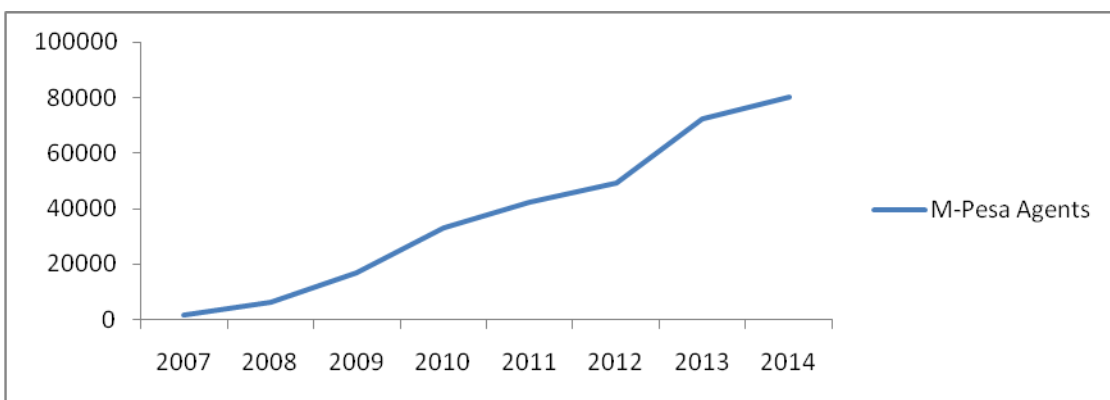


Figure 1.7: No. of M-Pesa Agents
Source: Communications Authority of Kenya (2014)

Currently, there are over eighty thousand M-Pesa agents in the country up from only about one thousand in June 2007. Unlike the banking system, the role of M-Pesa is to improve financial access and not financial intermediation (Buku and Meredith, 2014). M-Pesa is more of a transactional platform and a store of value system. M-Pesa transaction flows account for about 43 percent of GDP (Safaricom, 2015) which gives the unbanked access to financial services via mobile phones in Kenya. The number of M-Pesa transactions and volumes are shown in Figure 1.8.

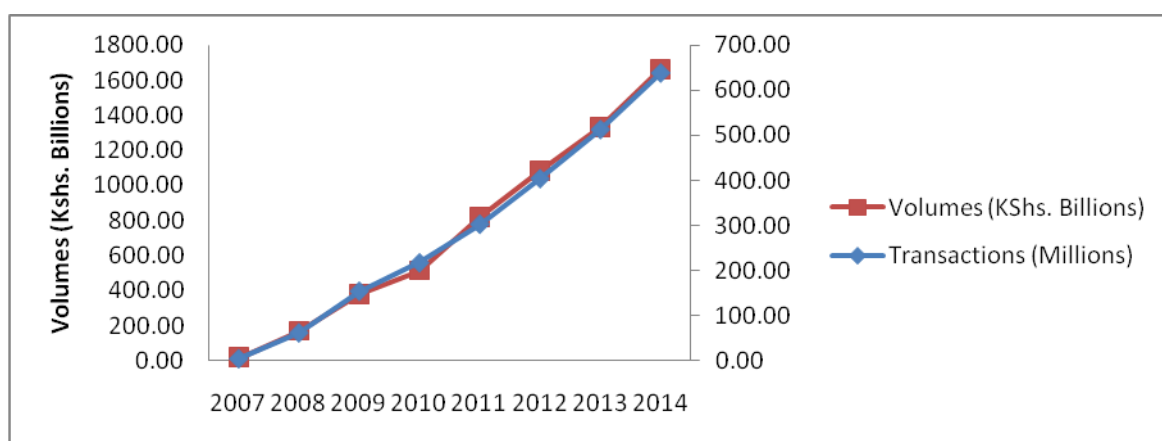


Figure 1.8: M-Pesa Transactions and Volumes

Source: Central Bank of Kenya (2014b)

The number of M-Pesa transactions had grown from 5.5 million transactions in 2007 to about six hundred and thirty eight (638) Million transactions in 2014 with the volume of M-Pesa transfers growing from Kshs. 16.3 Billion in 2007 to Kshs. 1.6 Trillion by 2014.

Initially, Safaricom limited partnered with Equity Bank to extend M-Pesa to M-Kesho (which allowed for savings and credit by Equity Bank). M-Kesho had collapsed in 2010 due to mistrust between Safaricom and Equity Bank. Extending M-Pesa further brought the launch of M-Shwari by Safaricom Limited in November 2012. M-Shwari is a byproduct of Safaricom, Vodafone and Commercial Bank of Africa (CBA). It allows M-Pesa customers to access interest bearing savings accounts without going to the bank to open a savings account. In addition to saving, M-shwari allows customers to access credit from CBA

without going to the bank based on their M-Pesa transactions and saving history. The bank credits the customer’s M-Pesa account with the loan amount which is between one hundred and two hundred and fifty thousand Kenya shillings (Kshs 100 – 250,000) to be repaid within one month (or two if rolled over).

This loan does not attract any interest but only a 7.5 percent processing fee. Deposits on M-Shwari attract an interest of between two and six percent (2 - 6 percent) depending on the amount saved. This has led to financial inclusion⁸ of the poor as they can now save and borrow small amounts of money without having bank accounts. As at 2012, only around 6 million people (less than 20 percent) had access to financial institutions (Central Bank, 2012). With the launch of such products, the number of people with access to financial institutions is expected to increase significantly. The use of M-Shwari has grown with it having 3.6 million active users by June 2014 and Kshs four billion worth of deposits held at Commercial Bank of Africa and Kshs 1.2 billion worth of loans issued every month. Out of these loans, the non-performing loans as at June 2014 were at 2.7 percent (Safaricom, 2014). Growth in M-shwari loans and deposits is given in Figure 1.9.

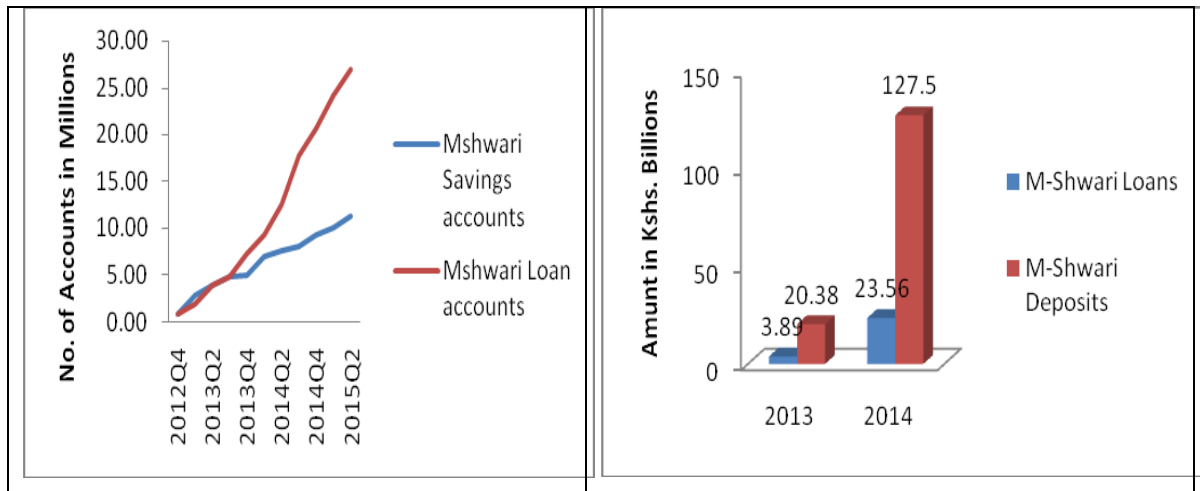


Figure 1.9: M-Shwari Loans and Deposits Accounts and Amounts
 Source: CBA (2014), CBK (2014b)

⁸ The World Bank defines financial inclusion as where the low income and disadvantaged populations do not have access to affordable financial services

The Mshwari loan accounts and loan amounts grew speedily between 2013 and 2014 with loans growing from 3.89 billion Kenya shillings in 2013 to 23.6 billion Kenya shillings. Additionally, the number of deposit accounts grew more than two fold with deposits growing from 20.4 billion Kenya shillings to 127.5 billion Kenya shillings.

Safaricom Limited had signed an exclusivity contract for two years with Commercial Bank of Africa in regards to M-Shwari which shut out any other bank from partnering with Safaricom in such a product. This contract expired at the end of 2014 which meant that other banks could get into similar products. In March 2015, Kenya Commercial Bank (KCB) came up with another M-Pesa product known as KCB M-Pesa which is a partnership with Safaricom Limited and its equivalent to M-Shwari. It works the same way as M-Shwari where people are able to save and borrow through KCB. The only difference is the additional features where for M-Shwari, deposits can only be made through M-Pesa while for the KCB M-Pesa, deposits are made through both M-Pesa and KCB bank branches. KCB M-Pesa also offers higher amounts of loans from fifty to one million Kenya shillings (Kshs 50 – 1,000,000). The repayment period is also longer and can either be one, three or six months. The interest charged on loans is between two and four percent (2 - 4 percent) per month. By December 2015 as KCB released its half year results, KCB M-Pesa had a total of 2.1 million users. The total loans issued through KCB M-Pesa were two billion shillings while deposits were over two hundred million shillings (Kshs 200 million).

M-Pesa has changed how money is transferred in Kenya and this is important in financial inclusion. Figure 1.10 shows this dynamic shift.

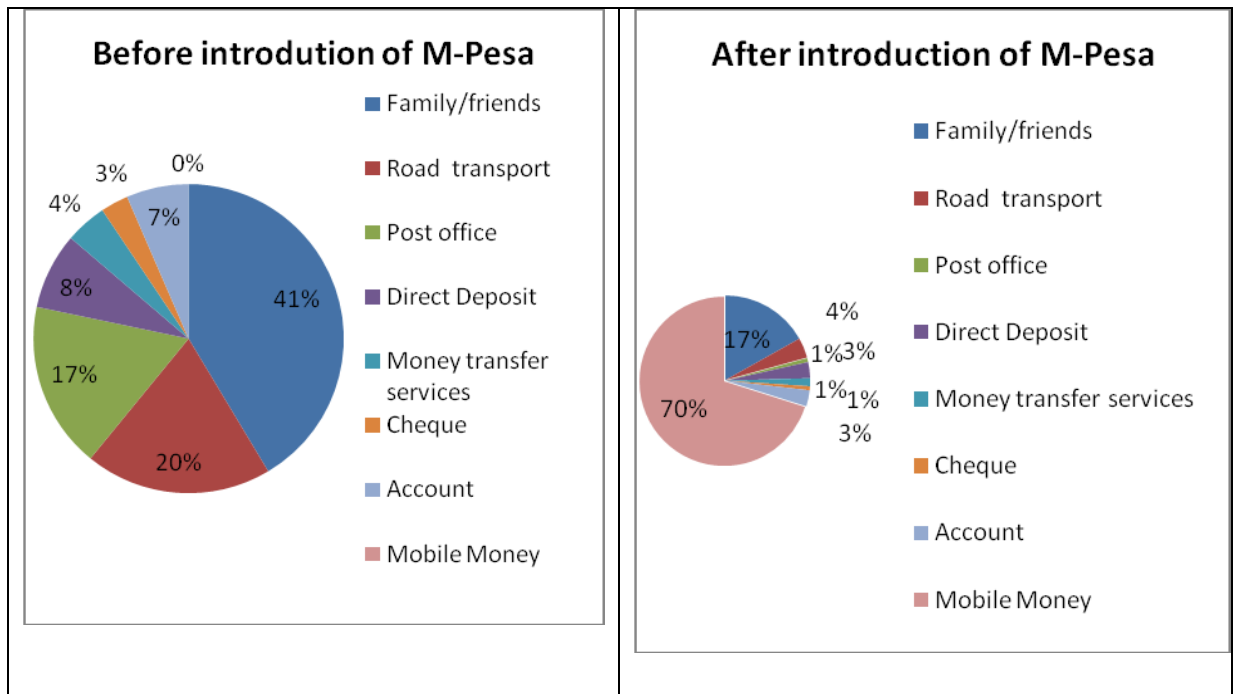


Figure 1.10: Migration of People to the Use of Mobile Money Transfer Services
 Source: FSD et al. (2013)

Initially, transferring money was mainly done through friends and family but with introduction of M-Pesa, use of family and friends for transfer of money reduced to 17 percent from 41 percent. M-Pesa now leads as a means of transferring money. Thus, M-Pesa has been adopted as an efficient way of moving money from one user to another and hence acts as a link between the urban and rural populations.

As Reed et al. (2013) reported, slightly more than 75 financial institutions had partnered with Safaricom’s M-Pesa in provision of services. Safaricom Limited has also partnered with other institutions to provide additional services through M-Pesa. For example, it has partnered with the technology startup, M-Kopa to provide clean energy solution i.e. solar home lighting solution is offered on hire purchase and paid through M-Pesa. Other providers have tapped into M-Pesa by making use of M-Pesa services or collaborating with Safaricom on the use of M-Pesa. Such include Insurance companies (CIC insurance – M-BIMA), SACCOs, state corporations like Higher Education Loans Board – HELB (where

former university students pay for their loans through M-Pesa), petrol stations and supermarkets.

Thus, it is clear from the discussions that there are several uses of M-Pesa including transfer and transaction, savings and credit. These four uses of M-Pesa give the key channels through which M-Pesa trickles down to economic growth and poverty.

1.3.3 Relationship between Financial Development and Financial Innovation

Financial innovation contributes to financial development. During the period post mobile banking introduction (after 2007), there is a connection between the financial development indicators and the financial innovation. Using the growth of M-Pesa agents from 2007, it was clear that the financial development indicators; credit to private sector, broad money supply and bank deposits have all had an accelerated increase post mobile banking introduction. Further, it was observed that non-performing loans have reduced to the less than 10 percent mark post mobile banking introduction. These relationships are shown in Figures A.1, A.2, A.3 and A.4. Meierrieks (2014) also found that financial development occurs simultaneously with financial innovation. This chapter thus discussed the M-Pesa mobile money service showing its operational framework and how it theoretically relates to economic growth and poverty.

These new financial developments in Kenya may have implications for growth and poverty. Therefore, this thesis sought to investigate the relationships between financial development, economic growth and poverty. This chapter laid an important basis for the three essays in regards to understanding the major financial developments and innovations. However, to understand these relationships empirically, there is need to examine the behavior of economic growth and poverty.

1.4 Economic Growth

Kenya has had a rather poor economic performance for over two decades. After independence, Kenya promoted rapid economic growth through public investment, support for agricultural production and offering incentives for private industrial investment. This saw the Gross Domestic Product (GDP) grow by an average of 6.6 percent from 1964-1972 but from 1974, a decline started with average annual growth averaging 5.2 percent in the period between 1972-1979, 4.0 percent over 1980-1989 and 2.4 percent over 1990-2000 (Republic of Kenya, 2001). This poor performance was due to poor macroeconomic policies in the 1970's and 1980's, for example price control, import substitution and exchange rate control. In addition, the government's poor governance standards deterred domestic investment.

In the early 1990's structural adjustment program (SAP) were introduced by the International Monetary Fund (IMF) and World Bank. These changes did not bring so much change in the growth rate due to poor commitment by the government to reform and high corruption. Other shocks in the 1990s include the after effects of the 1992 general election where too much money was printed for the elections. These shocks together with poor monetary and fiscal policies led to very low economic performance (Amanja and Morrissey, 2005). Poor monetary policies led to high interest rates while poor fiscal policies led to budget deficits.

After the National Rainbow Coalition government came into power in 2002, Kenya's economic performance took an upward trend and by 2007, the economic growth rate was at 7 percent. But the post-election violence following the 2007 elections lowered the economic performance of the economy for the subsequent years. This was due to the negative effects on agriculture and transport sectors which adversely affected others sectors. The average real GDP growth rate fell to a low of 3.7 percent between 2000 and 2009. It then improved in 2010 and 2011 to an average of 6.2 percent but then fell down to between 4 – 5 percent in 2012 and 2013. In 2014, growth rate was 5.3 percent. The World

Bank’s projections indicate a growth rate of 6 percent (World Bank, 2014) for 2015 propelled by ongoing infrastructural investments, for example the standard gauge railway, falling oil prices, increased agricultural production as well as growth in the others sectors. Figure 1.11 shows the trend of the growth rate of GDP in the last decade for Kenya.

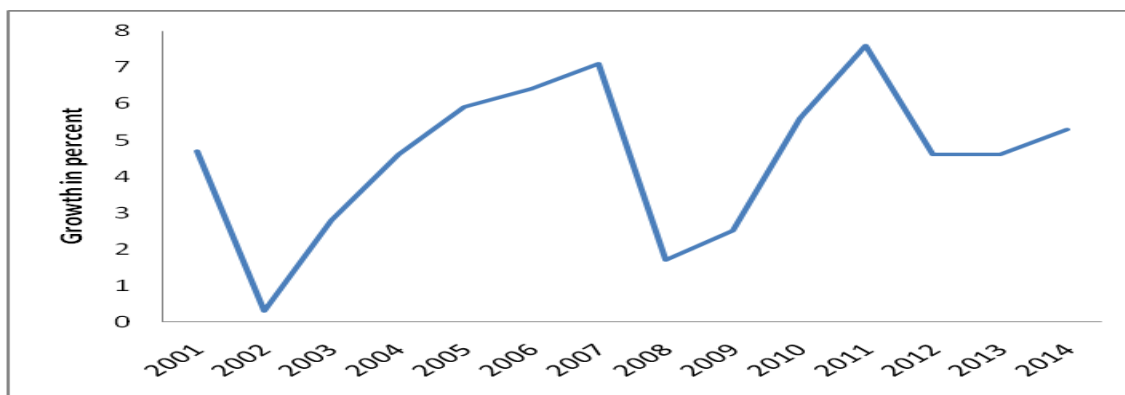


Figure 1.11: GDP Growth Rate
 Source: Kenya National Bureau of Statistics, Economic survey (2015, 2010, 2005)

The graph shows that growth rate of GDP has been fluctuating over the years with sharp declines in 2002, 2008 and 2012 due to the uncertainties of the 2002 elections, post election violence and the global financial crisis effects respectively. In comparison to other countries in the region, Kenya fairs well in terms of its growth rate. Figure 1.12 shows the East African Community (EAC) countries average growth rates from 2010 to 2013.

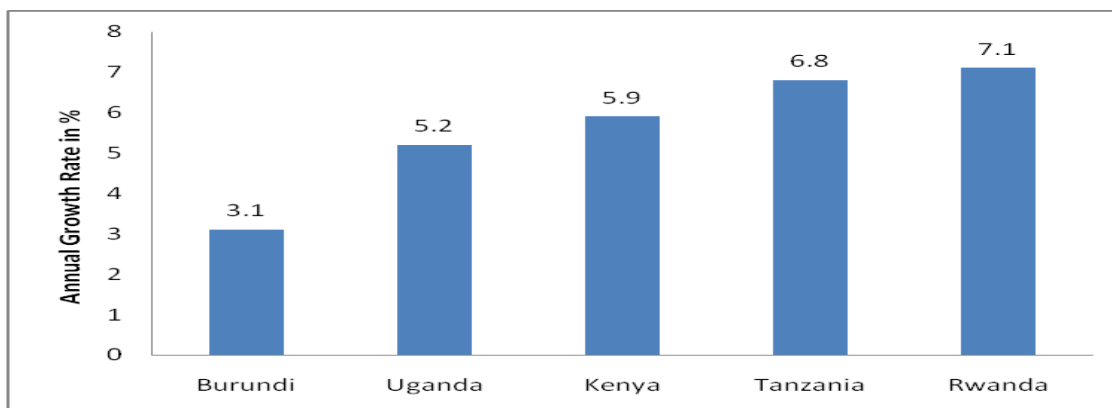


Figure 1.12: Average Annual Growth Rates for EAC Countries for the Period 2010-2015
 Source: World Bank (2014a), World Bank (2016)

Looking at the averages in the last four years, the growth rate was 6.2 percent and higher compared to Uganda's 5.4 percent and Burundi's 4.1 percent. Tanzania and Rwanda's growth rate were however higher than Kenya's. The growth rate for Kenya is projected upwards to 7.0 percent in 2017 (World Bank, 2014a) with the hope that there will be no negative eventualities.

In 2014, Kenya's GDP was rebased and the country's status rose from a low income country to a lower-middle-income country as per World Bank's classification. It was necessary to rebase the GDP by using a more recent base year to collate new constant price estimates. The old base year was 2001 while the new base year is 2009. It helps to accommodate changes in production structures due to developments and innovations, demand side changes like consumption patterns. Figure 1.13 shows this rebasing.

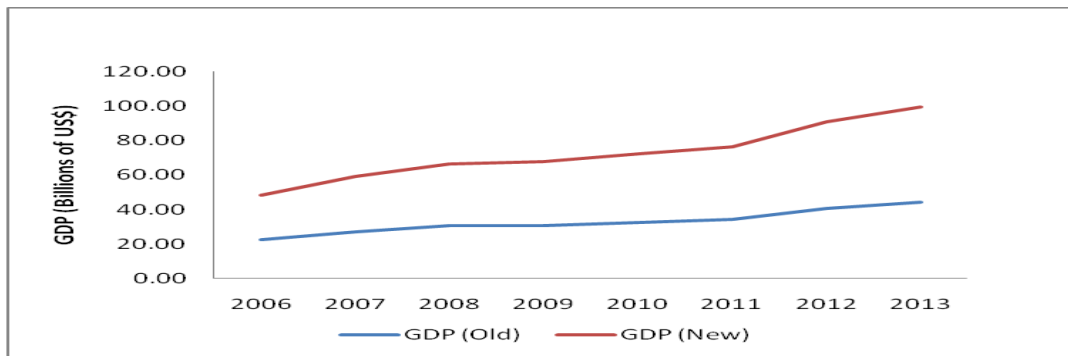


Figure 1.13: Kenya's GDP Before and After Rebasing

Source: Kenya National Bureau of Statistics (2014)

From the Figure, GDP has been on an upward trend since 2006 as most of the sectors of the economy have been growing and their contribution increasing. By 2013, GDP stood at US \$ 55.2 Billion (Kshs. 4,757.5 Billion).

1.5 Poverty status

Poverty is a multi-dimensional concept. It does not just involve material or income lack. The other dimensions include health, education and living standards. Measuring poverty in Kenya has been inconsistent. For the past 20 or so years, there have only been about four surveys and poverty trends as shown in Figure 1.14.

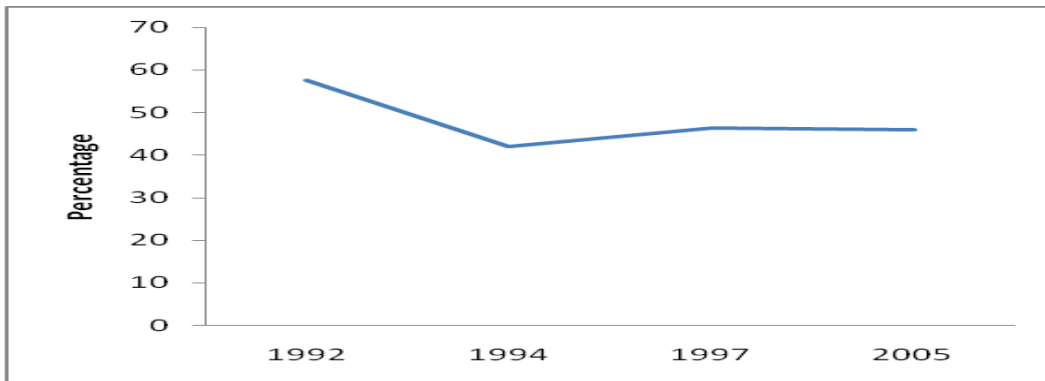


Figure 1.14: Poverty Trends in Kenya between 1992 and 2005

Source of data: Republic of Kenya (Various Welfare and Monitoring Surveys), KIHBS, 2005/06

For the period between 1992 and 2006, poverty has been high ranging over 40 percent. In 2006, poverty level was at 46 percent (Kenya Integrated Household Budget Survey, KIHBS, 2005/2006). After 2006, the Kenya Institute of Public Policy and Analysis (KIPPRA) has conducted poverty projections and the trends are shown in Figure 1.15.

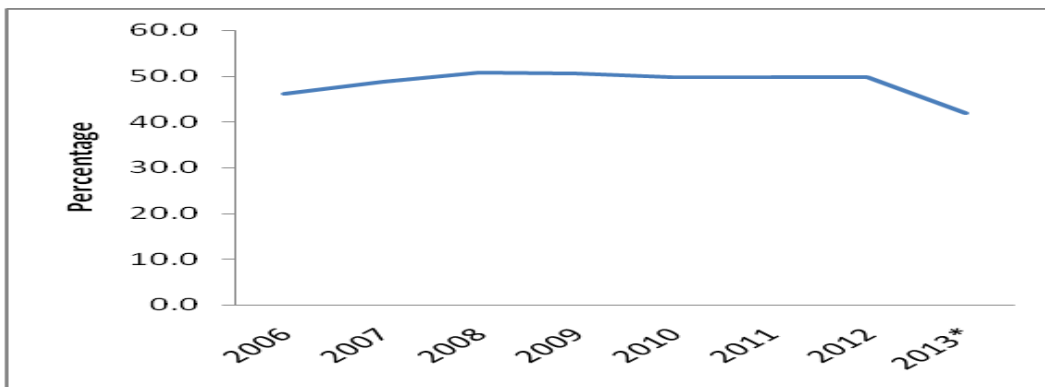


Figure 1.15: Poverty Trends Estimates in Kenya after 2006

Source: KIPPRA (Various Kenya Economic Reports) and World Bank, 2013a

* indicates World Bank, 2013 latest estimates

Poverty has remained above the 40 percent mark since 2006 and the latest estimates by the World Bank (World Bank, 2013a) show that poverty stands at between 38 percent and 43 percent. The poverty status in the country is made worse by the high levels of income inequalities. Although a lot of efforts have been made to reduce the poverty levels in Kenya, poverty remains high. For example, a number of anti-poverty policies were introduced in Kenya towards this effect as indicated in the National Poverty Eradication Plan (NPEP) for 1999-2005 and the Poverty Reduction Strategy Paper (PRSP) for 2001-2004 (Republic of Kenya, 2001). In these plans, the government committed itself to poverty alleviation by 2015 by growing the economic performance, adopting the International Development Goals and shifting resources to pro-poor programs (Republic of Kenya, 2001).

The Millennium Development Goals (MDGs) signed into in the year 2000 and came to an end in 2015 and were also targeting eradication of extreme poverty and were succeeded by Sustainable Development Goals. There are also other financial and non-financial public interventions (Ronge et al., 2002) as well as widespread support from development partners like World Bank, United Nations, IMF and United Nations Office for Project Services. The unresolved question to policy makers in Kenya and indeed many observers of the local economy is, what has gone wrong, and what remedy, if any, is there for Kenya's economic rejuvenation in terms of raising growth and reducing poverty?

1.6 Financial Development, Economic Growth and Poverty Link

The link between financial development and growth as discussed in theory show that financial development on the one hand is important for economic growth as it provides savings which are important for investment and hence growth. On the other hand, economic growth may act as a spur to financial development. These relationships are depicted in Figure 1.16.

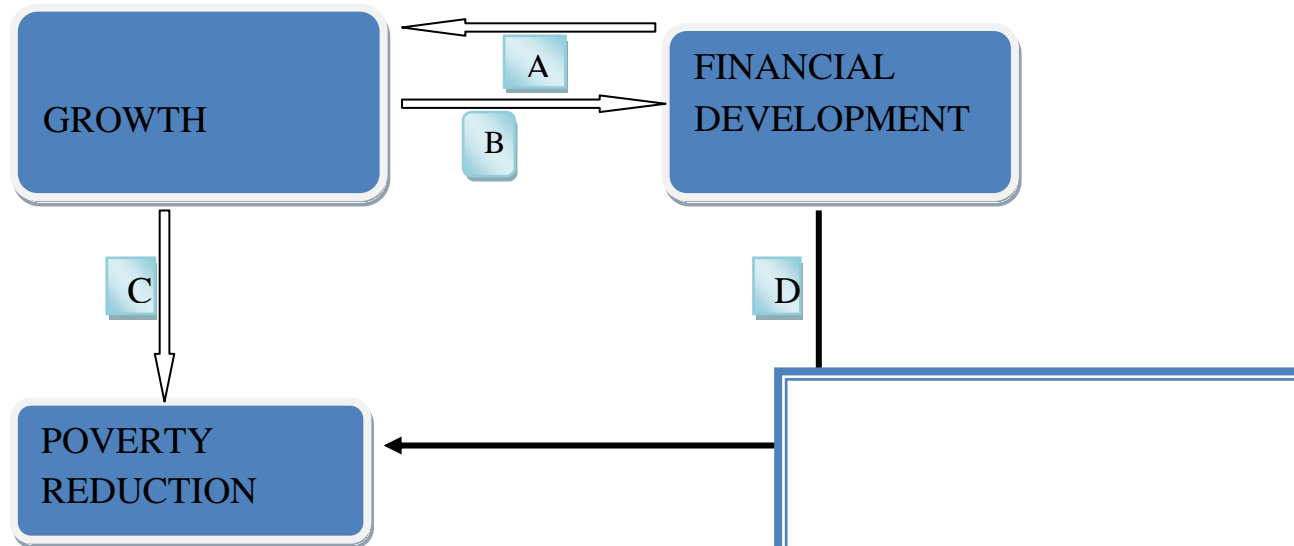


Figure 1.16: Link between Financial Development, Economic Growth and Poverty Reduction
 Source: Author's compilation

A represents the importance of financial development for growth while B represents the importance of growth for poverty. In addition, the link between financial development and poverty can be direct through providing self finance for the poor or indirect through economic growth as shown by route D.

This link is important even for Kenya and it is important to understand the link especially for policy makers. The Kenyan economy is affected by a number of dynamics both at the macro and the micro front. Kenya aims to raise its growth rate by ensuring that the various industries or sectors that contribute to GDP growth grow considerably. One of these sectors is the financial sector and efforts to grow the sector are necessary. In addition, the other main aim of every economy is to reduce poverty. This is also the World Bank's key objective in addition to encouraging shared prosperity. This thesis therefore sought to investigate how financial development in Kenya supports these key objectives of raising growth and reducing poverty.

1.7 The Statement of the Problem

In Kenya, the financial sector has played a major role in mobilization of savings for growth and development. Compared to other African countries, the Kenyan financial sector has made significant strides (Alter and Yontcheva, 2015). The financial sector grew from 2.7 percent in 2008 to 7.5 percent in 2014 mainly due to the banking sector growth (KNBS, 2014). It contributed 6.3 percent to GDP in 2011 but fell to 4.8 percent in 2013 before rising in 2015 to 8.4 percent (KNBS, 2015). It is evident that the financial sector has grown speedily in the last decade. This has been accompanied by growing financial innovations. However, economic growth has had a low fluctuating growth and poverty levels have remained rampantly high (World Bank, 2013a). In 2007, the growth rate was 7.1 percent reducing to 1.7 percent in 2008 after the 2007 post election violence and then increasing to 5.4 percent in 2014 (World Bank, 2014b)⁹. Considering the good performance of the financial sector, the question or the problem that remains unresolved is why this good performance has not culminated into higher economic growth and reduced poverty.

It is not clear whether financial sector development leads to economic growth in Kenya or whether it is economic growth that leads to financial development or whether they each spur the other. The empirical literature is divided with some studies showing the supply leading hypothesis (Uddin et al., 2013a), others the demand following hypothesis (Ang and Mckibbin, 2007) while others showing a bi-directional relationship (Akinlo and Egbetunde, 2010). In Kenya, same mixed results are reached (Odhiambo, 2008; Agbetsiafa, 2003; Wolde-Rufael, 2009 and Onuonga, 2014). Thus, there is no consensus in Kenya on the direction of causality and how financial development impacts economic growth. Some studies find that the impact of financial development on economic growth is very weak in Kenya (Nyamongo, et al., 2012). Again, these studies have concentrated on causality that other aspects of financial development have been left out. The quality and efficiency of the financial sector development has been ignored as well as the growing

⁹ Latest estimates indicate a growth rate of 6 percent for 2015, World Bank (2015)

financial innovations and how they affect growth. This prevailing gap warrants an empirical investigation.

Further, the debate surrounding finance and growth has ignored the finance - poverty relationship. Poverty still remains rampant in Kenya (World Bank, 2013a) while the financial sector is flourishing with developments and innovations (Gichuhi, 2013). The relationship between financial development and poverty is still not clear in Kenya. The existing studies in Kenya concentrate on micro finance and poverty (Kiiru, 2007; Okibo and Makanga, 2014) and other aspects of financial development and poverty are left out. The direct and indirect effects of financial development on poverty are not known. In addition, the effect of the ongoing growth in financial innovations on poverty is unexplored but requires immediate answers.

In the last decade, the country has experienced a number of financial innovations. The existence of these innovations has not been looked into conclusively and thus there is a gap in terms of understanding their theoretical implications and effect on growth and poverty. Again, a lot of financial developments have been experienced in Kenya and even if Kenya is relatively more advanced in financial development than other African countries (Alter and Yontcheva, 2015), the level of financial development is still quite low compared to other developing and developed countries. There is little literature on what drives financial development in Kenya since much emphasis has been put on the finance-growth nexus (Odhiambo, 2008, Wolde-Rufael, 2009 and Onuonga, 2014). Based on this background, there is an urgent need to understand why Kenya's financial sector is relatively more advanced than other African countries but trails other developing and developed countries. Therefore, consistent with this research problem, three pressing issues should receive more attention: What are the key drivers of financial development in Kenya?; What is the effect of financial development on economic growth in Kenya?; and What is the effect of financial development on poverty in Kenya?

1.8 Objectives of the Study

The main objective of this thesis was to investigate the relationship between financial development, economic growth and poverty in Kenya.

Specific objectives were to:

- i) Analyse the determinants of financial development in Kenya
- ii) Determine the effect of financial development on economic growth
- iii) Determine the effect of financial development on poverty

1.9 Significance of the Study

The findings of this study are important for policy makers in terms of making policies to grow the financial sector, grow the economy and reduce poverty. Previous studies have not incorporated financial innovations in the finance-growth-poverty nexus, ignoring the qualitative and efficiency aspects of financial development, leaving out the finance-poverty aspects and the channels of effect as well as not handling the causes of the time series variations of financial development. These gaps are important for policy. Understanding the key drivers for financial development are important for policy in deciding where to put focus. Policy makers and other stakeholders would also wish to understand what to target in promoting financial innovations while at the same time ensuring a conducive environment for growth. Knowing that the quality and efficiency of financial sector growth is important is key for policy makers as they would then work on improving these aspects. The study is useful to the regulatory authorities in the financial sector. Existing literature is limited to traditional measurement of financial development and this study contributes greatly to incorporating new aspects of financial development as well as financial innovations.

1.10 Scope of the Study

This study examines the dynamics between financial development, growth and poverty over time. It uses quarterly data for the period 2000 to 2014. The study is limited to Kenya to give a better understanding of the relationship since cross country studies do not allow one to examine the relationship exhaustively in terms of time series variations.

1.11 Structure of the Thesis

This thesis is structured into five chapters. Chapter one discusses the introduction and financial developments and innovations that have taken place in Kenya in the last decade. The determinants of financial development are discussed in chapter two. Chapter three discusses the effect of financial development on economic growth in Kenya, while Chapter four discusses the effects of financial developments on poverty in Kenya. Chapter five details the summary, conclusions and policy implications.

CHAPTER TWO

DETERMINANTS OF FINANCIAL DEVELOPMENT

2.1 Introduction

Kenya has experienced a steady growth in the financial sector. The banking sector, the stock and equity markets, the insurance industry and the non-bank financial institutions have all registered impressive development patterns. These developments have been accompanied by financial innovations such as mobile money, agency banking and ATS. Availability and accessibility of capital promotes innovative initiatives. This is through channeling funds from surplus to deficit investors. Financial development also enhances the efficiency and effectiveness of institutions which promote economic growth and poverty reduction.

Different countries experience different levels of financial development. More developed economies experience higher financial development while less developed countries experience lower financial development (Law and Habibullah, 2009). In as much as developed countries experience higher financial development than less developed countries, there are no specific thresholds to distinguish between countries that are more financially developed from those that are not. The only thresholds that exist for developed countries is the level of financial development that is impactful for an economy (Kose et al., 2009). African countries' level of financial development has been disappointing and on average lower than other low income countries (Alter and Yontcheva, 2015 and Easterly and Levine, 1997). Compared to other economies in the region, Kenya seems to have a better performance (Alter and Yontcheva, 2015) but still cannot compare to developed or other emerging economies. Further, Kenya has made a lot of progress in terms of financial innovation where it leads in mobile banking through M-Pesa (Allen et al., 2014). But why are some countries more financially developed than others?

Kenya has experienced growth in financial development in the last decade and a half. This could be attributed to several factors which are examined in the chapter. Figure 2.1 indicates this growth.

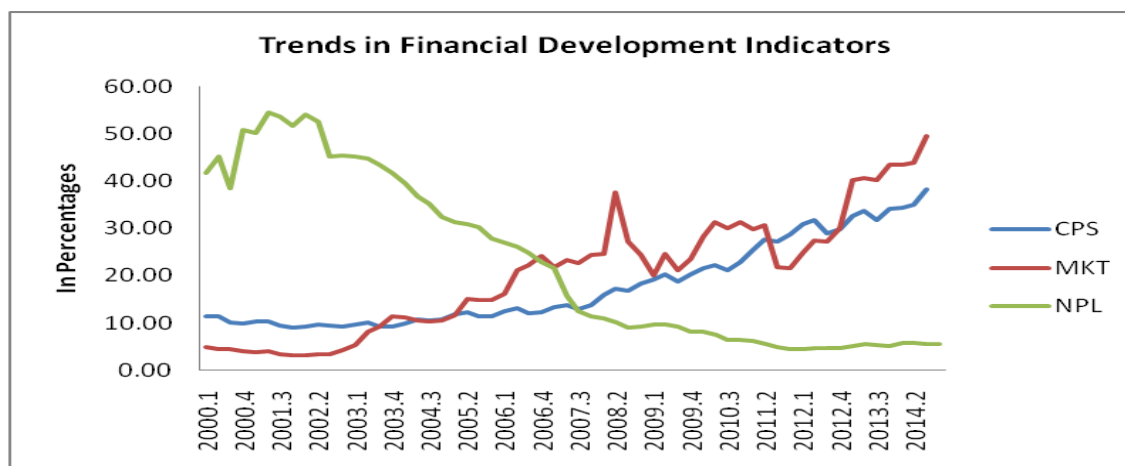


Figure 2.1: Trends in Financial Development Indicators

The indicators of financial development showed that financial development has been improving with credit to private sector (CPS) and market capitalization (MKT) having an upward trend and non-performing loans (NPL) having a downward trend. This chapter sought to uncover the factors responsible for this time series variation in financial development.

There are four hypotheses discussed in the literature in regards with what causes financial development which include: The economic institutions hypothesis put forward by Acemoglu et al. (2004), the endowment hypothesis introduced by Acemoglu et al. (2001) both explaining the importance of institutional quality, the simultaneous openness hypothesis due to Rajan and Zingales (2003) on the importance of openness and the law and finance hypothesis advanced by La Porta et al. (1997) which discusses the importance of the English common law (These are discussed in details in theoretical literature section).

Existing literature has documented several drivers of financial development. Economic institutions enhance better environment for investment, political institutions ensure proper

enforcement of property rights, openness allows more opportunities for investment and thus growth while institutional quality also enhances proper enforcement of property rights for long-term growth. There are many studies done on what drives financial development (See for example Huang, 2010a; Standley, 2010; Mbulawa, 2015). These studies summarized determinants of financial development as legal tradition, institutional quality, macroeconomic factors, openness policies, political economy factors and also other factors as remittances, geographical factors, culture, and technology.

Most studies on determinants of financial development have concentrated on the developed economies. Thus, less developed economies are left out in determining what causes financial development. In Kenya, very scant evidence (Aduda et al., 2012 and Githaiga and Kabiru, 2014) exists in this area. These few studies concluded that remittances, GDP, inflation and domestic savings are significant determinants of financial development. These findings were reached while looking at stock market development. These studies did not consider significant determinants of financial development including institutional quality, political economy factors as well as technology which has been key for financial innovation. Thus a gap exists in understanding why the financial sector has not grown relative to the developed economies and what determines this financial development.

Thus, this study sought answers to the following questions: What is the influence of institutional quality, openness, macroeconomic factors and political economy on financial development in Kenya? What are the other significant factors that influence financial development in Kenya? The main objective of this study was to analyze the determinants of financial development in Kenya.

Specifically, the study sought:

- i) To determine the effect of institutional quality on the level of financial development

- ii) To determine the effect of openness indicators on the level of financial development
- iii) To determine the effect of political economy factors on the level of financial development
- iv) To determine the effect of macro economic factors on the level of financial development
- v) To determine the effect of state of technology on the level of financial development

2.1.1 Significance of the Study

This study makes contributions to an emerging literature on financial development in three ways. First it is timely in view of the current emphasis on the role of financial development to economic growth. Second, the study is important in terms of providing feedback to policy makers on policies that can enhance financial development. Several factors have been discussed in literature including institutional factors, macroeconomic factors, political economy factors, openness factors and technology. Understanding the significant determinants of financial development in Kenya will help policy makers to make policy based on evidence. For example, any investigation evaluation that does not take into account the role of financial innovation, if it is found to robustly and non-negligibly predict financial development is therefore incomplete.

Thirdly, the study contributes to existing and new literature by bringing in new insights on financial development in Kenya by investigating the drivers of financial development. It does this by using appropriate indicators of financial development as opposed to the mainly used indicators (broad money supply and domestic credit) which mainly represent the size and depth of the financial sector and best used in developed countries. This study thus uses bank credit to private sector to show depth of financial intermediation and extends the analysis by including indicators of efficiency of the financial sector which constitutes financial development. It hence contributes new knowledge in literature for not just Kenyan policy makers but also for Kenyan and other future researchers. It fills the gap which is missing in Kenya on what leads to financial development.

2.2 Literature Review

2.2.1 Theoretical Literature

Theoretical literature on the determinants of financial development centers on four hypotheses which include the economic institutions, the endowment, the law and finance and the simultaneous openness hypotheses. The law and finance hypothesis argued that the English common law systems are better than the French law systems since they put emphasis on protecting property rights (La Porte et al., 1997). The endowment hypothesis (Acemoglu et al., 2001) argued that institutional quality is vital for development and differs between economies due to initial differences between economies. The economic institutions hypothesis was coined by Acemoglu et al. (2001) and proposed that good economic institutions aid in increasing investment fueled by a good political economy. Finally, the simultaneous openness hypothesis postulated that both trade and financial openness promote financial development (Rajan and Zingales, 2003). These hypotheses form an integral part of this study as it is the basis of the study. They were discussed further in the following section.

a) Institutional Factors

Acemoglu et al. (2001) discussed the important role institutions play in economic matters by introducing the *endowment hypothesis*. Institutional framework and quality differs among regions due to initial conditions. Further, Acemoglu et al. (2004) argued that economic institutions have an influence on the reward system facing economic actors which is important for derivation of economic outcomes which they refer to as the *economic institutions hypothesis*. Economic institutions contribute to productive and investment decisions. This hypothesis is limited to the importance of economic institutions while other institutions are important. Political institutions also affect the allocation and control of power in society which determines to a greater extent, economic outcomes. In a centralized form of government with little competition, financial systems are poorly developed in contrast to more decentralized competitive economies (Beck et al., 2001).

This is because it is possible to promote the interests of the elite leading to directed credit allocations. There are three types of institutions (Fernandez and Tamayo, 2015): legal institutions, macroeconomic institutions and informal institutions. Legal institutions provide the legal framework which is important in lowering the consequences of information asymmetry which causes failure of financial institutions. Correct enforcement of contracts and property rights is important in the financial sector where there are many financial contracts. There is also need for a strong judicial system to improve the legal processes.

In regards to the legal institutions, La Porta et al. (1997) introduced the *law and finance hypothesis* which asserts that the English common law systems are better than the French law systems since they put emphasis on protecting property rights. Legal institutions impact on financial development through two channels; the political channel and the legal adaptability channel (Beck et al., 2001). The political channel accentuates that financial development is determined by how property rights and investors in a country are protected. The legal adaptability channel points out the capacity of legal institutions to adapt to changes in financial institutions and the commercial environment. The macroeconomic institutions need to provide a good macroeconomic environment in terms of monetary, fiscal and financial policies which boosts financial development. Finally, the informal institutions are important in influencing people's trust and their attitudes in investment. They determine how people view risk and interest. This influences their involvement in the financial sector in terms of taking up new instruments and investing in financial markets (Fernandez and Tamayo, 2015).

b) Openness Factors

Trade and financial openness are seen to encourage competition and thus spur the development of financial systems (Rajan and Zingales, 2003) in what is known as the *simultaneous openness hypothesis*. Opening up of markets to foreign trade may be accompanied by opportunities for growth. It increases trade volumes which improves

financial deepening and hence economic growth. This increases savings and favors financial development. Ginebri et al. (2001) argued that an increased flow in trade can lead to growth of the financial sector. This could occur through attaining of more efficient technology, growth of capital markets making them more active and also higher growth both in the real economy and in the financial sector. The other probable scenario is that it can bring foreign competition to the domestic markets. This may lower economic profits and hence make domestic firms more dependent on external finance. This dependence could make domestic firms push for lowered interest rate (financial repression) which is not conducive for financial development. This hypothesis is critical in Kenya with the country having opened up its markets to the rest of the world with various bilateral and multilateral agreements like the East Africa Community and Common Market for Eastern and Southern Africa.

c) Macroeconomic Factors

The theory behind the relationship between financial development and economic growth is traced back to Schumpeter (1911) who argued that financial intermediation plays a key role in influencing economic growth. The theory also shows a reverse causation between financial development and economic growth where financial development follows economic growth in what is known as demand following hypothesis or the growth led finance. Economic growth leads to increased economic activity which calls for growth in financial systems and thus financial development is viewed as a consequence of economic growth (Robinson, 1952). Further, as Patrick (1966) argued, an upsurge in economic growth leads to increased demand for financial services, financial instruments and financial innovations. Economic growth also leads to introduction and set up of new financial institutions and growth of existing institutions (Trew, 2006) which leads to financial development.

Inflation is seen to negatively affect financial development. First, due to information asymmetries, efficiency in the financial system affects how savings and investments are allocated (Stiglitz and Weiss, 1981 and Huybens and Smith, 1999). When there is a high

rate of inflation, then volatility and instability in the financial markets is worsened as well as inefficiency which creeps in the financial system thus hindering growth in the long-run. High inflation is also seen theoretically to lead to instabilities in the financial markets especially volatilities which are endogenously determined for example through share prices and equity returns. Further, high inflation affects negatively the real return to savings by eroding the value of the returns.

Secondly, the relationship between inflation and financial development may be seen from the point of government deficit and financing (McKinnon, 1973 and Bencivenga and Smith, 1992). Governments when faced with large budget deficits may cover it through an inflationary tax by increasing the inflation tax base or seigniorage revenue. This may include efforts to tax the financial system which would lead to reduction in the activities of the financial markets and the financial system as a whole. Thirdly, inflation and financial development are related through economic growth (Boyd et al., 1996). These theories posited that higher economic growth is associated with lower inflation rates. Thus, because economic growth affects both inflation rates and financial development, then it implies higher levels of financial development. Thus, inflation and financial development are correlated holding other things constant.

d) Political Economy Factors

Rajan and Zingales (2003) argued that the presence of political powerful elite hinders financial development. This is because they want to keep resources to a minority elite group, control investment capital and this leads to financial repression. In regards to political economy Acemoglu et al. (2004) further postulated that different political institutions and political power leads to different distribution of resources. Governments which are more democratic have better distribution of resources than those with authoritarian types (Siegle et al., 2004).

e) Remittances

The theory of how remittances and financial development are linked can be looked at from Keynes (1936) motives of holding money; transactions, precautionary and speculative purposes (Keynes, 1936). Households receive money for and spend it on any of the three motives. On the precautionary and speculative motives, households direct their resources to demand deposits, savings deposits and/or time deposits. Thus, the demand of financial services comes in since households deposit their funds in banks for precautionary motives and keep it in demand deposits. Other funds can be placed in time deposits as they speculate on investment opportunities. The effect of remittances on financial development is through two main channels; the demand side and the supply side (Demirgüç-Kunt et al., 2010). The demand side proposes that use of formal remittance services increases financial literacy and people are able to use formal financial services as well as extend their use in what is referred to as “induced financial literacy hypothesis”. The supply side channel argues that receipt of remittances in formal financial services increases the amount of loanable funds which leads to credit expansion by financial institutions to private and public sector which increases financial depth.

2.2.2 Empirical Literature

Empirical literature discusses several strands of literature including: Institutional factors, Macro economic factors, Openness factors, Political economy factors and other factors including remittances and technology. Macroeconomic factors include economic growth, inflation, exchange rate, budget deficit. Economic growth promotes financial development (demand following hypothesis). Openness factors include trade openness and financial openness where financial openness involves opening up an economy to receive foreign capital flows, Overseas Development Aid, foreign Direct Investment, remittances and portfolio flows. Other factors include remittances, geography and technology. This section discussed literature based on these five strands of financial development determinants in literature.

a) Macroeconomic Factors

Macroeconomic stability is necessary for investment and hence for financial development (Bleaney, 1996). Economic growth is seen as propelling financial development. Several studies show that financial development is a consequence of economic growth (Shan et al., 2001; Agbetsiafa, 2003; Waqabaca 2004; Ang and McKibbin, 2007; Odhiambo, 2007; 2009; 2010; Yu and Gan, 2010 and Ezzo, 2010). Literature found that those economies which have less developed or poorly performing financial sectors are likely to experience the demand following hypothesis where economic growth is a determinant of financial development (Waqabaca, 2004 and Ang and McKibbin, 2007). Arestis and Demetriades (1997), Shan et al. (2001), Agbetsiafa (2003) and Law and Habibullah (2009) found that economic growth is positively related with banking sector and capital market development. They argued that a higher rate of economic growth leads to more demand of financial services which is instrumental for financial development.

Most of these studies used constant financial development indicators and found support that economic growth is a key determinant of financial development. The most common financial development indicators used include credit to private sector, broad money supply and market capitalization (Arestis and Demetriades, 1997; Shan et al., 2001; Agbetsiafa, 2003; Law and Habibullah, 2009 and Yu and Gan, 2010). The same indicators have been used in studies across Africa (Chukwu and Agu, 2009 and Ezzo, 2010). In Kenya, the importance of economic growth for financial development was shown by Agbetsiafa (2003), Odhiambo (2007; 2009 and 2010). Odhiambo (2007; 2009 and 2010) used the same measures of financial development and found the same results. These studies also used the same financial development indicators including broad money supply and credit to private sector.

English (1999) using cross sectional analysis found a positive relationship between inflation and financial development. High levels of inflation cause households to substitute

from financial transaction services to holding high levels of money balances which raises the size of the financial sector. On the contrary, inflation affects financial development negatively but with threshold effects. Haslog and Koo (1999) and Khan et al. (2001) using Ordinary Least Squares (OLS) and conditional least squares respectively for cross country analysis, found threshold effects with Haslog and Koo (1999) finding a threshold level of 15 percent above which inflation is hurtful to financial development and below which there are low marginal negative effects. Khan et al. (2001) using non-linear least squares found a threshold level of 3- 6 percent per year depending on the measure of financial development used. Below that threshold, inflation has a positive effect on financial development and above which, inflation is detrimental to financial development.

The reason for these conflicting results between the three studies is probably the use of different financial development indicators. English (1999) used financial sector GDP while Haslog and Koo (1999) uses broad money supply, deposit money bank domestic assets and credit to private sector. Khan et al. (2001) used domestic credit to private sector and stock market capitalization. Bank credit to private is a better measure of financial development in developing countries (Ayadi et al., 2013) and this study adopted this measure in addition to measures of quality of assets and stock market development.

There seem to be a consensus on a negative impact of inflation on financial development using panel data analysis mainly GMM (Boyd et al., 2001; Naceur and Ghazouani, 2005; Zoli, 2007; Bitten Court, 2008; Kim et al., 2010 and Al-Nasser and Jackson, 2012). Boyd et al. (2001) for example used the Hansen (1999) methodology of threshold effects and General Methods of Moments (GMM) and found that there is a threshold of 15 percent above which inflation is harmful to financial sector development. Kim et al., (2010) also found a negative relationship between inflation and financial development in the long run using panel ARDL. However, in the short run, they found that inflation is beneficial to financial development. They also found threshold effects of inflation.

Ayadi et al. (2013) using random effect panel regressions found that inflation affects financial development negatively but the effect is most significant when there is an open capital account. These studies mainly used the broad money supply (M2/GDP) as an indicator of financial development which is limited in developing countries as it is composed of currency in circulation and may not show the level of financial development. This measure is composed of M1 and quasi-money in banks and other NBFIs. It is noted that M1 comprises a high level of cash in circulation and other demand deposits. This measure thus makes the definition of financial development to be limited to just the quantity of money in circulation and in financial institutions (Ang and Mckibbin, 2007 and Gehringer, 2013). A broader perspective of financial development to include intermediation and quality of financial development is important. These studies apart from Ayadi et al. (2013) ignored the importance of institutional quality for financial development. Ayadi et al. (2013) also captured financial development in terms of meta-efficiency (distance of a bank from a meta frontier) instead of just the size of financial development. This study borrowed from Ayadi et al. (2013) by introducing efficiency indicators of financial development and institutional quality variable.

Country specific studies also found that inflation is negatively related with financial development (Lee and Wong, 2005; Keho, 2009; Ozturk and Karagoz, 2012 and Akosah, 2014). They concluded that poor macroeconomic policies are deleterious to financial development. There is an inflationary threshold above which inflation is disastrous to financial development and below which it has no or minimal effects (Lee and Wong, 2005, using the threshold autoregressive method). Akosah, 2014 using Vector Error Correction Model further showed that the negative relationship and causality between inflation and financial development depends on the measure of financial development used. These studies could have similar findings due to the use of similar financial development indicators, M2. Akosah (2014) in Ghana used M2/GDP which is not an appropriate measure in developing countries (Ang and Mckibbin, 2007). This study thus deviated by not using this measure.

b) Openness Factors

Trade openness is important for financial development in developed and developing countries (Levchenko and Quy-Toan, 2004; Huang and Temple, 2005; Herger et al., 2007). Trade openness promotes financial development only in rich developed countries and not in poor economies since trade openness can lead to importation of financial goods for the poor economies. This was supported by Levchenko and Quy-Toan (2004) who observed that openness to trade can lead economies to dwindle their financial systems if they depend on importation of financial services and financially dependent goods and services. Using OLS and instrumental variable analysis, they also found that trade openness is more effective in promoting banking sector development more than equity based development. Huang and Temple (2005) using OLS and GMM also found that in more developed countries, trade openness is accompanied by faster financial development while in poor less developed countries, trade openness leads to sluggish financial development. The studies used different indicators of financial development in determining if trade openness lead to financial development. These indicators (Credit to private sector, M2 and market capitalization) measured only the size of financial development which limits financial development. Only Huang and temple (2005) included a measure of quality of assets and efficiency and this study will follow by including an indicator of quality of assets.

Cross sectional analysis when used showed that trade openness is key for financial development (Rajan and Zingales, 2003; Klein and Olivei, 2008; Grima and Shortland, 2008; and Law, 2009). Rajan and Zingales (2003) for example employed the instrumental variable analysis and found that trade openness positively affects financial development which happens only if the effect is jointly with the presence of free flow of capital. Free trade alone is not sufficient to promote financial development. Further, Grima and Shortland (2008) using OLS, outlier robust regression and GMM found that openness to trade is more important and leads to faster growth in the banking sector whereas it negatively affect stock market development.

Panel data analysis also found that trade openness is important for financial development (Chinn and Ito, 2002; Huang, 2005a and Voghouei et al., 2010). They all found a positive relationship between trade openness and financial development. Using GMM panel data analysis, Chinn and Ito (2002) however observed that trade openness in less developed countries negatively affects equity markets development while leading to an expeditious development in the equity markets in developed and emerging economies. They also found that there is threshold level of institutional development that is necessary for trade openness to promote financial development. These studies concentrated on stock market financial development and did not show the time variant reasons of financial development. Hence, this study looked at time series dynamics.

Financial openness is important for financial development (Klein and Olivei, 1999; Aizenman, 2004; and Baltagi et al., 2009, Matadeen and Seetanah, 2013). Using time series Vector Error Correction Models (VECM), they found that there is a long run effect of financial openness on financial development. Some studies found that financial openness positively affects financial development if there is an aspect of trade openness in an economy (Rajan and Zingales, 2003; Aizenman and Noy, 2004 and Chinn and Ito, 2006). Rajan and Zingales (2003) observed that both financial openness and trade concurrently promote financial development. Others found that financial openness can only promote financial development if there is the presence of well functioning legal, economic and political institutions. These studies are panel cross country analysis and it is important to have country specific studies. Thus, this study looked at the importance of openness for financial development in Kenya.

Financial openness is important for equity markets and the stock market. Demetriades and Andrianova (2005), Chinn and Ito (2006) and Demetriades and Law (2006) using GMM and panel ECM models found that financial openness (capital account openness) leads to financial development in the stock market and equity market in emerging economies as well as in less developed economies but not in developed economies. Financial openness

is also very important for banking sector development (Law, 2008; Klein and Olivei, 2008; Erosy, 2011 and Abzari et al., 2011). Klein and Olivei (2008) found a positive relationship between financial openness and financial development only in the presence of institutional quality and sound macroeconomic policies while Erosy (2011) using ARDL cointegration approach found a relationship to exist only in the long run. Unexpectedly, financial openness is seen to prohibit financial development. Using dynamic panel data analysis, Voghouei et al. (2010) found that financial openness negatively affects banking sector development. These studies used broad money as the indicator of financial development which may not be a good indicator in developing countries. Hence, this study used other appropriate indicators of financial development.

c) Institutional Factors

Institutional quality and institutional factors like legal laws, governance and corruption are found to be important for financial development (La Porta et al., 1997; Levine, 1998; Law and Demetriades, 2006; Law and Habibullah, 2009; Assane and Malamud, 2010 and Becerra et al., 2012). Good legal laws and rules which protect investors, creditor rights and enforcement rights have a positive impact on the size and growth of equity, stock and debt markets as well as banking sectors in overall financial development (La Porta et al., 1997; Levine, 1998).

The English legal origin has been found to lead to more financial development than the French civil law because the French legal origin is associated with poor investor protection (La Porta et al., 1997). In addition to legal rights to creditors, better information sharing institutions leads to higher financial development in both the banking and the stock markets (Djankov et al., 2007). Assane and Malamud (2010) further supported that the English legal origin is superior to the French legal origin since it protects property rights more.

Institutional quality leads to improvement in financial development only in the long run (Huang, 2010b). Using General Method of Moments (GMM) in transition and low income countries, Huang found that institutional quality is important for financial development in poor countries in the long run. However, Sharma and Nguyen (2010) using OLS and a financial development index made of banking development indicators observed that while law enforcement and overall institutional quality is important for financial development, the importance is too over emphasized in literature. They indicate that the banking sector in Fiji developed quickly even in the absence of good institutions. Becerra et al. (2012) developed an index of institutional quality composed of corruption, law and order and bureaucratic quality and using GMM and Instrumental Variable (IV) methodology found that better institutional quality leads to better financial development.

Several factors have a significant and positive effect on financial development in the conditions of a good legal and institutional framework. These factors include trade openness, financial openness (Beji, 2007). Their effect on financial development can only be felt when a certain threshold of institutional quality is maintained. This literature was limited to cross country analysis using GMM panel and OLS analysis leaving out time variant analysis on specific countries. This study looked at a Kenyan study and includes institutional quality variables which have been left out in the Kenyan literature. The study also used different financial development indicators.

d) Political Economy Factors

Political power is key in the performance of the financial sector (Beck et al., 2001). They used panel estimation and found that political economies with open, competition and democratic status have better performing financial sectors than the authoritarian and closed political economies with centralized power. Electoral democracy is also seen to be a significant determinant of financial development. It leads to better financial development as it reduces the interest of governments to have public ownership of commercial banks.

When privatization is encouraged, it leads to increased competition and better performance of the financial sector (La Porta et al., 2002). Siegle et al. (2004) using GMM estimation found that electoral democracy and political freedom leads to higher financial development since electoral democracy comes with stronger institutions; legal, rule based and hence property rights protection. Stable political systems and regimes with minimal political constraints on the leaders increase financial deepening (Huang, 2005b). Further, Grima and Shortland (2008) used OLS and GMM models and found that major changes in political regimes have negative effects on financial development. It was important to borrow from these studies and test whether political economy variables affect financial development in Kenya especially with the improvement in democratic accountability index.

Voghouei et al. (2011b) used several political economy indicators including executive recruitment, political competition, political checks and balances, executive constraints and freedom of press in a GMM estimation. They found that political power is a significant influencing factor to economic institutions which then is key for financial development. They argued that whether political power is practiced in either an authoritarian or democratic way influences the performance of the financial sector.

e) Remittances

In regards to remittances, a negative relationship has been found between remittances and financial development (Adams and Page, 2005; Brown et al., 2011 and Githaiga and Kabiru, 2014). Adams and Page (2005) for example showed that remittances are mainly transferred through informal means instead of the formal bank and other financial channels. This does not lead to financial development since it does not grow the formal financial sector. Githaiga and Kabiru (2014) used a panel of 31 countries, Kenya included and GMM estimation to show the importance of remittances and found a negative relationship. Others, through cross country analysis show that remittances are important

and positively related to financial development (Aggarwal et al., 2011; Chowdhury, 2011; Oke et al., 2011 and Gwama, 2014).

There is the demand side channel of the effect of remittances on financial development and the supply side channel. On the demand side, Orozco and Fedewa (2005) found that receipt of remittances induces the recipients to demand more financial services in banks, for example bank accounts. Aggarwal et al. (2006) and Demirgüç-Kunt et al. (2010) using GMM estimation posited that receipt of remittances through remittance transfer services allows banks to find the unbanked receipts to offer them financial services which increase the population with access to financial services. The high costs of sending remittances may encourage recipients to demand certain financial products to reduce this cost. Oke et al. (2011) using OLS and GMM in Nigeria found that remittances have no effect on credit to private sector but has a significant effect of broad money supply indicating that most of the remittances are used for consumption and not investment.

On the supply side, remittances are associated with an increase in financial depth due to increase in credit of availability. Demirgüç-Kunt et al. (2010) using panel data for Mexico showed that remittances lead to improved credit and hence financial depth. Financial institutions are also more likely to offer credit facilities to remittance recipients since they can afford to repay as remittances are seen as a stable income (Aggarwal et al., 2010). These remittances also increase the level of deposits and hence the amount of loanable funds which then increases the depth of the financial sector. However, Brown et al. (2011) and Githaiga and Kabiru (2014) refuted the supply side channel by finding that remittances are negatively related with credit to private sector and Foreign Direct Investment and hence remittances hinder financial deepening. This is because receipt of remittances curtails the use of formal banking. This shows that the use of financial development indicators give differing results which could be due to the fact some indicators like money supply is an unsuitable indicator in developing countries (Ang and Mckibbin, 2007). This study introduced new indicators of financial development like non-performing loans. It

also considered the effect of remittances on financial development on a country specific study instead of the cross country analysis.

f) Technology

Berger (2003) and Beccalli (2007) using OLS and 2SLS found that technology use is high in the banking sector. Use of technology has led to reduction in costs, improvement in financial services offered as well as increases in productivity of the banks. This is one way of increasing financial development. Hauswald and Marquez (2003) found that information technology leads to reduced information asymmetry which lowers the cost of borrowing due to improved information processing. This leads to better performance of not only the credit markets but also insurance and securities markets. Industries with use of better technology are able to access more external finance and the financial sector is able to provide financial services when technology use is higher (Iliya and Samaniego, 2011 using fixed effects for a panel of countries).

Technology is a significant determinant of financial development (Marinc, 2013). Marinc discussed that use of Information Technology (IT) helps banks to tailor their services to the needs of customers and thus strengthens the relationship of the bank and its customers. Such banks are able to exploit economies of scale using technology and financial innovation which is an example of growth in the use of IT and thus improve their marketability. The use of mobile technology has led to increased financial development. Dekle and Pundit (2015) using panel data random effects and a financial development index for 23 Asian countries found that increased mobile subscription has led to higher financial development.

Literature on technology effect on financial development is growing and there are no specific studies in Kenya on it. This is necessary especially with the growth in innovations emanating from mobile technology. The study also deviated from use of standard financial

development indicators like broad money supply and domestic credit which mainly show the size and depth of financial development.

g) Geography

Geographical factors play a significant role in promoting or hindering financial development (Huang, 2005a; Herger et al., 2007). Whether a country is landlocked or not and is of specific latitude area has a direct effect on financial development. The effects of geography are felt on one side, either the supply side or the demand side like in import demands (Herger et al., 2007). However, geography is mainly used for cross country or cross sectional studies and may not help to account for time variant changes in financial development.

2.2.3 Overview of the Literature

The literature summarized two main strands; the indicators of financial development and the key drivers of financial development. With regard to financial development, several indicators have been used including broad money supply (M2/M3), domestic credit to private sector, and growth of liquid liabilities (Akosah, 2013; Ayadi et al., 2013). These with the exemption of domestic credit to private sector are indicative of the size of the financial sector and may not be appropriate for use in less developed and developing economies (Ang and Mckibbin, 2007 and Gehringer, 2013) as they do not indicate the ability of the financial system to convert savings to investment. They thus limit the definition of financial development to just quantity of money available. Financial development ought to include the aspect of intermediation, how savings are converted into investment as well as the quality and efficiency aspects of it. Indicators like the ones used in this study including credit to private sector, non-performing loans and interest rate spread cover these aspects of financial development.

Other indicators include, credit to private sector, equity market liquidity, rate of return and bond market capitalization (Boyd et al., 2001; Ozturk and Karagoz, 2012). Studies done in Kenya (Aduda et al., 2012 and Standley, 2010) have used the same measures on stock market development and banking sector development. The use of these indicators is limited and leaves out crucial aspects of quality and efficiency. Thus, this study introduced non-performing loans to capture quality of financial development in addition to credit to private sector and market capitalization.

Main drivers of financial development in literature include: openness, macroeconomic variables, institutional variables, political economy factors and remittances. Studies done in Kenya concentrate on stock market (Aduda et al., 2012) while others are cross country studies (Standley, 2010). They also leave out crucial drivers like institutional quality and mobile technology which has led to the leading innovations in Kenya (M-Pesa mobile money) and thus a critical determinant. This study filled these gaps.

2.3 Methodology

2.3.1 Theoretical Framework

The theoretical framework of the determinants of financial development can be modeled from the three hypotheses explaining the theory of financial development as discussed in section 2.2.1. The first one is the endowment hypothesis which stresses the importance of institutional quality for financial development. Next is the economic institutions hypothesis which explains that economic institutions are key for financial development (Acemoglu et al., 2004). Additionally, the simultaneous openness hypothesis due to Rajan and Zingales (2003) discusses that openness, both financial and trade is beneficial for local investors and hence important for financial development. This happens through the ability to access finance for investment. The endowment and economic institutions hypotheses are related as they lay the importance of institutions and institutional quality. Thus, the financial development model is represented as:

$$FD = f(INSTITUTIONS, OPEN, POLITIC) \dots\dots\dots 2.1$$

Where FD is financial development, INSTITUTIONS represent a combination of endowment and economic institutions hypotheses while OPEN represent openness as per the simultaneous openness hypothesis¹⁰. The economic institutions hypothesis also argues that for economic institutions to promote development then there should be a stimulating political economy. Thus, POLITIC represents political economy factors. The theoretical literature also proposes several other determinants of financial development including macro economic variables such as inflation (Bleaney, 1996 and Hybens and Smith, 1999), GDP which is seen to influence demand for financial services in what is known as the demand following hypothesis (Robinson, 1952; Patrick, 1966). There are also other determinants which influence financial development like remittances (Demirgüç-Kunt et al., 2010), culture (Stulz and Williamson, 2003) and geography (Kamarck, 1976; Acemoglu et al., 2001). Further, King and Levine (1993b) shows that finance responds to other interventions and innovations through technology. Therefore, equation 2.1 is augmented with additional factors and shown as:

$$FD = f(INSTITUTIONS, OPEN, POLITIC, MACRO, OTHER) \dots\dots\dots 2.2$$

Where MACRO is macro economic variables while OTHER is other important factors that affect financial development like remittances, culture, geography and technology.

2.3.2 Model Specification

The determinants of financial development are taken from the hypotheses on the determinants of financial development and empirical literature and include institutional factors, openness variables, political economy variables and other variables (macro

¹⁰ The law and finance hypothesis was not included since it focuses on factors that are historical in nature and which do not vary with time and are best in explaining cross country determinants of financial development.

economic variables, and other factors like technology and remittances¹¹) as indicated in equation 2.2. From equation 2.2, the specific indicators are introduced and following Huang (2005a) and Seetanah et al. (2010), the specification is given as:

$$FD = f(INST, TO, DM, GDP, \pi, REM, TE) \dots\dots\dots 2.3$$

Where INST is the institutional quality index representing endowment and economic institutions hypotheses, TO is trade openness representing openness hypothesis. The study used trade openness to represent the openness hypothesis due to data limitation on financial openness. GDP and π are GDP per capita and inflation respectively and represent macro economic variables. DM is democratic accountability and represent political economy factors while REM and TE are remittances and mobile technology respectively. The institutional quality index measuring economic institutions is a summation of five indicators including; corruption, bureaucratic quality, rule of law, government repudiation of contracts and risk of expropriation. Corruption is included in the institutional quality as a measure of quality of economic institutions (Knack and Keefer, 1995 and Baltagi et al., 2007) since high corruption is seen to erode the property rights protection including the functioning of the legal systems which lowers financial development.

FD is the dependent variable representing financial development. A number of indicators have been proposed in literature as measurements for financial development among them are the key ones; money supply (M2/M3) and domestic credit. However, these two measures have been criticized in literature as discussed in the literature review. Thus, this study introduced other indicators of financial development to capture the size, quality and efficiency of financial development. Bank credit to private sector is used as a measure of financial depth to specifically show the capability of the banking sector to provide savings

¹¹ Some variables like culture and geography have been discussed in literature as determining financial development. These variables are used mainly for cross country or cross sectional studies and may not help to account for time variant changes in financial development. Again, the sample size is not sufficiently large to allow for enough degrees of freedom. Thus, the variables were dropped out of the study.

for investment. Market capitalization is used as a measure of the size of stock market while non-performing loans shows the quality of credit given out by banks as well as efficiency of the financial sector (Dudian and Popa, 2013).

Equation 2.3 can be rewritten as a dynamic log-linear model as follows:

$$\ln FD_t = \alpha_0 + \beta_0 \ln FD_{t-1} + \alpha_1 \ln INST_t + \alpha_2 \ln TO_t + \alpha_3 \ln GDP_t + \alpha_4 \ln \pi_t + \alpha_5 \ln DM_t + \alpha_6 \ln REM_t + \alpha_7 \ln TE_t + \varepsilon_t \dots \dots \dots 2.4$$

The dependent variable is included as a lagged independent variable since previous values of financial development can influence the current values of financial development (Baltagi et al., 2007). It also helps to show the adjustment to long-run equilibrium of financial development from its short run dynamics. FD is represented by credit to private sector, market capitalization and non-performing loans implying that there are three different models of financial development for each indicator.

$$\ln CPS_t = \alpha_0 + \beta_0 \ln CPS_{t-1} + \alpha_1 \ln INST_t + \alpha_2 \ln TO_t + \alpha_3 \ln GDP_t + \alpha_4 \ln \pi_t + \alpha_5 \ln DM_t + \alpha_6 \ln REM_t + \alpha_7 \ln TE_t + \varepsilon_t \dots \dots \dots 2.4a$$

$$\ln MKT_t = \alpha_0 + \beta_0 \ln MKT_{t-1} + \alpha_1 \ln INST_t + \alpha_2 \ln TO_t + \alpha_3 \ln GDP_t + \alpha_4 \ln \pi_t + \alpha_5 \ln DM_t + \alpha_6 \ln REM_t + \alpha_7 \ln TE_t + \varepsilon_t \dots \dots \dots 2.4b$$

$$\ln NPL_t = \alpha_0 + \beta_0 \ln NPL_{t-1} + \alpha_1 \ln INST_t + \alpha_2 \ln TO_t + \alpha_3 \ln GDP_t + \alpha_4 \ln \pi_t + \alpha_5 \ln DM_t + \alpha_6 \ln REM_t + \alpha_7 \ln TE_t + \varepsilon_t \dots \dots \dots 2.4c$$

Equation 2.4 includes a test of the endowment and economic institutions hypotheses which is explained by α_1 . If this coefficient is significant and positive, then institutions/institutional quality is important in promoting financial development as explained by the economic institutions and endowment hypothesis put forward by Acemoglu et al. (2004; 2001) respectively. The openness hypothesis is explained by the coefficient α_2 . This hypothesis is limited to trade openness due to unavailability of data on financial openness. It is expected to be positive and significant for the hypothesis to hold as explained by the openness hypothesis by Rajan and Zingales (2003).

α_3 and α_4 captures the importance of macro economy on financial development and are expected as; $\alpha_3 > 0$ and $\alpha_4 < 0$. α_3 shows the demand following hypothesis by Patrick (1966) that financial development follows economic growth. α_4 shows that inflation is bad for financial development. α_5 is expected to be positive as argued by Acemoglu et al. (2004) that it fuels good institutions investment and thus financial development. α_6 and α_7 are expected to be positive and significant. α_6 is expected to be positive and shows the “induced financial literacy hypothesis” on the demand side and credit expansion on the supply side (Demirguc-Kunt et al., 2010) and is expected to be positive. α_7 is expected to be positive since technology leads to reduced information asymmetry and hence higher financial development (Hauswald and Marquez, 2003).

2.3.3 Definition and Measurement of Variables

This section presents the definition and measurement of variables which is shown in Table 2.1.

Table 2.1: Definition and Measurement of Variables

Variable	Definition and measurement	Expected Sign	Literature Source	Unit of Measurement
Credit to Private Sector (CPS)	Credit allocated by banks to the private sector only. It is a measure of financial depth and hence size of financial development. It's one of the indicators of FD	Dependent variable	Yartey, 2007 and Arcand et al., 2011	Kshs.
Market Capitalization (MKT)	Value of all outstanding shares of all companies listed at the Nairobi Stock exchange and it shows the size of stock market development. It's one of the indicators of FD	Dependent variable	Kenourgios and Samitas, (2007) and Levine (2003)	Kshs.
Non-performing Loans (NPL)	Sum of loans for which the borrowers have not made payment for atleast 90 days. It is measured as the value of NPLs divided by the total value of the loan portfolio. It's one of the indicators of FD	Dependent variable	Dudian and Popa (2013)	Ratio
GDP Per Capita (GDP)	The GDP divided by total population. It measures the total product of a country	Positive (demand following hypothesis)	Khan et al. (2011), Kar et al. (2015)	Kshs.
Inflation (π)	Continuous increment in price levels of goods and services over a certain time period. Measured month on month then aggregated quarterly	Negative	Easterly and Fischer (2001), Jeanneney and Kpodar (2011), Dollar and Kraay (2002)	Rate
Trade Openness (TO)	Aggregate of exports and imports of goods and services over GDP. Measures a country's openness to trade	Positive	Dauda and Makinde (2014), Menyah et al. (2014) and Wolde -Rufael (2009)	Index
Institutional Quality (INST)	It is a measure of how strong institutions are and is the summation of three ¹² Political Risk Services (PRS) indicators including; corruption, bureaucratic quality and risk of expropriation. It is measured as an index from 0 = low institutional quality to 6 = high institutional quality ¹³	Positive	Baltagi et al., 2007, Gries and Mierrieksy (2010)	Index
Democratic Accountability (DM)	How free and fair elections are as well as the extent to which a government is responsive to its citizens (ICRG, 2015). It is measured as an index from 0 = least democratic to 6 = most democratic	Positive	Baltagi et al., 2007, Gries and Mierrieksy (2010)	Index
Remittances (REM)	Sum of the money sent back home from persons in a foreign country and transfers by migrants	Positive	Demirguc-Kunt et al. (2010), Aggarwal et al. (2010)	Kshs.
Mobile Phone Technology (TE)	Defined as use of mobile phones. Measured as the number of mobile phones owned by people	Positive	Marinc (2013), Aker and Mbiti (2010)	Number

¹² Baltagi et al. (2007) describes institutional quality as a summation of five PRS indicators including corruption, bureaucratic quality, rule of law, government repudiation of contracts and risk of expropriation. However data on rule of law and government repudiation of contracts was not available limiting us to use only 3 PRS indicators. Corruption is measured as an index from 0 = most corrupt to 6 = least corrupt, bureaucratic quality is also scaled from 0 = Least bureaucratic quality to 6 = best bureaucratic quality and risk of expropriation is scaled from 0 = most risky to 10 = least risky.

¹³ The risk of expropriation measure which is scaled from 0 – 10 is first converted to 0 to 6 by multiplying it by 3/5 to ensure that it is comparable to the other two indicators. The three PRS indicators are then summed up to give the institutional quality indicator.

All the variables were in natural logarithm form¹⁴. The study uses LN to represent natural logarithm.

2.3.4 Data Type and Sources

Quarterly data on financial development indicators (credit to private sector and non-performing loans) was obtained from the Central Bank of Kenya while market capitalization was obtained from the Nairobi Securities Exchange. Quarterly data on inflation, trade openness and remittances was also obtained from the Central Bank of Kenya. Data on GDP per capita was obtained from World Development Indicators and converted to quarterly. The data on PRS indicators including corruption, bureaucratic quality and risk of expropriation as well as democratic accountability data was obtained from International Country Risk Guide (ICRG) which is given on a monthly basis but averaged to quarterly. Finally, quarterly data on the number of mobile phones to captures technology was obtained from Communications Commission of Kenya (CCK).

2.3.5 Estimation and Testing

a) Descriptive Statistics

It was essential to conduct a descriptive statistics analysis in order to give the estimable models the proper functional form and generate reliable estimates. The study checked for skewness and kurtosis and used the Jarque-Bera test to check for normally properties of variables. For a variable to be normally distributed, its skewness should be equal to zero, kurtosis should be equal to three and the JB statistics should be equal to zero. Further, the study sought to determine the spread of the data by estimating the mean and the standard deviation for all the variables contained in the models. A graphical analysis of the variables which are in logarithms was also presented to capture their movement over time.

¹⁴ While taking the natural logarithms of inflation and interest rate spread, we add one, $\ln(1+\pi) \approx \pi$ and $\ln(1+INT) \approx INT$ since this gives a very close approximation (Judson and Orphanides, 1996; Ghosh and Phillips, 1998 and Vinayagathan, 2013)

b) Unit Root Tests

One basic requirement of econometric estimation is that the variables contained in a regression model should be stationary where the mean, variance and covariance of each variable is time invariant. If non-stationary variables are used in a regression model, this could result into a phenomenon called spurious regression. To test the stationarity properties of the variables, the study used the ADF (Dickey and Fuller, 1979) and the Philip-Perron (PP) unit root test (Phillip and Perron, 1988)¹⁵. The tests are shown by the following equations:

$$ADF: \Delta Y_t = \alpha + \beta T + \sigma Y_{t-1} + \sum_{i=1}^k \lambda_i \Delta Y_{t-1} + \varepsilon_t \dots\dots\dots 2.6$$

$$PP: \Delta y_t = \alpha + \beta T + \lambda y_{t-1} + \mu_t \dots\dots\dots 2.7$$

The ADF and PP tests are both based on the null hypothesis that there exist unit root against the alternative hypothesis of no unit root. The ADF tests the null hypothesis that $\sigma = 0$ against the alternative $\sigma < 0$. Δ is the first difference and k the number of optimal lags to take care of serial correlation. The ADF test equation ignores serial correlation which is corrected for in the errors given by μ_t . The ADF t-statistic is calculated as:

$$ADF_t = t_{\sigma=1} = \frac{\hat{\sigma} - 1}{SE(\sigma)} \dots\dots\dots 2.8$$

The ADF unit root test deals with the errors that are correlated in the test model by adding enough lagged differences of the regressand. The PP test differs from the ADF test in terms of how it resolves the problem of serial correlation and heteroscedasticity in the error terms. It deals with correlated errors by using a correction factor to estimate the long-run variance of the error including a variation of the Newey-West formula. The test statistic is modified as:

¹⁵ The ADF and Philip-Perron usually gives consistent results (Bali moune-Lutz, 2008)

$$Z_t = \left[\frac{\hat{\sigma}^2}{\hat{\lambda}^2} \right]^{\frac{1}{2}} * t_{\lambda=0} - \frac{1}{2} \left[\frac{\hat{\lambda}^2 - \hat{\sigma}^2}{\hat{\lambda}^2} \right] * \left[\frac{T.SE(\hat{\lambda})}{\hat{\sigma}^2} \right] \dots\dots\dots 2.9$$

Where $\hat{\sigma}^2$ and $\hat{\lambda}^2$ are estimates of the variances of the parameters which are expected to be consistent.

Conventionally, the PP unit root test has a greater ability to detect unit root as compared to the ADF unit root test (Baliamoune-Lutz, 2008); hence this study conducted the PP unit root test. One of the reasons why the PP test is advantageous to the ADF test is because it is able to overcome any heteroscedasticity issues in the error term and there is no need to specify any lag length unlike the case of the ADF test. If non-stationarity is detected, the study then employed the use of differencing to deal with this problem.

Additionally, failing to consider presence of structural breaks could lead to rejecting the null hypothesis of unit root when it is not present and vice versa. Thus, the study considered structural breaks by conducting the Zivot Andrews test which was introduced by Zivot and Andrews (1992). This test considers one structural break in testing for unit root and it determines structural breaks endogenously. It allows for a structural break in the intercept and in the trend of each variable as it tests for the presence of unit root.

c) Estimation Method

The study aimed at estimating the determinants of financial development. Following Seetanah et al. (2010) and Takyi and Obeng (2013), the study used the Autoregressive Distributed Lag Model (ARDL). The ARDL model was introduced by Pesaran and Shin (1999) and later extended by Pesaran et al. (2001). It's an ordinary least square regression with lags of both the dependent variable and independent variables as regressors. It is preferred over other methods because of three main advantages: It accommodates variables which are either 1(0), that is, stationary or 1(1), integrated of order 1 or a combination of both. It therefore does not require testing for unit root properties of variables like in other methods like Engel Granger (1987) and Johansen and Julius (1990). It is thus

advantageous over VAR/VECM which requires variables to be 1(1); It takes into consideration the possibility of reverse causation. It produces valid t-statistics and unbiased coefficients even if some of the regressors are endogenous (Harris and Sollis, 2003). Pesaran and Shin (1999) and Jalil et al. (2008) showed that the ARDL model with the correct lags will correct both serial correlation and endogeneity. Thus, it is advantageous over OLS which cannot be used when variables are not stationary and endogenous; while other methods are sensitive to the sample size, the ARDL can be used even when the sample size is small and finally it tests for cointegration while incorporating both short run and long run effects.

The ARDL although it does not specify how low a sample it can handle, it is recommended for samples which are not large enough to accommodate enough degrees of freedom (Duasa, 2006). The model does not lead to over-parameterisation if the number of lags is big. The choice of this method in this study was not based on a small sample as our sample was modest enough. It was guided by the fact that the variables in the study were both 1(0) and 1(1). The number of observations in the study was 60 and considered enough to take care of the degrees of freedom. The study estimated the general ARDL model as follows:

$$\ln FD_t = \alpha + \sum_{i=1}^p \beta_i \ln FD_{t-i} + \sum_{j=1}^k \sum_{i=0}^{n_j} \phi_{j,i} \ln X_{j,t-i} + \varepsilon_t \dots \dots \dots 2.10$$

Where ln is natural logarithm, FD is financial development indicated by Credit to Private Sector (CPS); Market Capitalization (MKT) and Non-performing Loans (NPL). The vector X contains the explanatory variables including GDP per Capita (GDP), Inflation, trade openness, institutional quality, democratic accountability, remittances and technology. All variables are in natural logarithms. P is the number of lags of the dependent variables, q is the number of lags of the explanatory variables while k is the number of explanatory variables. The expanded three models incorporating specific variables as per equation 2.3 are therefore as follows:

$$\begin{aligned} \ln CPS_t = & \alpha + \sum_{i=1}^p \beta_i \ln CPS_{t-i} + \sum_{i=0}^q \phi_1 \ln GDP_{t-i} + \sum_{i=0}^q \phi_2 \ln \pi_{t-i} + \sum_{i=0}^q \phi_3 \ln TO_{t-i} + \sum_{i=0}^q \phi_4 \ln INST_{t-i} \\ & + \sum_{i=0}^q \phi_5 \ln DM_{t-i} + \sum_{i=0}^q \phi_6 \ln REM_{t-i} + \sum_{i=0}^q \phi_7 \ln TE_{t-i} + \mu_t \dots \dots \dots 2.11 \end{aligned}$$

$$\begin{aligned} \ln NPL_t = & \alpha + \sum_{i=1}^p \beta_i \ln NPL_{t-i} + \sum_{i=0}^q \phi_1 \ln GDP_{t-i} + \sum_{i=0}^q \phi_2 \ln \pi_{t-i} + \sum_{i=0}^q \phi_3 \ln TO_{t-i} + \sum_{i=0}^q \phi_4 \ln INST_{t-i} \\ & + \sum_{i=0}^q \phi_5 \ln DM_{t-i} + \sum_{i=0}^q \phi_6 \ln REM_{t-i} + \sum_{i=0}^q \phi_7 \ln TE_{t-i} + \mu_t \dots \dots \dots 2.12 \end{aligned}$$

$$\begin{aligned} \ln MKT_t = & \alpha + \sum_{i=1}^p \beta_i \ln MKT_{t-i} + \sum_{i=0}^q \phi_1 \ln GDP_{t-i} + \sum_{i=0}^q \phi_2 \ln \pi_{t-i} + \sum_{i=0}^q \phi_3 \ln TO_{t-i} + \sum_{i=0}^q \phi_4 \ln INST_{t-i} \\ & + \sum_{i=0}^q \phi_5 \ln DM_{t-i} + \sum_{i=0}^q \phi_6 \ln REM_{t-i} + \sum_{i=0}^q \phi_7 \ln TE_{t-i} + \mu_t \dots \dots \dots 2.13 \end{aligned}$$

The long-run coefficients are calculated as follows:

$$\theta_j = \frac{\sum_{i=1}^{n_j} \phi_{j,i}}{1 - \sum_{i=1}^p \beta_i} \dots \dots \dots 2.14$$

d) Cointegration

Cointegration tests for long run relationship between variables with unit root. The ARDL bounds test tests for cointegration within the ARDL framework. It is based on the Wald statistic/F-statistic. Cointegration among the variables was tested based on the null hypothesis of no long run relationship. Two set of critical values are reported based on the works of Pesaran and Pesaran (1997) and Pesaran et al. (2001). The first set of critical values assumes that all the variables in the model are 1(0) while the second set assumes they are 1(1). If the F-statistic is lower than the lower critical bounds value, then there is no

cointegration. If it is higher, then the presence of cointegration among the variables is confirmed. Finally, if it falls into the critical bounds, then the results are inconclusive.

The bounds testing is estimated as follows:

$$\Delta \ln FD_t = -\alpha - \sum_{i=1}^{p-1} \beta_i^* \Delta \ln FD_{t-i} + \sum_{j=1}^k \sum_{i=0}^{n_j-1} \phi_{j,i}^* \Delta \ln X_{j,t-i} - \sigma \ln FD_{t-1} - \sum_{j=1}^k \delta_j \ln X_{j,t-1} + \varepsilon_t \dots \dots \dots 2.15$$

The test for long-run relationship is:

$$\sigma = 0$$

$$\delta_1 = \delta_2 = \dots \dots \dots = \delta_k = 0$$

Where there is cointegration, the ARDL error correction model is then estimated to give the speed of adjustment from short run to long run equilibrium as follows:

$$\Delta \ln FD_t = -\sum_{i=1}^{p-1} \beta_i^* \Delta \ln FD_{t-i} + \sum_{j=1}^k \sum_{i=0}^{n_j-1} \phi_{j,i}^* \Delta \ln X_{j,t-i} + \lambda ECT_{t-1} + \varepsilon_t \dots \dots \dots 2.16$$

Where: β_i^* and $\phi_{j,i}^*$ are the short-run co-efficients while λ is the speed of adjustment and is expected to be negative.

$$ECT_t = y_t - \alpha - \sum_{j=1}^k \ln X_{j,t} \theta_j, \quad \lambda = 1 - \sum_{i=1}^p \hat{\beta}_i$$

$$\beta_i^* = \sum_{m=i+1}^p \hat{\beta}_m, \quad \phi_{j,i}^* = \sum_{m=i+m}^{n_j} \phi_{j,m}$$

2.4 Empirical Results and Discussion

2.4.1 Descriptive Statistics

To test for the normality properties of the variables, the study used JB test which compares the skewness and kurtosis coefficients of the variables. For a variable to be normally

distributed, its skewness should be equal to zero, kurtosis should be equal to three and the JB statistic should not be significant since the null hypothesis is not normally distributed. Additionally, the study sought to determine the spread of the data by giving the mean and the first movement away from the mean for all the variables contained in the two models.

The mean, standard deviation, skewness and kurtosis of all the variables in the model are reported in Table 2.2.

Table 2.2: Descriptive Statistics

Variables	Mean	Max	Min	Std. Dev.	Skewness	Kurtosis	Pr(JB-stat)
LN Credit to Private Sector (lnCPS)	13.23	14.43	12.38	0.67	0.7840	2.1823	4.691 [0.095]
LN Market Capitalization (lnMKT)	13.09	14.51	11.32	0.99	0.3147	2.2278	2.439 [0.295]
LN GDP per capita (lnGDP)	9.78	9.94	9.68	0.08	0.3579	1.8926	4.366 [0.113]
LN Real GDP	15.01	15.38	14.71	0.19	0.1209	2.2273	3.000 [0.223]
LN Interest Rate Spread (lnINT)	11.07	16.04	8.53	1.95	0.7932	2.5294	6.732 [0.034]
LN Non-performing Loans	2.77	4.00	1.48	0.92	-0.042	2.3559	4.163 [0.186]
LN Inflation (ln π)	8.44	19.19	1.23	4.86	0.6554	2.4394	4.998 [0.082]
LN Trade Openness (lnTO)	3.88	4.09	3.71	0.10	0.0482	1.9521	2.723 [0.256]
LN Institutional Quality (lnINST)	2.11	2.80	1.80	0.28	0.9483	3.3504	9.301 [0.009]
LN Democratic Accountability (lnDM)	4.73	5.50	3.00	0.97	-0.0879	2.4452	3.122 [0.030]
LN Technology (lnTE)	15.49	17.33	9.99	1.83	0.3321	3.4086	6.421 [0.040]

Where LN is natural logarithm. The mean gives the average or the expected value of each variable's observations. The maximum and the minimum numbers show for each variable the highest and the lowest value among all the values respectively. All variables were closely dispersed from their mean values as shown by their small standard deviations. From the values of skewness and kurtosis and the Jarque – Bera probability (the probability value of the adjusted chi-squared distribution is adjusted for the fact that the

Jarque Bera test takes long to converge to a chi-squared distribution and also for small sample sizes), GDP per capita, market capitalization, trade openness and inflation were normally distributed at five percent significance level. At one percent significance level, all the variables were normally distributed apart from institutional quality. These results indicated that the data is good for the study as they help in explaining data in a simpler and meaningful way.

2.4.2 Unit Root Test Results

Before conducting the unit root test, it was important to determine the optimal lag length of each variable which is important when testing for unit root and when running the empirical models. Indicating the wrong lag length could give incorrect stationarity results by showing presence of unit root when it isn't there and vice versa. The tests for optimal lag length were conducted including Fixed Prediction Error (FPE), Akaike Information Criteria (AIC), Hannan and Quinn Information Criteria (HQIC) and Schwarz' Bayesian Information Criteria (SBIC). For all the variables, all the lag length tests determined the same lag length as shown in Table A.1 (Appendix). Credit to private sector, non-performing loans, trade openness and remittances had a lag length of three, market capitalization, GDP per capita, institutional quality and democratic accountability had a lag length of one while inflation and mobile technology had a lag length of four.

The study conducted a graphical analysis of the variables (in logarithms) to capture their movement over time. It was conducted to show whether the variables have a deterministic trend or not. This gives guidance on whether to include a trend and intercept or not when conducting stationarity tests. These graphs are indicated in Appendix. From the graph, it is clear that all the variables had a trend except for institutional quality.

Unit root tests were conducted to determine the stationarity properties of the variables. One requirement of OLS is that variables have a constant mean, variance and the covariance between the values of two time periods is zero, failure to which can lead to spurious

regression. The ARDL does not require variables to be integrated of the same order. However, the variables cannot be 1(2). The study thus conducted the Phillip - Perron unit root test and the results are given in Table 2.3:

Table 2.3: Unit Root Tests

Variables	At levels				1 st difference				Order of integration
	Constant		Trend & Intercept		Constant		Trend & Intercept		
	t-stat	5% Critical value	t-stat	5% Critical value	t-stat	5% Critical value	t-stat	5% Critical value	
LN Credit to Private Sector (lnCPS)	1.134	-2.917	-3.142	-3.497	-2.632	-2.596	-3.296	-3.177	1(1)
LN Market Capitalization (lnMKT)	-0.527	-2.912	-1.420	-3.489	-6.355	-2.912	-6.289	-3.489	1(1)
LN Non-Performing Loans (lnNPL)	-0.644	-2.912	-1.711	-3.489	-6.936	-2.913	-6.875	-3.491	1(1)
LN GDP Per Capita (lnGDP)	0.462	-2.916	-1.429	-3.496	-3.497	-3.495	-3.236	-2.916	1(1)
Inflation (ln π)	-3.048	-2.916	-3.153	-3.495	-6.231	-2.916	-6.235	-3.494	1(1)
LN Trade Openness (lnTO)	-1.750	-2.912	-3.492	-3.495	-7.602	-2.914	-7.594	-3.492	1(1)
LN Institutional Quality (lnINST)	-2.030	-2.912	-2.188	-3.488	-8.224	-2.913	-8.172	-3.489	1(1)
LN Democratic Accountability (lnDM)	-1.764	-2.912	-1.971	-3.488	-7.994	-2.913	-8.452	-3.489	1(1)
LN Remittances (lnREM)	-1.623	-2.912	-3.653	-3.487	-14.634	-2.913	-16.848	-3.489	1(1)
LN Technology (lnTE)	-7.495	-2.912	-6.164	-3.488	-	-	-	-	1(0)

The Phillip – Perron test results showed a combination of 1(1) and 1(0) variables. technology was stationary at levels while Credit to private sector, market capitalization, non-performing loans, GDP per capita, inflation, openness, institutional quality, democratic accountability and remittances were all stationary at first difference.

Structural breaks should be taken into account in econometric modeling as ignoring their presence could lead to model misspecification and spurious regressions (Allaro et al., 2011 and Perron, 1997). So, the study tested for unit root using the Zivot-Andrews unit root test which takes into account presence of structural breaks. The test starts with determining the lag length of the variable using AIC or BIC criteria. There is also a graphical presentation of the variable to scrutinize the unit root statistics for breaks. One has to specify whether a

break is being imposed in the trend or intercept or both. The study imposed a break in both the trend and intercept as discussed in section 3.3.3. The results are given in Table 2.4

Table 2.4: Zivot-Andrews Unit Root Test Results

Variables	Year of structural break	Trend & Intercept				Order of integration
		Level		First Difference		
		t-stat	5% Critical value	t-stat	5% Critical value	
LNCredit to Private Sector	2008q ₁	-3.206	-5.08	-10.832	-5.08	1(1)
LNMarket Capitalization	2002q ₄	-3.940	-5.08	-8.032	-5.08	1(1)
LNNon-performing Loans	2007q ₂	-4.760	-5.08	-8.011	-5.08	1(1)
LNGDP per Capita	2008q ₁	-3.439	-5.08	-9.071	-5.08	1(1)
LNReal GDP	2008q ₁	-3.439	-5.08	-9.071	-5.08	1(1)
LNInflation	2005q ₄	-4.226	-5.08	-7.686	-5.08	1(1)
LNInterest	2011q ₄	-4.621	-5.08	-6.108	-5.08	1(1)
LNTrade Openness	2007q ₁	-4.905	-5.08	-8.248	-5.08	1(1)
LNInstitutional Quality	2004q ₂	-4.391	-5.08	-8.912	-5.08	1(1)
LNDemocratic Accountability	2003q ₂	-8.852	-5.08	-	-	1(0)
LNRemittances	2003q ₁	-6.257	-5.08	-	-	1(0)
LNTechnology	2009q ₁	-7.685	-5.08	-	-	1(0)

The Zivot Andrews test results showed that some variables (credit to private sector, market capitalization, non-performing loans, GDP per capita, inflation, trade openness and institutional quality) were integrated of order one (1) while democratic quality, remittances and technology were stationary at levels. These results were similar to the results obtained with the Phillip-Perron test apart from democratic accountability and remittances which were stationary at levels in the presence of structural breaks but integrated of order one (1) without structural breaks.

2.4.3 Cointegration Results

Before doing the analysis, it was important to determine whether there was presence of cointegration. The ARDL bounds test was conducted and the results are indicated in Table 2.5.

Table 2.5: ARDL Bounds Test

	Model 1 (Credit to Private Sector)	Model 2 (Market Capitalization)	Model 3 (Non-performing Loans)
F – Statistic	10.313	2.807	3.467
Cointegration Status	Cointegration	No cointegration	Cointegration

Bounds critical values 1% is 3.9, 5% is 3.21, 10% is 2.89.

From the bounds test, the F statistic was greater than the critical level at five percent for both the credit to private sector and non-performing loans models of financial development and thus concluded that there was presence of cointegration. Hence the study ran an error correction model for these two models to bridge the short run and the long-run relationship. No cointegration was found in the market capitalization model of financial development.

2.4.4 Autoregressive Distributed Lag Model Results

This study relied on the estimation of three different models in the context of the Autoregressive Distributed Lag Model using the three financial development indicators; credit to private sector, non-performing loans and market capitalization. The ARDL model used a lagged dependent variable as an independent variable and this could lead to serious implications on the findings by introducing autocorrelation or heteroscedasticity. This could lead to statistically invalid coefficients and confidence intervals (Gujarati and Porter, 2009). To overcome these problems, the study used the Newey-West or the HAC (heteroskedasticity and autocorrelation consistent) standard errors. The HAC standard errors surmount the problem of higher order autocorrelated errors.

The diagnostic tests results showed that the residuals of the three models were free from autocorrelation as indicated by the p-values. On the model for credit to private sector the probability value was 0.98, for non-performing loans was 0.14 while for market capitalization, it was 0.93. Model stability was tested using the test for parameter stability. A graphical plot of the cusum of squares is presented in Figures A.19, A.20 and A.21 (Appendix). The cusum of squares should not cross the five percent significance level. The

graphs showed that the parameters in the non-performing loans and credit to private sector models were stable but there is some instability in the market capitalization model. However, when the variables were differenced and lag length is increased, then the market capitalization model was stable. This implied that the study could continue with the ARDL model estimation knowing that there was no autocorrelation problem and there was stability in the models.

Using both the AIC and SIC lag selection criterion, the lags determined by AIC were found to be more than those by SIC lag selection criteria. Thus, for parsimonious reasons, the regression considered the lags by SIC for the two models. The results of the long-run models of two financial development indicators are given in Tables 2.6 and 2.7.

Table 2.6: Long-run Estimates of the Credit to Private Sector Model

Dependent Variable = LNCredit to Private Sector (lnCPS)	Long – Run Coefficients
LNTrade Openness (lnTO)	0.995* (0.502)
LNInstitutional Quality (lnINST)	0.089 (0.294)
LNGDP Per Capita (lnGDP)	4.169** (1.152)
LNInflation (lnINF)	0.239** (0.069)
LNDemocratic Accountability (lnDM)	0.908** (0.253)
LNRemittances (lnDM)	0.037 (0.239)
LNTechnology (lnTE)	0.295** (0.096)

Figures in parenthesis () indicate standard errors; * and ** indicates significance at 10% and 5% significance level respectively. Adjusted $R^2 = 0.754740$

The model had an adjusted R^2 of 0.755 implying a satisfactory goodness of fit of the model since 75.5 percent of the variations in credit to private sector were explained by the model.

GDP per capita was found to promote financial development. A one percent increase in GDP per capita increases credit to private sector by 4.16 percent. An increase in income levels is expected to improve the ability of individuals to take up credit due to increased

ability to pay and also increase in collateral ownership. This also supports the demand following hypothesis of the financial development – economic growth nexus as supported by Agbetsiafa (2003), Law and Habibullah (2009) and Yu and Gan (2010). The coefficient of inflation was found to be positive and significant. An increase in inflation by one percent increases credit to private sector by 0.23 percent. It is expected that inflation erodes the purchasing power of individuals and hence reducing their ability to acquire credit. However, Khan et al. (2001), Haslog and Koo (1999) and Abbey (2012) found a threshold level of inflation of six percent, 15 percent and 11-16 percent respectively below which inflation promotes financial development. English (1998) also found a positive relationship between inflation and financial development.

The coefficient of democratic accountability was found to be positive and significant. A one percent improvement in democratic quality increases credit to private sector by 0.91 percent. It is expected that more democratic economies remove the obstacles for the citizens to acquire credit since decisions are not controlled by a small elite group which happens in less democratic economies. This is supported by Huang (2005b), Girma and Shortland (2008) and Yuang (2011) who found that countries which are more democratic have more developed financial institutions and thus higher financial development. More use of mobile technology is associated with higher levels of financial development. A one percent increase in mobile technology usage leads to a 0.30 percent increase in credit to private sector. Mobile technology is expected to improve financial inclusion and financial development. Uptake of mobile technology in Kenya has been vast which has led to other mobile services like mobile money. This was further supported by Dekle and Pundit (2015) and Iliya and Samaniego (2011). Dekle and Pundit (2015) for example found that mobile subscriptions increase the growth rate of financial development. Allen et al. (2014) also found that mobile banking linked to mobile subscriptions improves financial development and financial inclusion.

The coefficient of trade openness was positive and significant. A one percent increase in trade openness leads to a 0.99 percent increase in credit to private sector. It is expected that trade opens up an economy to more investment opportunities and access to goods and services and hence can increase financial development. This was supported by Rajan and Zingales (2003), Grima and Shortland (2008) and Voghouei et al. (2010). The coefficients of institutional quality and remittances were not significant. Therefore, institutional quality and remittances did not have a significant effect on credit to private sector and hence financial development. As Effiong (2015) noted that, in poor and developing countries, the current status of poor institutions could be the reason why the coefficient of the institutional quality variable was insignificant which supports these results. Table 2.7 that follows shows the results of the non-performing loans model.

Table 2.7: Long-run Estimates of the Non-performing Loans Model

Dependent Variable = LNNon-performing Loans (lnNPL)	Long – Run Coefficients
LNTrade Openness (lnTO)	2.814 (2.733)
LNInstitutional Quality (lnINST)	-0.216** (0.067)
LNGDP Per Capita (lnGDP)	-14.429** (5.128)
LNInflation (lnINF)	0.145** (0.069)
LNDemocratic Accountability (lnDM)	-1.503 (1.177)
LNRemittances (lnREM)	1.782 (1.109)
LNTechnology (lnTE)	-0.631** (0.313)

Figures in parenthesis () indicate standard errors; ** indicates significance at 5% significance level respectively. Adjusted $R^2 = 0.0798372$

The non-performing loans model had an adjusted R^2 of 0.798 implying that 79.8 percent of the variations in non-performing loans were explained by the model and the overall goodness of fit of the model is good. The F-statistic which is the test of joint parameter significance showed that the estimated coefficients were jointly significantly different from zero.

The coefficient of institutional quality was significant and negative. Better institutional quality reduces non-performing loans. A one percent improvement in institutional quality reduces non-performing loans by 0.22 percent. This was as expected since better institutions like the Credit Reference Bureaus, better rule of law, bureaucratic quality leads to more quality loans being advanced and thus less non-performing loans. This result was supported by Boudriga et al. (2009) and Boudriga et al. (2010) who asserted that a better institutional environment lowers the level of non-performing loans thus a higher level of financial development.

GDP per capita promotes financial development by reducing non-performing loans. A one percent increase in GDP per capita lowers non-performing loans by 14.4 percent. This was as expected where an increase in income increases the ability of people to repay their debts. This was supported by Makri et al. (2014), Messai and Jouini (2013), Curak et al. (2013) and Boudriga et al. (2009) who posited that an increase in GDP reduces non-performing loans.

Inflation affects financial development negatively. A one percent increase in inflation leads to a 0.14 percent increase in non-performing loans. It is expected that inflation reduces the purchasing power of people and this would affect repayment of debt since it is more expensive for people to buy goods and services. The same was established by Curak et al. (2013), Klein (2013) and Skarica (2014) who found that inflation is bad for financial development as it worsens the level of non-performing loans. Mobile technology was found to be good in reducing non-performing loans and thus increasing financial development. A one percent increase in uptake of mobile technology leads to a 0.63 percent reduction in non-performing loans. Uptake of mobile technology is likely to come with other benefits like the mobile money (M-Pesa and others) in Kenya which improves financial development. Banks are able to leverage technology to its fullest potential for increased collections efficiency.

The coefficients of trade openness, democratic accountability and remittances were insignificant and hence the variables were not determinants of non-performing loans and hence financial development. These results supported the economic institutions hypothesis and rejected the openness hypothesis. The reason for rejection of openness hypothesis could be due to the omission of financial openness which may work together with trade openness to impact financial development (Rajan and Zingales, 2003 and Matadeen and Seetanah, 2013). Further, trade openness may only impact financial development only if a certain level of institutional quality is maintained (Chinn and Ito, 2005).

2.4.5 Error Correction Model Results

Due to the presence of cointegration, the study estimated the error correction models with the differenced variables to bridge the long-run and short-run relationships. Table 2.8 reports the error correction estimates of the credit to private sector and non-performing loans models. The short run variables were in differenced form while the long run variables were at levels.

Table 2.8: ECM Estimates of Credit to Private Sector and Non-performing Loans Models

	Credit to Private Sector MODEL	Non-performing Loans MODEL
Variables	Coefficient	Coefficient
Short – Run Coefficients		
	Dependent Variable = DLNCredit to Private Sector	Dependent Variable = DLNNon-Performing Loans
DLNCredit to Private Sector (-1)	-0.066 (0.093)	-
DLNCredit to Private Sector (-2)	-0.556** (0.109)	-
DLNTrade Openness	0.042 (0.123)	-0.228 (0.194)
DLNTrade Openness (-1)	-0.740 (0.104)	-
DLNTrade Openness (-2)	-0.402** (0.108)	-
DLNInstitutional Quality	-0.033 (0.082)	-0.257** (0.151)
DLNGDP Per Capita	0.571 (0.683)	-2.672** (1.202)
DLNInflation	0.043* (0.012)	0.045** (0.023)
DLNDemocratic Accountability	0.142** (0.062)	-0.070 (0.119)
DLNRemittances	-0.282** (0.133)	0.080 (0.068)
DLNTechnology	0.060** (0.029)	-0.071 (0.045)
Error Correction Term - ECM(-1)	-0.170** (0.025)	-0.104** (0.019)

Figures in parenthesis () indicate standard errors; * and ** indicates significance at 10% and 5% significance level respectively.

Where D means difference while LN is natural logarithm. From the credit to private sector model, the short run coefficients showed that the previous levels of credit to private sector, trade openness, inflation, democratic accountability, remittances and technology are significant determinants of credit to private sector. A one percent increase in trade openness in lag two reduces credit to private sector by 0.03 percent. This short run finding was in contrast to the long run finding that trade is good for financial development. As Do and Levchenko (2004) found out, trade may not lead to financial development in poor countries since they may import financial services rather than demand and develop their own financial systems. A one percent increase in inflation, democratic accountability and technology leads to a 0.04 percent, 0.14 percent and 0.06 percent increase in credit to private sector respectively.

Remittances were found to reduce credit to private sector. A one percent increase in remittances leads to a 0.28 percent reduction in credit to private sector. It is expected that remittances would lead to uptake of more investments hence improvement in credit worth. Ability to pay and credit worth would lead to increase in credit to the private sector. Remittances may also be used for consumption and investment purposes and hence act as a substitute to bank credit (Githaiga and Kibiru, 2014 and Giuliano and Ruiz-Arranz, 2000). This could be the reason remittances impacted negatively on credit to private sector. The coefficients of institutional quality and GDP per capita were significant and thus the two variables were important determinants of financial development. The error correction coefficient was negative and significant. The value of -0.17 showed a rapid adjustment process with a disequilibrium or shock in the system taking six quarters or about one and a half years to be restored to long –run equilibrium.

The short run coefficients of the non-performing loans model indicated that institutional quality, GDP per capita and inflation were significant determinants of financial development in the short run. A one percent increase or improvement in institutional quality and GDP per capita reduces non-performing loans by 0.26 percent and 2.67 percent respectively. However, an increase in the inflation rate by one percent increases non-performing loans by 0.05 percent and thus lowering financial development. The error correction term had a negative and significant coefficient of 0.10. This implied that when there is a shock in the system, 10 percent of the shock is restored to equilibrium. So for the whole disequilibrium to be adjusted to the long-run equilibrium, then the system needs ten quarters or two and a half years.

2.4.5 Short Run Estimates of the Market Capitalization Model

The study found that there was no long run relationship in the market capitalization model. The short run estimates of the market capitalization model were given in Table A.2 (Appendix). The results supported the economic institutions hypothesis that institutions are important for financial development since the institutional quality coefficient is positive

and significant. Aduda et al. (2012) and Mbulawa (2015) found that higher institutional quality promotes stock market development and hence financial development since better institutions are able to guarantee security and protection of property rights for investors in the stock market. The openness hypothesis was rejected since the trade openness coefficient is insignificant. Huang and Temple (2005) and Chinn and Ito (2002) found that trade openness promote financial development only in developed countries. In poor countries it does not have an impact and if there is any impact then it can only be negative. Klein and Olivei (2008) also found that trade openness is important for financial development only in the presence of high institutional quality which is absent in developing countries like Kenya. Other significant determinants of market capitalization as an indicator of financial development included GDP per capita, democratic accountability and technology which promote financial development. A one percent increase in GDP per capita, democratic accountability and technology leads to a 2.84 percent, 0.57 percent and 0.15 percent increase in market capitalization respectively.

2.5 Conclusions and Policy Implications

This chapter set to determine the factors that influence financial development. The main hypotheses tested were the endowment, economic institutions and the openness hypotheses while controlling for other determinants of financial development. Three financial development measures were used including credit to private sector, market capitalization and non-performing loans. The ARDL model including the bounds test was used for analysis. The findings showed that the three measures of financial development gave distinct results and that the estimation results were sensitive to the choice of financial development indicators.

The credit to private sector model supported the openness hypothesis as trade openness was found to promote financial development in the long-run. In the short run, the effect was negative. Therefore, economies should not expect immediate gains from trade. Higher GDP per capita, better democratic accountability and higher uptake of mobile technology

were also found to promote financial development. Remittances were found to negatively impact financial development only in the short run. The endowment and economic institutions hypotheses were rejected since the coefficient of institutional quality was not significant.

On the non-performing loans model, the endowment and economic institutions hypotheses were supported as institutional quality coefficient was significant. However, the openness hypothesis was rejected. Still, higher GDP per capita, less inflation, better democratic accountability and more uptake of mobile technology were found to promote financial development by reducing non-performing loans. No long-run relationships were found in the market capitalization model but higher levels of institutional quality, GDP per capita, democratic accountability and mobile technology were found to promote stock market capitalization in the short run.

Deriving from the results of the three models, the results of the market capitalization were weak since no long-run relationship was found between the variables. Hence, this study relied on the results of the credit to private sector and non-performing loans models. It was important to note that almost the same findings were found between the two models since GDP per capita, democratic accountability and technology were significant determinants of financial development in the long-run. However, the key distinct result was that credit to private sector model supported the importance of trade openness (openness hypothesis) while the non-performing loans model supported the importance of institutions (economic institutions and endowment hypotheses). This was as expected since credit to private sector shows the size of financial development and hence trade which increases the economic activities of a country would then be key for financial development (Rajan and Zingales, 2003). Contrary, non-performing loans which indicate the quality of loans and efficiency of the financial sector would be reduced if there are good institutions (Boudriga et al., 2010). Thus, the two results were very important for the study. This was especially

important because the significance of institutional quality and relating it with the efficiency of financial development is a new finding in Kenya.

Results indicated that institutional quality positively affected financial development since the coefficient was significant. It is important especially for improving the quality of credit in the financial sector which enhances financial development. Thus, policies that improve the institutional environment should be pursued by the government and institutions. This is especially important as institutional quality is considered low in Kenya. The government should ensure proper functioning of legal and regulatory institutions to guarantee protection of property rights and enforcement of credit contracts. There is also need to have anti corruption policies to reduce corruption by increasing transparency in business transactions and accountability. More credit reference bureaus should be introduced to keep abreast with defaulters.

Trade was found to be significantly and positively related to financial development in the credit to private sector model. Benefits from trade seem to be in the long-run and hence it is important for policies to be directed at the long-term benefits of trade. Efforts should be made by the government to reduce imports of financially dependent goods and services and to promote exports. This should include not only primary exports as has been in Kenya but also value added exports especially for agricultural products since they fetch better earnings.

GDP per capita was positively related with financial development since the coefficient was significant. The coefficient for inflation was also significant and negative. Thus, policies to ensure a good macro-economic environment are important. Growth of the real economy is important as it increases the GDP per capita of individuals. Strengthening legal and other institutions, maintaining a good macro environment and improving human capital development are some of the policies which can ensure continued growth in GDP per

capita. Policies to maintain inflation at threshold levels should be pursued by the Central Bank including inflation targeting.

Democratic accountability coefficient was significant and positive. The political economy is important for financial development as it promotes well functioning economic institutions. Policies to improve the democratic accountability of Kenya should be pursued including creating a conducive political environment, a more democratic government, a system of political checks and balances, an increase in citizens' participation in financial decisions, increased accountability and individual rights and reduced power held by interest groups. So far, Kenya is doing well in terms of devolution which decentralizes power for the benefit of the citizens and policies to tap into benefits of devolution should continue. These include improved coordination mechanisms between the national and county governments, capacity building for county governors and efforts to improve governance at the county level.

Finally, mobile technology promotes financial development. The findings showed that the coefficient of mobile technology was significant. Policies aimed at increasing the use of mobile technology in the financial sector should be encouraged by the government. So far, Kenya is leading in the use mobile money through M-Pesa. Such innovations should be encouraged to tap fully into the benefits of technology. The Central Bank of Kenya has so far ensured an enabling environment for banks to work with Safaricom Ltd and other MNOs in advancing mobile banking.

2.6 Contribution of the Study

This study made three main contributions to knowledge. First it aimed at determining drivers of financial development which has been ignored in Kenya. It introduced institutional quality and political economy factors which have not been considered. The study did this by testing three hypotheses: economic institutions, endowment and openness hypotheses. The importance of institutional quality and political economy was supported

by the findings. Two, it introduced indicators of financial development which do not necessarily show the size and depth of financial development but rather its quality and efficiency. This has been ignored in literature especially in African countries. The findings showed that the quality and efficiency of financial development is important. Thirdly, the study did not leave out the importance of mobile technology which has been key in the wake of financial innovation in Kenya. Mobile technology was found to be significant for financial development.

2.7 Limitation of the Study

The study was faced by limitations on data on the independent variables. Data on financial openness was unavailable which may limit the results by biasing openness of a country to trade and not capital/financial openness. Nonetheless, remittances would deal with this problem as it is an aspect of financial openness. Further, data on some institutional quality variables was unavailable. However, the used data was believed to be reliable for policy recommendations.

2.8 Areas for Further Research

Further analysis of the determinants of financial development ought to include an analysis of threshold effects so as to determine at what level of the financial development indicators one can say that a country is financially developed. With availability of more data, it is important to capture the aspects of financial openness so as to avoid any biases in the results. It would also be important to test the law and finance hypothesis and how it affects financial development.

CHAPTER THREE

FINANCIAL DEVELOPMENT AND ECONOMIC GROWTH

3.1 Introduction

This chapter investigated the relationship between financial development and economic growth. Having discussed the financial developments and innovations in Kenya, this chapter endeavoured to demonstrate how they are related to economic growth.

Several financial developments have occurred in Kenya in the last decade. They include the increase in number of bank branches, extension of bank operation hours, introduction of Islamic banking, cross border banking, interbank trading, revised Prudential and Risk Management Guidelines and the National Payment System Regulations enacted in 2014, introduction of micro insurance schemes in the insurance industry, introduction of ATS, new indices for the stock market and a trading platform for SMEs known as Growth Emerging Markets Segments in the capital markets and new infrastructure bonds in the bonds market. Additionally, there have been innovations in mobile payment services such as M-Pesa which has been discussed in chapter one.

The growth of the financial sector has not been in tandem with economic growth. The growth rate of the financial sector has been higher than the growth rate of the economy. This growth in the financial sector has not been fully felt in the growth of the economy. Globally financial sectors grow faster than the economy. Figure 3.1 compares the growth rates of the financial sector and of the economy.

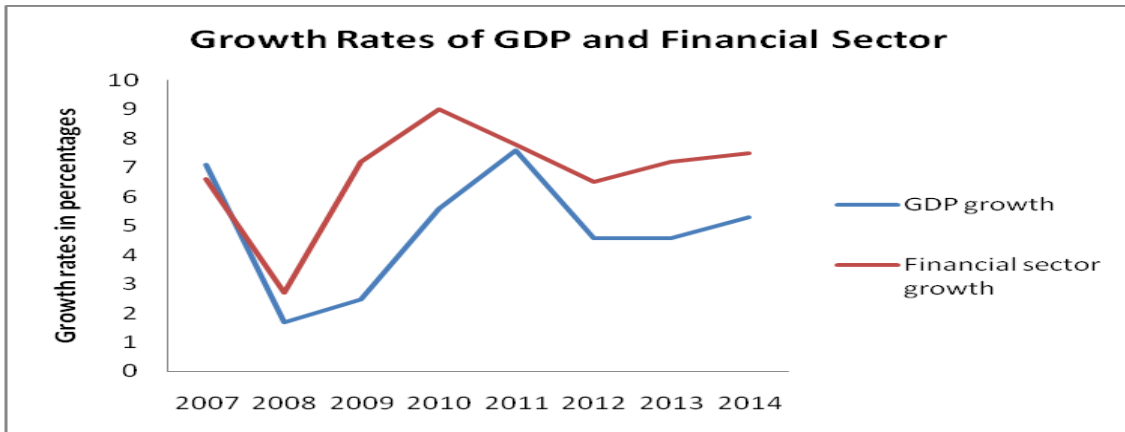


Figure 3.1: GDP and Financial Sector Growth Rates

Source: Kenya National Bureau of statistics, 2014

GDP and financial sector growth rates dipped in 2008 to 1.7 and 2.7 percent respectively down from 7.1 and 6.6 in 2007 respectively. This drop was due to the effects of the 2007/2008 post election violence which affected many sectors in the country as well as the effects of the global financial crisis. The growth rates then started rising due to the stability that followed but dropped slightly in 2012 and 2013 to 4.6 percent due to the fears of the 2013 elections. This growth has then started rising and stood at 5.3 percent in 2014. The high growth in the financial sector could be explained by the financial developments and the innovations.

The relationship between finance and growth has generated a lot of debate all over the world as seen in empirical literature (King and Levine, 1993a; Waqabaca, 2004 and Odhiambo, 2009). With most developed and developing countries experiencing phenomenal growth in their financial sectors, the evidence on whether this growth in financial sector leads to economic growth, which may be referred to as growth in the real sector or it's converse, remains inconclusive. Kenya has been one of the leading countries in terms of financial innovation with its leading product, M-Pesa (Buku and Meredith, 2013). The financial sector has experienced tremendous growth also. With the recent financial innovations, there are no existing studies on the effect of these new innovations

on economic growth. Further, the quality and efficiency of the financial sector have been left out in determining the relation between financial development and growth, hence there is a knowledge gap in Kenya which is yet to be addressed. Additionally, consensus is lacking on the causality between these concepts in Kenya. Thus, the following questions beg for answers which the study attempted to answer: How does financial development affect economic growth when aspects of quality and efficiency are introduced?; How does financial innovation affect economic growth?; What is the nature of the causal link between financial development and economic growth?

The main objective of the study was to determine the relationship between financial development and economic growth in Kenya.

Specifically, the chapter aimed at determining;

- i) The effect of efficiency and qualitative aspects of financial development on economic growth
- ii) The effect of financial innovation on economic growth
- iii) The nature of causality between financial development and economic growth

3.1.1 Significance of the Study

The study is important in terms of providing knowledge on whether financial development is crucial for economic growth or the vice versa. This is important for policy decision making with respect to targeting the growth of the financial sector or overall economic growth. Further, knowing how financial innovations affect economic growth is important to policy makers in deciding how to support innovations. This is especially in terms of the legal and regulatory framework, gaining legitimacy and how they can be integrated into the wider financial system. The gap of disregarding the quality and efficiency aspects of financial development in the finance-growth relationship is important to policy makers since they can work on improving these aspects. The study is also important to existing literature and for future researchers in the finance-growth nexus especially in giving more clarity on the causality between financial development and growth and expanding the

definition of financial development to include financial innovation and the quality and efficiency aspects.

3.2 Literature Review

3.2.1 Theoretical Literature

The seminal literature on finance and growth is due to Schumpeter (1911). Schumpeter argued that financial intermediation through the banking channel plays an important role in economic growth and development. The effect is through the allocation of savings from the ones who have to the ones who do not and thus increasing productivity, technical progress and thus improving economic growth.

Another theory linking financial development to economic growth is what Mckinnon called 'conduit effect' (Mckinnon, 1973). The theory posits that financial development leads to growth in domestic savings which further leads to increase in investments. In this theory, investment is related positively to the real interest rate. This is because a high interest rate leads to an increase in domestic savings which then avails funds for investment. An increase in investment further enhances growth. This view is supported by Shaw (1973).

The theory behind finance and growth can also be derived from the neoclassical growth model introduced by Solow and Swan (1956) which posits that long-run growth is explained by capital accumulation, labour productivity and technical progress. Thus, the link between finance and growth can be explained by incorporating financial development into the simple neoclassical model (King and Levine, 1993; Easterly and Levine, 1994 and Elbadawa and Ndulu, 1994). Thus, from the simple production function, financial development variables are added as shift parameters in addition to the usual factors of production to form the unrestricted neoclassical growth model. However, the neoclassical growth model is limited due to the fact that technology is treated as an exogenous factor. Therefore, the endogenous growth theory is better in explaining the relationship between

finance and growth (Loayza and Ranciere, 2006). Technology, through which financial development enters the model, is treated as an endogenous factor affecting growth.

One of the endogenous growth theories linking finance and economic growth is the AK endogenous growth model introduced by Pagano (1993). The theory propounds that output is a linear function of capital accumulation or capital stock resulting in a production function given by: $Y_t = AK_t$, Where Y_t is economic growth, K_t is capital stock and A is capital productivity. This model was extended by Romer (1989) in which each firm faces technical progress with constant returns to scale and productivity is an increasing function of capital. Pagano (1993) then assumed that a proportion of savings is lost in the process of intermediation $1-\theta$ such that in a closed economy where savings equals investment, then $\theta S_t = I_t$. The Pagano AK endogenous growth model eventually reduces to $g = A\theta s$ concluding that finance affects economic growth by reducing the proportion of resources that is lost in allocating capital, by increasing the savings ratio and increasing the capital productivity.

In regards to the theoretical models between finance and growth, the various propositions of the theories differ along three distinct aspects which include the source of endogenous growth, the finance mechanism and the way asymmetric information is handled (Trew, 2006). In regards to the source of endogenous growth, the sources identified include; production externalities, vertical externalities, horizontal externalities, capital and human capital externalities. The finance mechanisms mainly include banking system/credit markets, capital markets, insurance markets and entrepreneurship funding. Information asymmetry includes adverse selection and moral hazard and also presence of exogenous productivity and liquidity shocks. In most of these models it is clear that the main hindrance to growth is credit or financial constraint in the acquisition of knowledge and technology.

Theory also gives two channels through which financial development connect with economic growth which are risk sharing and information asymmetry. Investors in trying to allocate capital to the most profitable investments, usually face information constraints and they do not always have the capacity to collect all the necessary information so as to invest in the most profitable investments. Acquiring information to ensure more optimal resource allocations is costly and hence a challenge. As such, financial intermediaries improve resource allocation by reducing the costs of information acquisition (Allen, 1990). They collect information on behalf of investors and thus investors can make informed decisions based on expected returns thus weeding out the weak projects. However, financial intermediaries may be limited due to limited information on investment opportunities resulting from a large informal sector.

On the other hand, risk sharing plays an important role in promotion of economic growth if the agents are risk averse and less risky projects yield low returns. The financial system allows agents to diversify their portfolios with those that have higher expected yields while maintaining reasonably low risks (Greenwood and Jovanovic, 1990; Obstfeld, 1994 and Schumpeter, 2011). This increases investment returns as well as allowing for better allocation of resources and thus impacting growth. Further, risk sharing plays a critical role also when economic agents face liquidity risks. Agents, In addition to being averse to risks will want to hold some of their savings in liquid assets. Thus, the financial system can play a role in ensuring maintenance of liquidity and ensuring that projects are generally acceptable thus promoting growth (Diamond and Dybvig, 1983).

Further, a reverse or feedback mechanism exists from economic growth to finance development. Economic activity can have an effect on financial systems. Financial development is seen as a consequence of a growing economy (Robinson, 1952 and Patrick, 1966). A growing economy leads to increased demand for financial services and instruments. Patrick (1966) termed this as demand following financial development while Robinson (1952) called it the growth led finance. Further, Patrick (1966) postulated that there could be a two way relationship not just the demand following hypothesis but also a reverse causation

between finance and growth. Another route growth impacts financial development is through the growth of institutions (Trew, 2006). Increased demand in the economy leads to set up of new financial institutions, their growth and innovations.

3.2.2 Empirical Literature

a) Relationship between Financial Development and Economic Growth

Three views exist in the empirical literature regarding the relationship between financial development and economic growth. The first view argues that financial development is important and leads to economic growth (supply-leading hypothesis). The second view postulates that it is economic growth that drives the development of the financial sector (demand-following hypothesis) while the third view contends that both financial development and economic growth Granger-cause each other, i.e., there is a bidirectional causality between financial development and economic growth. The studies that supported the supply-leading hypothesis include: Jung (1986), Crichton and De Silva (1989), King and Levine (1993), DeGregoria and Guidotti (1995), Odedokun (1996), Levine and Zervos (1998), Rajan and Zingale (1998), Odhiambo (2002), Habibullah and Eng (2006), Odhiambo (2009c) and Uddin et al. (2013a).

In regards to the supply leading hypothesis, this finding is reached even with the use of different methodologies, different type of data as well as different areas of study. Financial development is seen to be important for economic growth in various ways. One of the ways this happens is through innovation (King and Levine, 1993). Innovations do improve the usual way of doing things and thus increases productivity. However, distortions in the financial sector are seen to reduce innovation and hence growth. Financial market development in contributing to growth leads to reduced costs of external finance to firms (Rajan and Zingales, 1998). Industrial sectors that depend more on external finance thrive well in countries with better developed financial sectors and thus financial market development is crucial for economic growth. Another view supported by Habibullah and

Eng (2006) is the “financial structuralist” view which postulated a significant broad presence of financial institutions and growth of financial instruments will lead to higher growth.

Savings and investment were found to be important in raising economic growth (Xu, 2000 and Suleiman and Abu-Qaun, 2008). This proposition is in support of the Mckinnon conduit effect. The financial sector development encourages savings which in turn encourage investments and thus growth. Japelli and Pagano (1994) and De Gregoria and Guidotti (1995) also supported the importance of savings in growth. De Gregoria and Guidotti (1995) however noted that poor regulation of financial markets can lead to negative effects on economic growth. As regards to the Pagano (1993) A.K model, some studies have indicated that financial development affects growth through the allocative efficiency where better allocative efficiency improves investment (Greenwood and Jovanovic, 1990; Bencivenga and Smith, 1991 and Levine, 1991). Efficiency is another way financial development affects economic growth (Graff and Karmann, 2006). When resources are allocated efficiently without wastages, this is likely to cause higher and faster growth.

In Kenya, several studies have been carried out and found support for the supply leading hypothesis. Odhiambo (2002) was among the first studies who found support for supply leading hypothesis. Mckinnon hypothesis was found to exist in Kenya with introduction savings. Savings are seen to be important for capital accumulation hence growth. In Odhiambo (2009c), lack of a conclusion on the relationship between finance and growth led to introduction of interest rate reforms as a new variable in the analysis. Interest rate reforms which support financial development led to growth. Other studies which supported the role of savings (through growth in the financial sector) in fuelling economic growth include Uddin et al. (2013a).

The second hypothesis which is the demand following hypothesis is supported by several studies. These studies included Shan et al. (2001); Agbetsiafa (2003); Waqabaca (2004); Odhiambo (2004); Ang and McKibbin (2007); Odhiambo (2008a, 2009b) and Gautam, (2014). Economic growth provides a conducive environment for the growth of financial sector since it creates higher demand for financial services (Shan et al., 2001; Agbetsiafa, 2003). Countries with less sophisticated and lowly developed financial sectors likely find that it is economic growth that leads to the development of the financial sector (Waqabaca, 2004 and Ang and McKibbin, 2007). In Kenya, the importance of economic growth for financial development was shown by Agbetsiafa (2003) and Odhiambo (2004, 2008a, 2009c). Odhiambo (2009b) controlled for inflation and still found a demand following hypothesis support. These Kenyan studies used the same financial development mainly broad money supply.

Other findings support neither the supply-leading hypothesis nor the demand-following hypothesis. They have shown that financial development and economic growth can Granger-cause one another, that is, a bi-directional relationship. Jung (1986), Wood (1993), Akinboade (1998), Kar and Pentecost (2000), Calderon and Liu (2003), Chuah and Thai (2004) found support that demand following hypothesis usually holds mostly for developed countries in contrast to the developing countries. This is because developed countries are likely to have more developed financial sectors even with low growth rates. The good conditions, better facilities act as a further catalyst for the growth of the financial sectors. However, in Kenya, which is a developing country, similar findings of both the demand following hypothesis and supply leading were reached (Odhiambo, 2005; Odhiambo, 2008a; Wolde – Rufael, 2009 and Onuonga, 2014). These findings could have been arrived at due to the use of poor financial development indicators which are applicable for developed countries like broad money supply. Most of the other studies used the same financial development indicator, for example Gautum (2014) using M2 found a bi-directional relationship between finance and growth in Nepal.

b) Data and Methodology

Various studies have reached different conclusions based on the methodologies and the types of data used. Jung (1986) and King and Levine (1993) used cross sectional data and OLS method of analysis and concluded that financial development positively influences economic growth. However, OLS does not control for endogeneity and other methods like the GMM-IV methods are able to deal with this problem (Beck et al., 2000 and Gehringer, 2013). Other panel data analysis found different results. Panel data is advantageous especially because of low data availability for long periods in many countries. De Gregoria and Guidotti (1995) and Rajan and Zingale (1998) using OLS and fixed effects model found support for the supply leading hypothesis between financial development and economic growth. However, Calderon and Liu (2003) used panel data and applied the VAR methodology and granger causality methods and found a bi-directional relationship between financial development and growth. Panel data GMM estimations were used to find the supply leading hypothesis by Habibulla and Eng (2006).

Time series country specific analysis have been found to be advantageous especially when forecasting is necessary (Ang and McKibbin, 2007). Multivariate time series analysis also deals with endogeneity problems common in cross sectional and panel data analysis (Neusser and Kugler, 1998). Time series analysis has been carried out with different findings. The main methods of analysis with time series data include Cointegration, granger causality testing, Hsiao causal testing approach (Hsiao, 1979), VAR, VECM, ECM and ARDL. Xu (2000), Odhiambo (2002), Habibullah and Eng (2006), Uddin et al. (2013a) and Mittal (2014) all found support for the supply leading hypothesis using time series data. Other country specific studies found support for demand following (Agbetsiafa, 2003; Waqabaca, 2004; Ang and McKibbin, 2007; Odhiambo, 2009 and Gautam, 2014). Finally, those who found a bi-directional relationship using time series analysis included Luintel and Khan (1996), Akinboade (1998), Odhiambo (2008a), Wolde – Rufael (2009) and Onuonga (2014). There are several studies done in Kenya using time series and they all found different results which could be as a result of use of different

financial development indicators (Odhiambo, 2008a; Wolde – Rufael, 2009 and Onuonga, 2014).

c) Measurement of Financial Development

The use of different financial development indicators have led to different findings. Starting with Goldsmith (1969), they used the value of deposits to GDP. This measure was criticized as it is very simplified and does not assess the direction of causality. Further, King and Levine (1993a) used several indicators of financial development including liquid liabilities as a percentage of GDP, credit allocation of commercial banks relative to Central bank, domestic credit to GDP and credit to private sector to total domestic credit and found strong support that financial development is good for the growth of the economy. Levine and Zervos (1998) used some of these measures and found support for supply leading hypothesis. However, Rajan and Zingales (1998) criticized these measures as they just reflect the level of financial development in terms of credit allocated and money supply. They used capitalization measures and the accounting standards which indicate possibility of obtaining finance instead of looking at just the finance secured and found that financial development is important for economic growth through reduction of costs of finance and rise of new firms which come with new sources of ideas.

This measurement issue has been discussed in literature with many criticizing some of the financial indicators used. One of the indicators of financial development which has been criticized is the broad money supply, M2 or M3. This indicator has been used in several studies (Odhiambo, 2002; Agbetsiafa, 2003; Odhiambo, 2009; Wolde-Rufael, 2009, Akinlo and Egbetunde, 2010 and Gautam, 2014). This measure is criticized because it does not show the capacity of the financial sector to provide savings for investment (Ang and Mckibbin, 2007 and Gehringer, 2013). It mainly shows the overall stock of money in circulation and other liquid assets not necessarily what is available for investment (Khan and Senhadji, 2003). This measure is also criticized for use in low income countries since currency in circulation which makes the highest proportion of M2 is high (Dushku, 2010).

Adnan (2011) recommended that currency in circulation ought to be removed from the broad money supply if it has to be used as a measure of financial development because an increase in broad money supply basically implies an increase in currency in circulation.

Assets by commercial banks as a ratio of assets by commercial banks plus central banks assets as used by King and Levine (1993) has also been criticized since it shows the relevance of commercial banks in intermediation better than Central banks can do. However, this measure only shows the financial intermediation but does not indicate the quality of the financial sector in intermediation (Gehring, 2013). Another measure that has been criticized is the use of domestic credit as a ratio of GDP as it includes credit even to the public sector which is assumed not to be as efficient in allocating resources unlike the private sector (Ayadi et al., 2013). Therefore, literature suggests the use of credit to private sector which implies more efficient allocation of resources (Liang and Teng, 2006; Adamopoulos, 2010; Arcand et al., 2011).

To avoid all the criticisms of the use of these indicators, several studies have used a financial development index calculated through the Principal Component Method (Ang and McKibbin (2007), Kargbo and Adamu (2010), Adnan (2011), Uddin et al. (2013a), Dhrifi (2013). They supported the use of a financial index since the use of the various indicators of financial development are not exhaustive and do not fully cover financial development especially in the bonds market, pension funds and insurance markets. Neusser and Krugler (1998) in critiquing the various measures of financial development including the index proposed the use of the GDP of the financial sector because it encompasses the various aspects of financial development. They argued that financial activities are not just from the banking institutions but include activities from pension funds, investment banks, security brokers, insurance dealers and thus, the GDP of the financial sector would be a good measure of financial development. However, the same studies criticized this measure as being too broad and it does not show the specific

contributions from the various intermediation institutions hence specific policy cannot be inferred.

The use of a financial index has been criticised as the process of creating one leads to loss of information which would be better captured by individual indicators (Neusser and Krugler, 1998). These indicators show the financial depth, the liquidity of the banking sector, return on savings as well as the contribution of non-bank sectors. These also do not show how savings are converted into investments. They further do not show the quality of financial development but just the quantity. Therefore, with the strong critic of the various measures, the study takes a broader definition of financial development. Financial development should not only show the expansion of the financial sector in terms of quantity, it is also important to show the quality and efficiency of this expansion. From the above discussion, the efficiency and quality of financial development seem to have been ignored while it has been raised as important in the relationship between financial development and poverty (Dhrifi, 2013). Thus, it was important to include these aspects of financial development in the relationship between financial development and poverty. Thus, the study adopts new financial development indicators including non-performing loans and interest rate spread as well as credit to private to show how savings are converted to investment.

d) Use of Efficiency and Quality Indicators of Financial Development

The use of various financial development indicators has led to conflicting results as discussed. Literature has evolved to include the importance of efficiency measures of financial development in determining the relationship between financial development and economic growth. Koivu (2002) pointed out that when efficiency of the financial sector is ignored, then findings are likely to give the wrong effects and causality between financial development and economic growth. The study argued that indicators that measure the size of the financial sector only like domestic credit could be better used in developed economies since the quantity of the financial sector may be correlated with its efficiency

and both of them are high in developed economies. Therefore, using only the quantity of the financial sector in developing economies does not fully give us the correct relationship between financial development and economic growth as it does not show us the efficiency of the sector. Further, mere growth in the quantity of the financial sector cannot be considered as financial development. Adnan (2011) and Ayadi et al. (2013) also indicated the importance of the efficiency of the banking sector in allocating resources which is important as mere quantity of intermediation may not show financial development.

The qualitative development of the financial sector is important and aspects like transaction costs and the quality of information the banking sector collects are well explained by indicators which show the quality of the financial sector (Dudian and Popa, 2013). Qualitative as well as quantitative aspects of the financial sector should be considered since growth in the quantitative aspects may not be accompanied by a similar growth in the quality of the growth hence undermining the overall effect. Non-performing loans and interest rate spread represents qualitative and efficiency aspects. Quality of the financial sector development is important for economic growth while the quantity of the development is less relevant in transition economies (Dudian and Popa, 2013).

Efficiency of the financial sector as indicated by high collateral and low transaction costs is lower in low income countries as compared to emerging and developed economies (Dabla-Norris et al., 2014). The study found that GDP responds to lower transactions costs and thus these measures are important for economic growth. This study thus in expanding the definition of financial development to include the quality and efficiency included two measures to show this. One is the non-performing loans which show the quality of credit and hence may indicate the quality of financial development. Secondly, the study used the interest rate spread which shows the transaction costs in the process of financial intermediation. A higher interest rate spread would imply higher inefficiency in the financial sector. Thus, the study adopted these two measures in the analysis.

e) Use of Bank Based or Stock Market Based Financial Development Indicators

In addition to literature on causality and effect of financial development and growth, the role of bank based and market based financial systems has been highlighted in literature (Levine, 2003 and Adebola and Dahalan, 2011). Some countries like Germany and Japan have developed based on the banking sector while others like the US and England have developed based more on the stock market hence the importance of these two industries is critical. Several studies have been undertaken on the relationship between financial development due to the stock market and economic growth (Nagaraj, 1996; Levine and Zervos, 1996; Tadesse, 2002 and Yartey, 2007) and on financial development based on the banking industry and growth (Odhiambo, 2008a and Odhiambo, 2009b). Some of these studies also supported the importance of both systems. Yartey (2007), for example, concluded that both the banking sector and the stock market are important for economic growth. The study posited that a well functioning banking sector can support growth in the stock market while a stock market that is vibrant can improve performance of the banking sector and hence encourage growth.

Levine and Zervos (1996) using cross country analysis asserted that the stock market is important since it offers what the banking sector cannot offer. Credible examples include equity finance which is a form of long term finance that can influence investment and growth. This equity finance is less sensitive to the effects of moral hazard and adverse selection and thus better in leading growth. Singh (1997) criticized the disregard of the importance of the stock market for economic growth and concludes that they play an important role in both domestic and foreign liberalization. Stock markets (due to increased liquidity) can also influence growth negatively. This effect occurs through three channels which include reducing savings rate due to increased liquidity, increasing uncertainty on savings as well as the benefits from a perky stock market (Arestis et al., 2001). Studies which supported stock markets' importance on economic growth in Kenya include Olweny and Kimani (2011). Using the cointegration approach and granger causality, they found a

unidirectional causality from stock market performance economic growth thus concluding that the stock market (NSE) is important in spurring growth in Kenya.

The importance of the banking industry cannot be underestimated. Even from the start of this debate of the contribution of financial development to economic growth, pioneers in this area like McKinnon and Shaw (1973), showed the importance of banking sector development rather than market based development. The banking sector is important for leading growth in developing countries since it annihilate the problems of liquidity risks thus increasing investments and thus growth (Bencivenga and Smith, 1991). The banking sector can also stimulate investment by encouraging savings as well as reduce liquidity risks through increased lending (Ndikumana, 2003). Further, some scholars have posited that the banking sector leads to long term investment and stability unlike the stock market since it is not as sensitive to volatilities in price changes like the stock market (Odhiambo, 2010a). From the empirical literature discussed, Table 3.1 shows the major conclusions on the direction of causality between finance and growth.

Table 3.1: Summary of the Findings of the Relationship between Finance and Growth

Author(s)	Methodology	Findings
A: Studies Supporting the Supply-Leading Hypothesis		
Jung (1986)	Cross-section data	Finance leads to growth in developing countries
King and Levine (1993a)	Cross-section data; OLS	Finance is important for Growth
De Gregoria and Guidotti (1995)	Panel data Analysis	Financial development leads to higher economic growth. However, poor regulation of financial markets can lead to a negative effect between financial development and growth.
Rajan and Zingale (1998)	Panel data; OLS and fixed effects model	Finance leads to firms' growth and hence economic growth
Xu (2000)	Multivariate VAR model	Finance leads to growth through investment
Odhiambo (2002)	Cointegration and ECM	Finance leads to growth through investment
Suleiman and Abu-Quan (2005)	Trivariate VAR framework	Finance leads to growth through investment
Habibullah and Eng (2006)	Dynamic panel data	Finance leads to growth in Asian developing countries
Odhiambo (2009c)	Time series; financial deepening model and Dynamic granger causality model	Finance led growth predominates in Kenya although there is a weak bi-directional relationship
Uddin et. al. (2013a)	Time series; ARDL model using PCM to construct a Financial Development Index	Financial development impacts growth in the long-run
Mittal(2014)	Cointegration and Granger causality using market capitalization ratio	Financial development is important for economic growth but the causal relationship is country specific.

Table 3.1 continued

B: Studies Supporting the Demand-Following Hypothesis		
Agbetsiafa (2003)	Time series; VECM	Economic growth leads to Financial development in Kenya and Ivory Cost
Waqabaca, (2004)	Time series; Bivariate autoregressive framework	Growth precedes financial development
Odhiambo (2004)	Time series; Bivariate causality test based on ECM	Economic growth leads to Financial development in South Africa and Kenya
Ang and Mckibbin (2007)	Time series; VECM, Cointegration, granger causality and PCA	Economic growth leads to financial development in the long-run
Odhiambo (2008a)	Time series; Cointegration and ECM	Demand following hypothesis dominates in Kenya
Odhiambo (2008b)	Time series; Trivariate causality test based on ECM	Growth leads finance
Odhiambo (2009b)	Time series; Trivariate causality test based on ECM	Unidirectional causality from growth to finance
Gautam (2014)	VECM and Granger Causality	Growth leads financial development in Nepal
C: Studies Showing a Bi-directional Causality between Finance and Growth		
Wood (1993)	Time series; Hsiao causal testing approach	Bi-directional causality between finance and growth
Luintel and Khan (1996)	Time series; Multivariate VAR framework, VECM	Bi-directional causality between finance and growth
Akinboade (1998)	Time series	Bi-directional causality between finance and growth
Calderon and Liu (2003)	Panel data analysis; VAR, Geweke decomposition and Granger causality models	Bi-directional causality between finance and growth. However, the finance effect on growth is higher in developing countries than in developed countries
Odhiambo (2005)	Time series; Bivariate causality test based on ECM	Bi-directional causality between finance and growth in Tanzania
Wolde-Rufael, 2009	Time series: Quadivariate VAR framework	Bi-directional causality between finance and growth in Kenya
Akinlo and Egbetunde (2010)	Time series; Multivariate cointegration analysis and ECM	Bi-directional causality in Kenya, Chad, South Africa, Sierraleone and Swaziland. However, finance is found to precede growth in Central African Republic, Congo, Gabon and Nigeria while the demand following hypothesis is found in Zambia.
Onuonga (2014)	ARDL	Both financial development and economic growth influences each other in Kenya

3.2.3 Overview of the Literature

Different theories on the relationship between finance and growth are supported due to methodologies used, indicators of financial development used and country of study. The literature concluded that three types of relationships between financial development and economic growth exists; supply leading, demand following and a bi-directional relationship. Despite the literature giving divergent views on the importance of the banking industry as well as the stock market, both of these industries are seen to be important indicators of financial development. For this reason, the study included bank and stock

market variables. With the literature supporting these three views, two questions are; what if there exists no relationship between financial development and economic growth? is economic growth caused by other variables other than financial development?

Secondly, the studies that have been done in Kenya (Odhiambo, 2008, 2009 and Wolde Rufael, 2009) in their analyses of financial development and growth used financial development indicators/variables which are applicable to developed countries. For example, M2 or M3 is a monetization measure representing financial depth. M3 composes M1, M2 and long term time deposits, institutional money market funds and repurchase agreements. Generally, this is a good measure of financial development in developed countries as the level of M1 is low. However, in underdeveloped countries, currency in circulation, that is currency held outside the banking system, makes the highest percentage of M2 and M3 and thus they would not be good measures of financial development (Dushku, 2010). This is supported by researchers who have argued that M2 and M3 are poor measures of financial development in underdeveloped countries as the high monetization may be linked to underdevelopment in the financial sector (De Gregorio and Guidotti, 1995). In addition, M2 mostly reflects the extent of financial services provided by the financial system instead of the ability of the financial system to channel funds from those who have (depositors) to those who do not (Khan and Senhadji, 2003). A good substitute for this monetization measure in underdeveloped countries would be liquid liabilities of banks to GDP (Dushku, 2010) as it excludes currency outside banks which is high in underdeveloped countries.

Domestic credit may also not be a good measure of financial development as used by most studies done for Kenya (Adamopoulos, 2010; Arcand et al., 2011). This includes domestic credit by all institutions to both public and private sectors. This measure is quite broad and since not all funds given out are used for investment, narrowing down to bank credit to private sector helps us to concentrate on those funds that go for investment purposes by the private sector. The private sector is deemed to be more competitive than the public sector

and thus funds may be used more efficiently and lead to Pareto optimal allocation of resources. Thus, Bank credit to private sector is a good indicator of financial development as it shows the ability of the financial system to channel funds from the surplus to deficit agents through the banking system (Levine and Zervos, 1998; Liang and Teng, 2006; Adamopoulos, 2010; Arcand et al., 2011). It shows the general level of development in the banking sector (Ayadi et al., 2013).

This study thus made a diversion on the indicators used previously to represent financial development to use Liquid Liabilities of banks which excludes currency instead of Money supply measure (M2 or M3), bank credit to private sector instead of domestic credit to private sector. Other variables to represent efficiency and quality of the financial sector included non-performing loans and interest rate spread which have been ignored before in the earlier studies in Kenya. Non-Performing Loans (NPLs) can be used as a proxy for efficiency since an efficient banking system would be expected to have low NPLs while interest rate spread shows the transaction costs of channeling funds to investment. These variables were as suggested in literature (Koivu, 2002 and Dudian and Popa, 2013) to incorporate the qualitative and efficiency aspects of financial development.

None of the studies done in Kenya has included a measure of financial innovation even with all the financial innovations that have taken place in Kenya in the last couple of years. Therefore, this study included mobile payments as a measure of financial innovation in the financial development and growth equation. Further, presence of structural breaks in the variables may lead to distortion of results where a unit root may be rejected and it is present due to the influence of structural breaks. Most of the studies especially those that have been done in Kenya had not taken into consideration the distortions which would be brought about by presence of structural breaks in the data. Thus, this study went further to consider structural breaks.

3.3 Methodology

3.3.1 Theoretical Framework

The relationship between finance and growth can be derived from the Pagano ‘AK’ endogenous growth model (Pagano, 1993) where output is a linear function of capital stock giving a reduced form production function resulting from Romer (1989) where each firm faces technical progress with constant returns to scale and productivity increasing with capital.

$$Y_t = AK_t \dots\dots\dots 3.1$$

Changes in capital stock which leads us to investment is given by gross investment less depreciation of capital stock (δ)

$$K_{t+1} - K_t = I_t - \delta K_t \dots\dots\dots 3.2$$

Then gross investment becomes;

$$I_t = K_{t+1} - (1 - \delta)K_t \dots\dots\dots 3.3$$

In a closed economy, equilibrium requires that Savings equals Investment. However, Pagano assumes that a proportion of $1 - \theta$ is lost during the process of financial intermediation and thus equilibrium becomes:

$$\theta S_t = I_t \dots\dots\dots 3.4$$

Introducing growth rates and using equations 3.1, 3.2 and 3.3, the steady state growth rate of output is derived as follows:

At steady state, growth rate of output is the same as growth rate of capital since marginal productivity of capital absorbs all depreciation, growth rate at time $t+1$ is: $g_{t+1} =$

$$\frac{Y_{t+1} - Y_t}{Y_t} = \frac{Y_{t+1}}{Y_t} - 1 = \frac{K_{t+1}}{K_t} - 1 \dots\dots\dots 3.5$$

Where g_{t+1} is the growth of output in time $t+1$.

Using equation 3.1, $Y_t = AK_t$, then $Y_{t+1} = AK_{t+1} \dots\dots\dots 3.6$

From equation 3.3, $K_{t+1} = I_t + (1 - \delta)K_t \dots\dots\dots 3.7$

Then, substituting for K_{t+1} , $Y_{t+1} = A(I_t + (1 - \delta)K_t) \dots\dots\dots 3.8$

Applying the growth rates:

$$\frac{Y_{t+1}}{Y_t} - 1 = \frac{A(I_t + (1 - \delta)K_t)}{Y_t} - 1 \dots\dots\dots 3.9$$

Replacing I_t using equation 3.4, using $A = \frac{Y_t}{K_t}$ (from equation 3.1) and the fact that $\frac{S_t}{Y_t} = s_t$

$$g_t = \frac{\frac{Y_t}{K_t}(I_t + (1 - \delta)K_t)}{Y_t} - 1 \dots\dots\dots 3.10$$

$$= \frac{Y_t}{K_t} \cdot \frac{1}{Y_t} [\theta S_t + (1 - \delta)K_t] \dots\dots\dots 3.11$$

$$= [\theta \frac{S_t}{K_t} + (1 - \delta)] - 1 \dots\dots\dots 3.12$$

$$= [\theta \frac{S_t}{Y_t} \cdot \frac{Y_t}{K_t} + (1 - \delta)] - 1 \dots\dots\dots 3.13$$

dropping the time indices, then:

$$g = A\theta s - \delta \dots\dots\dots 3.14$$

Where g is economic growth, s is the saving rate denoted by S/Y . Thus, output growth is influenced by θ , the proportion of savings channeled to investment, s , the saving rate and A , the social marginal productivity of capital. According to Pagano, 1993 financial development can affect growth through these three variables; it can raise the proportion of savings channeled to investment, it may increase the marginal productivity of capital or influence savings. Thus financial sector development “has not only a level effect but also a growth effect”, as it affects economic growth not only through savings but also the marginal productivity of capital.

Assuming zero depreciation, equation 3.14 gives the Pagano endogenous growth model as:

$$g = A\theta s \dots\dots\dots 3.15$$

3.3.2 Empirical Model

The study aimed at estimating the effect of financial development on economic growth as well as determining the causality between financial development and economic growth. Deriving our model from the Pagano ‘AK’ endogenous growth model described in section 3.3.1 where output is a linear function of capital stock, a reduced form equation is obtained as: $g = A\theta s$

Where financial development indicators were included to capture A and θ . The variables used here either represented A , which is the allocative efficiency/productivity of capital, θ , which is the proportion of savings channeled to investment and s , the savings rate. Non-performing loans as a percentage of total loans and Bank credit to Private sector represent allocative efficiency (A) while interest rate spread influences the proportion of savings channeled to investment (θ) and captures transaction costs for financial intermediation. Liquid liabilities of banks and market capitalization represent the quantity of financial

development. Liquid liabilities of banks includes M2 less currency in circulation, bank credit to private sector is a measure of financial depth but isolates credit given by other financial institutions and credit to the public sector. It is thus the most important measure of financial intermediary development, (Levine and Zervos, 1998 and Yartey, 2007).

The study assumed that the private sector is more competitive than the public sector. Therefore, according to the first theorem of welfare economics, it (competitive markets) leads to more Pareto efficient allocation of resources (a restatement of the Adam Smith's invisible hand theorem). Thus, giving credit to the private sector in contrast to the public sector would lead to more Pareto efficient outcomes. NPLs as a percentage of total loans is a measure of the quality of financial assets hence quality of financial development while interest rate spread is the difference between borrowing and lending rates by financial institutions.

A measure of financial innovation in the form of mobile payments was included. According to Krishnan (2011), financial development is broad and includes three pillars: The policies, factors, institutions and innovations that allow for effective financial intermediation; The size, depth and efficiency of the financial intermediaries and the institutions/markets that provide financial services and: Financial access which involves access of individuals and business to financial services as well as credit/capital. Mobile money services as a financial innovation allow people to have access to new financial services. In this study, mobile money services were represented by M-Pesa which is one of the innovations discussed in chapter one. Thus, this study went beyond the traditional measures of financial development which are size and intermediation, to include new indicators of financial development which can be divided into efficiency and quality of the financial system (World Bank, 2006) as well as financial innovation.

The study also included other factors affecting economic growth as control variables. Excluding them could lead to bias in the direction of causality between financial

development and economic growth (Akinlo and Egbetude, 2010). These factors include inflation which has also been used by Easterly and Fischer (2001) and Dollar and Kraay (2002) and trade openness which has been used by Wolde-Rufael (2009). The Pagano Model is limited in that it assumes a closed economy. However, economies will always trade and this cannot be ignored (Adu et al., 2013; Jalil and Feridun, 2011 and Khan, 2008). To deal with this shortcoming, trade openness was included which is based on the importance and positive effect of trade on economic growth (Beck, 2002; Do and Levchenko, 2004).

Thus the augmented model was specified as:

$$\ln Y_t = \beta_0 + \beta_1 \ln FD_t + \beta_2 \ln X_t + \beta_3 FI + \varepsilon_1 \dots\dots\dots 3.16$$

Where Y represents economic growth, FD is financial development which includes bank credit to private sector (CPS), interest rate spread (INT), NPLs over total loans (NPL), Stock market capitalization (MKT) while X is other control variables which include trade openness (TO) and inflation (INF). The coefficient β_1 gives the effect of financial development on economic growth. The study also included a financial innovation dummy (FI) to control for financial innovation. The study limits financial innovation to introduction of new financial instruments and in this case, M-Pesa mobile banking. This is because M-Pesa has been the leading mobile payment in the world (Buku and Meredith, 2013; Nyamongo and Ndirangu, 2013). The variables were expressed in logarithms to express the multiplicative time series effects as well as ensure stationarity in their variance.

3.3.3 Estimation and Testing

a) Descriptive Statistics

Descriptive data analysis was essential in determining the statistical properties of the data so as to select the proper functional form of the estimable model. The study conducted normality test of the variables as non-normality of the variables could lead to non-normality of the residuals. To test for the normality properties of the variables, the study

made use of the Jarque-Bera (JB) Test which compares the skewness and kurtosis coefficients of the variables. For a variable to be normally distributed, its skewness should be equal to zero, kurtosis should be equal to three and the JB statistics should be equal to zero.

Additionally, the study sought to determine the spread of the data estimating the mean and the first movement away from the mean for all the variables contained in the two models. The study also conducted a graphical analysis of the variables (in logarithms) to capture their movement over time.

b) Unit Root Tests

Before running the model, it was important to determine the optimal lag length. The Akaike Information Criterion, Schwarz Information Criterion and Hannan-Quinn Criterion were used to determine the optimal lag length of the variables as well as the optimal lag length of the VAR/VEC model. Under-estimating the number of lags could lead to autocorrelated errors in the model while over-estimating lags could lead to errors with high means meaning the model is over-fit. Thus, it was very important to determine the optimal lag lengths.

Unit root test for checking stationarity properties of the variables was done to avoid spurious regression. To test this, the ADF (Dickey and Fuller, 1979) and the Philip-Perron (PP) unit root test (Phillip and Perron, 1988)¹⁶ can be used. The null hypothesis is that there is a unit root. The two tests are shown by the following equations:

$$\text{ADF: } \Delta Y_t = \alpha + \beta T + \sigma Y_{t-1} + \sum_{i=1}^k \lambda_i \Delta Y_{t-1} + \varepsilon_t \dots\dots\dots 3.17$$

$$\text{PP: } \Delta y_t = \alpha + \beta T + \lambda y_{t-1} + \mu_t \dots\dots\dots 3.18$$

¹⁶ The ADF and Philip-Perron usually gives consistent results (Baliamoune-Lutz, 2008)

Where Δ is the first difference and k is the number of optimal lags to deal with serial correlation. The PP test equation ignores serial correlation which is corrected for in the errors, μ_t

Adding sufficient lagged differences of the dependent variables usually helps the ADF unit root test deal with the errors that are correlated in the test model while the PP unit root test deals with correlated errors by using a correction factor to estimate the long-run variance of the error including a variation of the Newey–West formula. The PP unit root test is believed to have a greater ability to detect presence of unit root compared to the ADF unit root test. Therefore, this study relied on the PP unit root test. If non-stationarity is detected, the first differencing is used to deal with the problem.

The ADF and Phillip Perron tests are limited and could lead to failure to reject the null hypothesis in presence of unit root in case there is presence of structural breaks in the series (Perron, 1989). These tests could find the series to be $I(1)$ while in actual sense they could be stationary, $I(0)$, around structural breaks and thus wrongly classified as non-stationary. Thus, it is important to incorporate structural breaks to counter this limitation. There are two ways of incorporating structural breaks; either exogenously where break date is known or endogenously where break date is not known. Perron-Vogelsang (1992) proposed a unit root test incorporating one structural break. However, Enders (2004) argued that this test is more appropriate to test for unit root when the structural break is known.

Thus, this study utilised the Zivot and Andrews (1992) test for unit root which determines structural breaks endogenously instead of assuming they are known, that is, they are as a result of an estimation procedure. This test is advantageous since it identifies the dates of structural breaks in each of the series and it then allows the analysis of whether a structural break in each of the series can be linked to a particular event or policy. The Zivot and Andrews test allows for one structural break in the intercept and in the trend of each

variable. So, there is a different dummy for each possible structural break in each variable. This test is a modification of Perron's test for unit root where the structural break date is known or the structural break is exogenously determined. The Zivot - Andrews test thus estimates three models as follows: Model one allows for one structural break in the level, model two allows for one structural break in the trend while model three allows for one structural break in both the level and trend of each series as follows;

$$\text{Model 1: } \Delta y_t = \alpha + \beta y_{t-1} + \delta t + \gamma DUM_t + \sum_{j=1}^k d_j \Delta y_{t-j} + \varepsilon_t \dots\dots\dots 3.19$$

$$\text{Model 2: } \Delta y_t = \alpha + \beta y_{t-1} + \theta DUT_t + \sum_{j=1}^k d_j \Delta y_{t-j} + \varepsilon_t \dots\dots\dots 3.20$$

$$\text{Model 3: } \Delta y_t = \alpha + \beta y_{t-1} + \delta t + \theta DUT_t + \gamma DUM_t + \sum_{j=1}^k d_j \Delta y_{t-j} + \varepsilon_t \dots\dots\dots 3.21$$

Where DUM_t is the dummy variable representing structural break at level at any possible break date and DUT_t is the trend shift dummy variable and;

$$DUM_t = \begin{cases} 1 & \text{if } t > BD \\ 0 & \text{Otherwise} \end{cases}$$

$$DUT_t = \begin{cases} t - BD & \text{if } t > BD \\ 0 & \text{Otherwise} \end{cases}$$

BD is the break date. The null hypothesis for all the models is unit root in the presence of one unknown structural break. The study followed model 3 since it is regarded as more superior to the other models (Perron and Sen, 2003). The values of λ which give the range within which structural breaks are detected for the variables lies between 0 and 1. This is gotten at the point that minimizes the t-statistic for stationarity.

Zivot and Andrews test checks for stationarity in the presence of only one structural break. However, just like ignoring structural breaks could lead to non rejection of the null hypothesis of unit root, failure to allow for two structural breaks could lead to non

rejection of the null hypothesis hence spurious results (Ben-David et al., 2003; Lumsdaine and Papell, 1997 and Clemente et al., 1998). Thus, the study employed the Clemente-Montanes-Reyes (1998) unit root test which allows for the presence of two structural breaks. This test extends the Perron and Vogelsang (1992) test for unit root by allowing for two structural breaks. It tests for the null hypothesis of unit root in the presence of 2 structural breaks against the alternative of stationarity in the presence of structural breaks as follows:

$$H_0 : y_t = y_{t-1} + \alpha_1 DUTb_{1t} + \alpha_2 DUTb_{2t} + \varepsilon_t \dots\dots\dots 3.22$$

$$H_1 : y_t = a + \beta_1 DUMB_{1t} + \beta_2 DUTb_{2t} + \mu_t \dots\dots\dots 3.23$$

Where:

$$DUM_t = \begin{cases} 1 & \text{if } t > \text{BD} \\ 0 & \text{Otherwise} \end{cases}$$

$$DUT_t = \begin{cases} 1 & \text{if } t = \text{BD} + 1 \\ 0 & \text{Otherwise} \end{cases}$$

BD is the break date

The test estimates two models; the innovative outlier model and the additive outlier model. In the innovative outlier model, a dummy for the structural break in the level and also in the trend is allowed. The dummy here is depicted as evolving slowly over time. In the additive outlier model, the dummy is modeled as a shock and allows for a break in the trend. The null hypothesis under the two models remains the same; there is unit root in the presence of structural breaks.

The innovative outlier model for testing for unit root then becomes:

$$y_t = a + \sigma y_{t-1} + \alpha_1 DUTb_{1t} + \alpha_2 DUTb_{2t} + \beta_1 DUM_{1t} + \beta_2 DUM_{2t} + \varepsilon_t \dots\dots\dots 3.24$$

If the breaks are assumed to be additive outliers, then the model is estimated through a two step process where the first process involves elimination of the deterministic part as follows:

$$\tilde{y} = y_t - a - \beta_1 DUM_{1t} - \beta_2 DUM_{2t} \dots\dots\dots 3.25$$

The minimum t ratios are then obtained and then using this to test if the autoregressive parameter is one for all structural breaks times.

The next step involves testing and searching for the minimum t ratios when the hypothesis set is $\sigma = 1$ from equation 3.24. Thus, the trend shift dummy for structural break at trend, gives the following model:

$$\tilde{y}_{t-1} = \tilde{y}_t - \alpha_{1t} DUTb_{1t} + \alpha_{2t} DUTb_{2t} - \Delta \tilde{y}_{t-1} + \varepsilon_t \dots\dots\dots 3.26$$

Thus, the t ratios help in inferring for the presence of structural breaks.

c) Cointegration Analysis

The first step was to confirm that all the variables are not stationary. In case the variables were stationary, then the normal OLS is used for analysis. If they were not stationary, the study would proceed with cointegration analysis. Cointegration tests were used to determine the possibility of a long run relationship between the variables in the model. Johansen cointegration (Johansen, 1988 and Johansen and Juselius, 1990) test based on a Vector Autoregression (VAR) approach was used.

$$\ln Z_t = \alpha + \beta_1 \ln Z_{t-1} + \beta_2 \ln Z_{t-2} + \dots\dots\dots + \beta_k \ln Z_{t-k} + \varepsilon_t \dots\dots\dots 3.27$$

Introducing changes, equation 3.27 can be expressed as:

$$\Delta \ln Z_t = \alpha + \beta_k \ln Z_{t-k} + \sum_{i=1}^{k-1} \varphi_i \Delta \ln Z_{t-i} + \varepsilon_t \dots\dots\dots 3.28$$

Where, Z_t is a vector of endogenous variables including real GDP, financial development indicators (credit to private sector, non-performing loans, interest rate spread and market

capitalization) and control variables (trade openness and inflation). β and ϕ represents the p by p matrices of unknown parameters while ln is natural logarithms.

d) Vector Autoregressive / Vector Error Correction Model

After carrying out the above tests, the results from the cointegration test determined whether to run a Vector Autoregression (VAR) system (Sim, 1980) or a Vector Error Correction Model within the VAR framework. The VAR model is a model that allows for analysis of the joint dynamic behavior of a number of variables without requiring strong restrictions on parameters. The VECM model is a cointegrated VAR with an error correction model mechanism in case cointegration is found. The Error Correction term allows for detection of short run and long run casual relationships and captures the long-run adjustment of the cointegrated variables. The VECM methodology is preferred over other methods of analysis like OLS and ARDL because it considers the dynamic relationships between variables which ARDL does not consider and deals with the problems of endogeneity by using endogenous variables and incorporating their lagged values which simple OLS cannot deal with. Again, OLS would give spurious results where variables are not stationary. Further, the methodology is preferred to GMM which is more designed for large cross-section data as compared to time series data. Since macro analysis has little cross-section aspects due to time aspects, GMM is less suited to perform such analysis and hence the need for VAR/VECM analysis. The VAR model is given as:

$$\ln Z_t = \sum_{i=1}^k A_i \ln Z_{t-i} + \phi D_t + \varepsilon_t \dots\dots\dots 3.29$$

Where Z_t is a vector of endogenous variables which include real GDP and financial development indicators as well as the control variables. ε_t is a vector of the error terms. D_t is the financial innovation dummy and ln represents natural logarithms. Based on the results, if unit root and cointegration exist in the variables, the Vector Error Correction Model is estimated as follows:

$$\Delta \ln Z_t = \sum_{i=1}^k \Delta A_i \ln Z_{t-i} + \phi D_t + \Pi ECM_{t-1} + \varepsilon_t \dots\dots\dots 3.30$$

Where Π gives the error correction parameter that show how the cointegrated variables adjust to deviations from long run equilibrium.

$$\Delta \ln FD_t = d_0 + \sum_{i=1}^n d_1 \Delta \ln Y_{t-i} + \sum_{i=1}^n d_2 \Delta \ln FD_{t-i} + \sum_{i=1}^n d_3 \Delta \ln X_{t-i} + d_4 ECM_{t-1} + u_t$$

$$\Delta \ln Y_t = b_0 + \sum_{i=1}^n b_1 \Delta \ln Y_{t-1} + \sum_{i=1}^n b_2 \Delta \ln FD_{t-1} + \sum_{i=1}^n b_3 \Delta \ln X_{t-1} + b_4 ECM_{t-1} + \varepsilon_t$$

$$\Delta \ln X_t = a_0 + \sum_{i=1}^n a_1 \Delta \ln Y_{t-1} + \sum_{i=1}^n a_2 \Delta \ln FD_{t-1} + \sum_{i=1}^n a_3 \Delta \ln X_{t-1} + a_4 ECM_{t-1} + \varepsilon_t \dots\dots\dots 3.31$$

FD is financial development which is represented by Credit to Private Sector, Non-performing Loans, Interest Rate Spread and Market Capitalization. The X vector includes control variables including Trade openness and inflation.

e) Granger Causality Methodology

Causality between financial development and economic growth using granger causality tests was examined. Granger causality was introduced by Granger (1969) and adopted by studies like Kokaveshi and Kola (2013). The intuition of granger causality is the fact that past values of a series can cause another in the future (Takaendesa and Odhiambo, 2007). According to Granger, 1988, a time series variable can be predicted by using the past values of another time series variable termed as granger causality. Thus X_t granger causes Y_t if the past values of X explains Y_t . Granger causality however does not imply with certainty that one series causes another but rather that one series might cause another. Economic growth is caused by financial development if it can be better predicted by past values of financial development and economic growth and also financial development is caused by economic growth if it can be better predicted by past values of economic growth

and financial development. Thus, the following equations between financial development and economic growth were given:

$$\ln Y_t = \sum_{i=1}^n b_1 \ln Y_{t-1} + \sum_{i=1}^n b_2 \ln FD_{t-1} + \varepsilon_t \dots\dots\dots 3.32$$

$$\ln FD_t = \sum_{i=1}^n d_1 \ln Y_{t-1} + \sum_{i=1}^n d_2 \ln FD_{t-1} + u_t \dots\dots\dots 3.33$$

Where FD is financial development represented by the following financial development indicators; Bank credit to private sector and Stock market capitalization, Interest rate spread and non-performing loans as a ratio of total loans.

The study adopted the Vector Error Correction (VEC) Granger Causality/Block Exogeneity Wald tests to determine the causal relationships among the variables which use differenced values of the variables. The chi-square statistic or the Wald statistic was used to test the joint significance of each of the endogenous variables in the model as well as the joint significance of all the other endogenous variables (which are lagged) in the VAR/VECM model.

f) Variance Decomposition

The study also captured the dynamics of the variables in the model by running the Variance Decompositions. These decompositions help in the interpretation of the VAR or VECM model. Variance decompositions analysis was important because it gives the importance of each shock in the overall variance or changes in each variable over time. This analysis also helps in analyzing shocks to variables and how these shocks resonate through any system. It is important in decomposing the explained variations of a variable resulting from variations in another as well as other unexplained variations or exogenous shocks.

g) Post-Estimation Diagnostics

Having estimated the model, to establish the validity of the estimated results, it was essential to conduct post estimation tests in order to ascertain the fit of the model and to examine the structure of the residuals so as to ascertain the validity of inferences made from the estimated results. These tests include; the model stability test, the residual normality test, the residual autocorrelation LM test and the residual heteroscedasticity test.

3.3.4 Definition and Measurement of Variables

The variables used here represent either the allocative efficiency/productivity of capital (A) or the proportion of savings channeled to investment, θ in the Pagano AK model. NPLs as a percentage of Total loans and Bank credit to Private sector represented allocative efficiency (A) while interest rate spread influences the proportion of savings channeled to investment (θ) and captures transaction costs for financial intermediation. Liquid liabilities of banks and market capitalization represented the quantity of financial development. Liquid liabilities of banks was defined as M2 less currency in circulation, bank credit to private sector is a measure of financial depth but isolates credit given to the public sector. It is thus the key measure of financial intermediary development (Levine and Zervos, 1998 and Yartey, 2007).

NPLs as a percentage of total loans is a measure of the quality of financial assets hence quality of financial development while interest rate spread is the difference between borrowing and lending rates by banks. It was important to include a measure of stock market as stock markets are likely to affect the level of a country's economic activity by increasing liquidity (Kenourgios and Samitas, 2007). Stock market also provides long term finance instead of the short term finance for banks. Stock market capitalization measured the size of the stock market and can be used as a measure of market development (Levine and Zervos, 1998; Mohtadi and Agrawal, 1998 and Levine, 2003). Trade openness index is defined as the sum of exports and imports of goods and services over GDP and measures a country's openness to trade or integration in the world economy while inflation is the

overall month on month inflation and was defined as the persistent increase in the price levels of goods and services over a certain time period. It captures the extent of future uncertainty which makes firms shy away from making long term investment decisions due to high price volatility (Caporale et al., 2009). Real Gross Domestic Product is used as a proxy for economic growth.

Financial innovation is represented by the volumes of money transacted through mobile money in specific M-Pesa. However, since the data observations for mobile payments were few (from 2007) and would not allow for enough degrees of freedom, a dummy variable was used to represent onset of M-Pesa accompanied with M-Pesa volumes of transactions. The dummy was one from quarter two of 2007 onwards when mobile payments through M-Pesa started and zero otherwise.

In regards to economic growth, it is noted that growth of GDP is mostly used in cross-sectional and panel data analysis since countries do not have similar aggregate production functions and comparisons using growth would be ideal (Greiner et al., 2004) although it has been used in time series studies (Dushku, 2010 and Shan and Jianhong, 2006,). In this study, real GDP is used as a measure of economic growth as used in literature (Jalil and Feridun, 2011; Kargbo and Adamu, 2010; Mittal, 2014 and Ghatak and Siddiki, 1999). Further, introducing logarithms ensures that the log difference of real GDP gives economic growth (Herzer and Morrissey, 2011; Kargbo and Adamu, 2010 and Kargbo, 2012). Table 3.2 summarises the definition and measurement of variables.

Table 3.2: Definition and Measurement of Variables

Variable	Definition and Measurement	Expected Sign	Literature Source	Unit of Measurement
Real GDP (GDP)	It gives the value of all goods and services produced in a country in a year expressed in 2009 prices taking inflation into consideration		Kargbo and Adamu (2010), Mittal (2014)	Kshs.
Credit to Private Sector (CPS)	This is the credit/loans offered by the banking industry to the private sector.	Positive	Levine and Zervos (1998), Yartey (2007), Liang and Teng(2006), Adamopoulos (2010), Arcand et al. (2011)	Kshs.
Liquid Liabilities of Banks (LL)	This is the defined as broad money, M2 less currency outside banks or currency in circulation.	Positive	De Gregorio and Guidotti (1995), Dushku (2010)	Kshs.
Market Capitalization (MKT)	It is the value of all outstanding shares of all companies listed at the Nairobi Stock exchange. It is calculated by multiplying all the outstanding shares by their current market prices.	Positive	Kenourgios and Samitas, 2007, Levine and Zervos (1998), Mohtadi and Agrawal (1998) and Levine (2003)	Kshs.
Non - Performing Loans (NPL)	The sum of loans for which the borrowers have not made payment for atleast 90 days. It is measured as the value of NPLs divided by the total value of the loan portfolio. It is a measure of the quality of financial development	Negative	Dudian and Popa (2013)	Ratio
Interest Rate Spread (INT)	It is the difference between borrowing (demand, time and savings deposits) and lending (loans) rates by banks. It measures the efficiency of the banking sector	Negative	Antzoulatos et al (2008), Dudian (2013)	Rate
Financial Innovation (FI)	This is represented by a dummy variable. The dummy is one from quarter two of 2007 onwards when M-Pesa was introduced and zero otherwise.	Positive	This measure is new literature and it is justified in (Krishnan, 2011)	Dummy
Inflation (INF)	Overall month on month inflation and is defined as the continuous increment in price levels of goods and services over a certain time period. The month on month values are then added per quarter and divided by 3	Negative	Easterly and Fischer (2001), Dollar and Kraay (2002) and	Rate
Trade Openness (TO)	Sum of exports and imports of goods and services over GDP and it measures a country's openness to trade or integration in the world economy	Positive	Wolde-Rufael (2009) and Menyah et. al (2014)	Index

All the variables were in logarithm form as described in section 2.3.3 in chapter 2 apart from the financial innovation dummy. The study uses LN to represent natural logarithm.

3.3.5 Data Set and Description

Quarterly time series data, which cover the 2000 to 2014 period, was utilized in this study. The choice of this period was due to the availability of quarterly data which stems from the year 2000. The study differs from other studies especially the ones done in Kenya by using quarterly frequency data. Less developed countries like Kenya rarely have data that covers long span of time. Quarterly data comes in handy in this situation and larger data observations can help in attaining more statistically significant estimates. Putsis (1996) also concluded that use of quarterly data can lead to more accurate forecasts than annual data. The data was largely obtained from the CBK annual, quarterly and monthly reports from the years 2000 to 2014. In addition, the stock market data was collected from NSE. Data on GDP was obtained from the Kenya National Bureau of Statistics (KNBS), quarterly statistical reports.

3.4 Empirical Results and Discussion

3.4.1 Descriptive Statistics

The study determined the spread of the data giving both the mean and the standard deviation to show the deviations from the mean. The study also tested for normality of the variables using the JB test which compares the skewness and kurtosis coefficients of the variables. These results are as discussed in Table 2.2 in section 2.4 in chapter 2. All the variables were not highly dispersed from their mean values as shown by their small standard deviations. From the values of skewness and kurtosis and the Jarque – Bera probability, real GDP, market capitalization, trade openness and inflation were normally distributed at five percent significance level. However, at one percent significance level, all the variables were normally distributed. This was important as it shows how reliable data is in the results and in this case, then the data was reliable.

3.4.2 Correlation Matrix

Correlation shows the linear relationship between variables. It interrogates the relationship between pairs of variables. High pairwise correlations imply multicollinearity problems which could lead to high standard errors and insignificant statistics, thus inaccuracy of the regression coefficients. There was high correlation (0.87) between credit to private sector and liquid liabilities of banks as shown in Table A.3 (Appendix). Correlations above 0.70 are considered to be high (Fawcett, 2007). High pairwise correlations indicate multicollinearity problems and hence the t statistics and regression coefficients cannot be trusted. So the study dropped liquid liabilities of banks and used Credit to private sector because it shows the financial depth as compared to liquid liabilities of banks which shows more of the liquidity aspect. All the other variables were not highly correlated but both positive and negative correlations were evident between the various variables.

3.4.3 Unit Root Tests

It was important to determine the optimal lag length of each variable. This is important in testing for unit root as ignoring this could lead to giving the false stationarity results. The tests for optimal lag length which were conducted included Fixed Prediction Error (FPE), Akaike Information Criteria (AIC), Hannan and Quinn Information Criteria (HQIC) and Schwarz' Bayesian Information Criteria (SBIC). For almost all the variables, all the lag length tests determined the same lag length as shown in Table A.1 (Appendix). Credit to Private Sector, Non-performing Loans, trade openness and remittances had an optimal lag length of three, market capitalization and real gdp had a lag length of one while inflation had a lag length of four.

A graphical presentation of the variables was important so as to capture their movement over time. This was important because it shows whether the variables had a deterministic trend or not. This gives guidance on whether to include a trend and intercept or not when conducting stationarity tests. These graphs are indicated in Appendix. From the graph, it was clear that all the variables had a trend. The stationarity properties of the variables were

determined by conducting unit root tests. This was important as ignoring stationarity properties would lead to spurious regression. The study conducted the Phillip - Perron unit root test and the results are given in Table 3.3:

Table 3.3: Phillip - Perron Unit Root Test Results

	At levels				1 st difference				Order of integration
	Constant		Trend & Intercept		Constant		Trend & Intercept		
Variables	t-stat	5% Critical value	t-stat	5% Critical value	t-stat	5% Critical value	t-stat	5% Critical value	
LNReal GDP	1.057	-2.916	-2.049	-3.495	-4.217	-2.916	-11.947	-3.494	1(1)
LNCredit to Private Sector	1.134	-2.917	-3.142	-3.497	-2.632	-2.596	-3.296	-3.177	1(1)
LNMarket Capitalization	-0.527	-2.912	-1.420	-3.489	-6.355	-2.912	-6.289	-3.489	1(1)
LNNon-performing Loans	-0.644	-2.912	-1.711	-3.489	-6.936	-2.913	-6.875	-3.491	1(1)
LNInflation	-3.048	-2.916	-3.153	-3.495	-6.231	-2.916	-6.235	-3.494	1(1)
LNInterest Rate Spread	-1.213	-2.912	-1.397	-3.488	-6.733	-2.912	-6.673	-3.489	1(1)
LNTrade Openness	-1.750	-2.912	-3.492	-3.495	-7.602	-2.914	-7.594	-3.492	1(1)

Results from the Phillip – Perron test showed that, all the variables are integrated of order one meaning that they were non-stationary at levels but stationary at first difference.

The study conducted Zivot-Andrews unit root test to test for unit root in the presence of structural breaks. The test combines both intercept and trend in testing for unit root in the presence of a structural break. From the results of the Zivot-Andrews test as summarized in Table 3.4, all variables were integrated of order one.

Table 3.4: Zivot Andrews Unit Root Test Results

Variables	Year of structural break	Trend & Intercept				Order of integration
		Level		First Difference		
		t-stat	5% Critical value	t-stat	5% Critical value	
LNCredit to Private Sector	2008q ₁	-3.206	-5.08	-10.832	-5.08	1(1)
LNMarket Capitalization	2002q ₄	-3.940	-5.08	-8.032	-5.08	1(1)
LNNon-performing Loans	2007q ₂	-4.760	-5.08	-8.011	-5.08	1(1)
LNReal GDP	2008q ₁	-3.439	-5.08	-9.071	-5.08	1(1)
LNInflation	2005q ₄	-4.226	-5.08	-7.686	-5.08	1(1)
LNInterest Rate Spread	2011q ₄	-4.621	-5.08	-6.108	-5.08	1(1)
LNTrade Openness	2007q ₁	-4.905	-5.08	-8.248	-5.08	1(1)

The results showed a replication of the reported results using the Phillip-Perron test for unit root. The test also endogenously determined the presence of structural breaks. The results confirmed the presence of structural breaks at different periods for each of the variables. Some of the breaks could be attributed to the post election violence effects of 2008 as well as the uncertainties of the 2007 elections, uncertainties at the end of 2002 elections after the end of the term of the second president of Kenya, effects of the global financial crisis of 2008-2009 and the recession effects that followed.

The analysis was extended to include two structural breaks since not considering more than one structural break could invalidate the results. Thus, the Clemente-Montanes-Reyes unit root test which allows for two structural breaks was conducted and the results are indicated in Table A.4 (Appendix). From the test results, all the variables were stationary at first difference with two structural breaks either at the additive outlier model or innovative outlier model or both. Real GDP and Trade openness were not stationary at first difference in the innovative outlier model but stationary at first difference in the additive outlier model. Bank credit to private sector was stationary at first difference when there are two structural breaks and with additive outlier.

3.4.4 Cointegration Test Results

The study used the two ways for testing for cointegration or the long – run relationship. The normal regression was ran and test for stationarity of the residuals with and without

incorporating structural breaks. Further, dummies for the structural breaks for each variable were added. The residual was found to be stationary even with incorporation of structural breaks. This confirmed the presence of cointegration with or without structural breaks. The study then tested for cointegration using the Johansen test. The results are given in Tables 3.5 and 3.6.

Table 3.5: Cointegration Results with Trace Statistic

Hypotheses	Hypothesized	Eigenvalue	Trace Statistic	0.01 Critical Value
	No. of CE(s)			
$H_0: r=0$ $H_1: r>0$	None ***	0.704233	183.9170	135.9732
$H_0: r\leq 1$ $H_1: r>1$	At most 1 ***	0.515833	115.6987	104.9615
$H_0: r\leq 2$ $H_1: r>2$	At most 2	0.362044	75.08050	77.81884
$H_0: r\leq 3$ $H_1: r>3$	At most 3	0.350054	49.90929	54.68150
$H_0: r\leq 4$ $H_1: r>4$	At most 4	0.236471	25.78076	35.45817
$H_0: r\leq 5$ $H_1: r>5$	At most 5	0.108189	10.67172	19.93711
$H_0: r\leq 6$ $H_1: r>6$	At most 6	0.073244	4.259654	6.634897

*** denotes rejection of the null hypothesis at the 1% level

Table 3.6: Cointegration Results with Max-Eigen Statistic

Hypotheses	Hypothesized	Eigenvalue	Max-Eigen Statistic	0.01 Critical Value
	No. of CE(s)			
$H_0: r=0$ $H_1: r=1$	None ***	0.704233	68.21829	52.30821
$H_0: r=1$ $H_1: r=2$	At most 1	0.515833	40.61821	45.86900
$H_0: r=2$ $H_1: r=3$	At most 2	0.362044	25.17120	39.37013
$H_0: r=3$ $H_1: r=4$	At most 3	0.350054	24.12853	32.71527
$H_0: r=4$ $H_1: r=5$	At most 4	0.236471	15.10905	25.86121
$H_0: r=5$ $H_1: r=6$	At most 5	0.108189	6.412062	18.52001
$H_0: r=6$ $H_1: r=7$	At most 6	0.073244	4.259654	6.634897

*** denotes rejection of the null hypothesis at the 1% level

Max-eigenvalue and Trace test indicated 1 and 2 cointegrating equations respectively at the 0.01 level. As indicated in Tables 3.5 and 3.6, the Johansen test indicated one cointegrating equation for the maximum eigen value test while it indicated two cointegrating equations for the trace statistic. In deciding which statistic to use, the study followed Lütkepohl et al. (2000) arguments. Lutkepohl indicated that the trace statistic is superior in terms of power performance to the maximum eigenvalue statistic. However, the trace statistic is preferred

when there are more than two cointegrating relations than specified under the null hypothesis. Further, when the two statistics give differing numbers of cointegrating equations, then keep rejecting the null hypothesis until one of the tests fails to reject the null hypothesis (Pantula principle). In this case, the test that fails to reject the null hypothesis first, gives the actual number of cointegrating equations. From this discussion and the above results, the conclusion was that there was one cointegrating equation. Thus, the presence of cointegration was found.

3.4.5 Vector Error Correction Model Regression Results

Having found cointegration, the study conducted the VECM model. Before running the VECM model, the optimal lag length for the model had to be selected. Under-estimating the number of lags could lead to autocorrelated errors in the model while over-estimating the lags could lead to errors with high means meaning the model is over-fit. Thus, it was very important to determine the optimal lag lengths. The optimal lag length criteria test results are given in Table A.5 (Appendix). The results for lag length criteria indicated an optimal lag length of either one or five.

The study went a step further to determine which of the two lag lengths was optimal by testing for autocorrelation and stability of the model. The tests for autocorrelation and stability showed that the optimal lag length was one. At lag one, the LM statistic showed that the error terms were not statistically significant at any lag length. Thus the model with lag one had no autocorrelation problem. The AR roots graph at lag length of one indicated that the VECM model was stable and the results obtained were valid as all roots lay within the unit circle (See Figure A.22 in Appendix). Lag one was therefore the optimal lag length. This was important for the VECM model as instability may imply misspecification and inability to use the model for forecasting.

Having found cointegration among the variables, the study estimated the Vector Error Correction Model (VECM). The results are summarized as follows:

Table 3.7: VECM Long – run Relationship Results

Dependent Variable – LNReal GDP			
Variable	Coefficient	Standard error	t-statistic
CONSTANT	-13.0844		
LNCredit to Private Sector (lnCPS)	-0.28048**	0.04679	-5.99500
LNInterest Rate Spread (lnINT)	-0.107990**	0.04173	-2.58753
LNNon-performing Loans (lnNPL)	-0.079228**	0.01885	-4.20327
LNMarket Capitalization (lnMKT)	0.048598**	0.01595	3.04653
LNInflation (ln π)	0.009624	0.00624	1.54137
LNTrade Openness (lnTO)	0.380138**	0.07326	5.18893

** indicates significance at 5% significance level

Table 3.7 shows the long-run relationship between the variables. Bank credit to private sector, interest rate spread and non-performing loans were negatively related to real GDP and their coefficients were statistically significant. A one percent increase in credit to private sector leads to a 0.28 percent decline in GDP. This finding was contrary to theory expectation which indicates that intermediation from surplus sectors to deficit sectors is important for growth as it reduces external financing constraints (Mishkin, 2007). However, it was in line with findings in literature (Koivu, 2002; D’alfonso and Moretti, 2012; Dudian and Popa, 2013).

The negative relationship could be due to several reasons; one could be the low level of financial intermediation which is normally low for developing countries. D’alfonso and Moretti (2012) found that credit to private sector of less than 40 percent may be negatively related to GDP which may be the case for Kenya with credit to private sector by banks at 34 percent of GDP. The other reason for the negative relationship could be due to low quality of this credit and the economic environment (Dudian and Popa, 2013). Growth in credit to private sector may not fully indicate that it is used efficiently. There could be situations where the private sector is unable to put it into productive use and hence fail to repay the loans leading to non-performing loans which are not profitable and thus

reductions in further credit hence reduction in economic performance. In some countries, this has led to banking crises.

The coefficient of interest rate spread was significant and indicated that a one percent increase in interest rate spread leads to 0.11 percent decline in GDP. The higher the interest rate spread, the lower the affordability of credit and thus less investments. This happens when the spread is caused by an increase in lending rate, holding the deposit rate constant, lowering it or increasing it at a lower rate than the lending rate. This is the case in Kenya, where the interest rate spread is high because banks have previously maintained very low deposit rates while charging very high borrowing rates. The interest rate spread is a measure of transaction costs as well as efficiency and the negative sign was consistent with theory (Harrison et al., 1999) which indicated that a lower interest rate spread or margin encourages investment and thus spurs economic growth. High interest rate spread is also asymptomatic of other imperfections in the financial sector and hence may undermine growth. Bank credit to private sector may only show the size of the financial sector but not the quality of the sector. To show the quality of the financial sector, non-performing loans was used.

The results showed that, an increase in non-performing loans led to reduction in real GDP. The coefficient was significant and indicated that a one percent increase in non-performing loans led to 0.08 percent reduction in GDP. This was as supported by theory which indicates that inefficiency of the financial sector leads to inefficient allocation of resources (Bencivenga and Smith, 1991) and non-performing loans may lead to a credit crunch (Krueger and Tornell, 1999). Non-performing loans may cause financial institutions to be burdened with large loans of negative real value thus reducing their ability to give new loans for investment and thus reduced economic performance. NPLs may also indicate that banks are financing non-productive or political activities which have a dampening effect on economic growth. They may also result from high interest rates that attract high risk borrowers engaged in activities not conducive to growth.

On the other hand, market capitalization and trade openness were positively related to real GDP. The two coefficients were significant and indicated that a one percent increase in market capitalization resulted in a 0.05 percent increase in GDP while a one percent increase in trade openness resulted in a 0.38 percent increase in GDP. Theoretically, the stock market is expected to reduce the costs of savings mobilization and hence ensure allocation of resources to productive activities. Market capitalization is expected to contribute positively to GDP or economic performance especially for the case of developed countries where the capital markets are efficient (Arestis et al., 2001). Under developed capital markets may not contribute much to GDP.

In our case, market capitalization leads to a positive effect on real GDP mainly attributed to the fast growth of the capital market in Kenya thus offering long term funds for investments. The coefficient of trade openness was also positive and significant implying that trade openness affected GDP positively. This was in line with the endogenous growth theories as supported by Chen and Gupta (2006) and Grossman and Helpman (1990) who asserted that trade openness spurs economic growth through productive knowledge spillovers, improved human capital and increased productivity.

The short run results are presented in Table 3.8. The analysis of the short-run relationship is done with differenced variables hence the variables were in first difference.

Table 3.8: VECM Short – run Relationship Results

Dependent Variable – DLNReal GDP			
Variable	Coefficient	Standard error	t-statistic
CONSTANT	0.0187		
DLNReal GDP(-1)	0.0742	0.1606	0.4623
DLNCredit to Private Sector (-1)	-0.3987**	0.1333	-2.9914
DLNInterest Rate Spread (-1)	-0.2128**	0.0751	-2.8349
DLNNon-performing Loans (-1)	-0.0403	0.0482	-0.8361
DLNMarket Capitalization (-1)	0.0281	0.0318	0.8847
DLNInflation (-1)	0.0058	0.0097	0.5960
DLNTrade Openness (-1)	0.3251**	0.0854	3.8056
Variable	Coefficient	Standard error	t-statistic
Error Correction Term (ECT _{t-1})	-0.9708**	0.0960	-10.1121

** indicates significance at 5% significance level

Where D represents first difference and LN is natural logarithm. Due to the presence of cointegration, a lagged Error Correction Term (ECT) was fitted to the short-run model as an explanatory variable to establish the speed of adjustment towards the equilibrium per period. The residual was taken as a valid error correction term; hence the model resulted into the Error Correction Model (ECM).

Only the coefficients of bank credit to private sector, interest rate spread and trade openness were statistically significant. Bank credit to private sector and interest rate spread were negatively related to GDP while trade openness was positively related to GDP. The coefficients indicate that a one percent increase in credit to private sector and interest rate spread resulted in a 0.40 percent and 0.21 percent reduction in GDP respectively in the short term. On the other hand, a one percent increase in trade openness led to 0.33 percent increase in GDP. The coefficient of the error correction term was statistically significant and negative implying that whenever there are deviations from an equilibrium path, the model corrects 97 percent deviations per quarter per year. Thus, for the system to finally go back to long-run equilibrium, it would take slightly more than one quarter, that is, a quarter and two weeks.

3.4.5 Granger Causality Results

The study ran the granger causality test based on the VECM to show the dynamic casual interactions among the variables in the presence of cointegration. This was important as it shows both the short-run and long – run causality on the chi squared-test of the lagged first differenced terms of the independent variables and the t-statistic of the error correction term respectively. The variables are in first difference and in natural logarithm. The results are given in Table 3.9:

Table 3.9: Granger Causality Results of the Real GDP Model

Independent Variable								
Dependent Variable	χ^2 - statistics of lagged first differenced term [p-value]							ECT _{t-1} Co-efficient
	Real GDP	Credit to Private Sector	Inflation	Interest Rate Spread	Market Capitalization	Non-performing Loans	Trade Openness	
Real GDP	–	8.95*** [0.0025]	0.36 [0.5512]	8.04*** [0.0046]	6.95*** [0.0084]	0.70 [0.4031]	14.48*** [0.0001]	-0.97*** (-10.11)
Credit to Private Sector	12.40*** [0.0004]	–	3.29* [0.0697]	6.34** [0.0118]	0.04 [0.8484]	0.03 [0.8583]	15.37*** [0.0001]	0.85 (7.4086)
Inflation	0.16 [0.6883]	0.55 [0.4603]	–	0.61 [0.4354]	0.66 [0.4170]	1.27 [0.2596]	0.41 [0.5196]	-0.88 (-0.629)
Interest Rate Spread	0.00 [0.9589]	0.08 [0.7757]	1.93 [0.1652]	–	6.95*** [0.0084]	0.26 [0.6100]	0.00 [0.9808]	-0.16 (-0.894)
Market Capitalization	0.25 [0.6163]	0.30 [0.5838]	0.48 [0.4894]	0.37 [0.5406]	–	0.22 [0.6399]	4.49** [0.0340]	0.33 (0.6746)
Non-performing Loans	3.29** [0.0698]	1.56 [0.2121]	0.01 [0.9065]	0.37 [0.5439]	2.13 [0.1446]	–	0.80 [0.3699]	0.69 (2.598)
Trade Openness	5.99** [0.0143]	2.86* [0.0908]	0.00 [0.9915]	1.48 [0.2233]	2.82* [0.0929]	0.63 [0.4281]	–	-0.66*** (-4.969)

Note: *, ** and *** denotes significance at 10%, 5% and 1% significance level, respectively. The figures in the squared brackets [...] indicate the p-values while the figures in the parenthesis (...) indicate the t-statistic.

The results indicated that there was a one way causality between interest rate spread and real GDP with causality running from interest rate spread to real GDP, market capitalization and real GDP with causality running from Market capitalization to real GDP and between non-performing loans and real GDP with causality running from real GDP to non-performing loans. There was a bi-directional causality between bank credit to private sector and real GDP and between trade openness and real GDP.

Therefore, the supply leading hypothesis between financial development and economic growth was supported by market capitalization and interest rate spread where causality was running from the financial development indicators to GDP while the demand following hypothesis was supported by non-performing loans, that is, financial development (experienced through reduction in non-performing loans) follows economic growth. Finally the bi-directional relationship was supported by bank credit to private sector, in which case, bank credit to private sector (financial development indicator) leads to economic growth and economic growth also leads to financial development (increased

bank loans to private sector). The channels between the dependent and independent variables with emphasis on the financial development indicators were summarised in Figure 3.2:

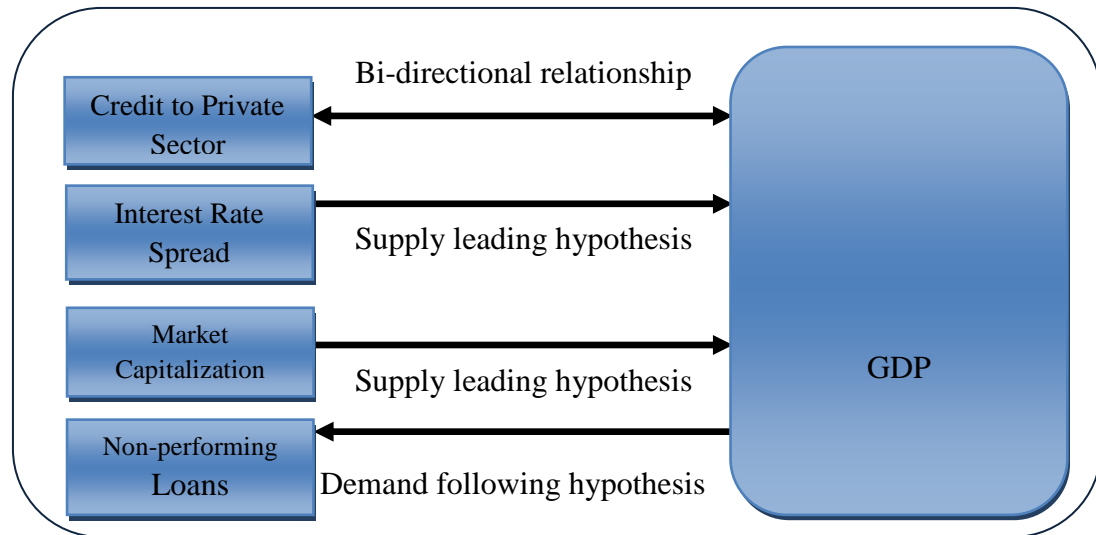


Figure 3.2: Causality between Real GDP and Financial Development Indicators
 Source: Author's compilation from the empirical results

3.4.6 Variance Decomposition

The study ran the VECM model which indicates the exogeneity and endogeneity of the variables in the system and the granger causality based on the VECM model to determine the causality between the financial development indicators and real GDP. The study further sought to determine the dynamic properties or interactions of the variables within a system using the variance decompositions. The variance decomposition method used was the cholesky decomposition. This method is preferred because the other non-orthogonal factorization methods, shocks to one unit, shocks to one standard deviation do not fulfill the adding up property. The rows show the forecast variance percentage due to each shock and should add up to 100. The results are presented in Tables 3.10 and 3.11.

Table 3.10: Variance Decompositions of GDP to Other Variables

Variance Decomposition of Real GDP								
Period	S.E	LNReal GDP	LNCredit to Private Sector	LNInflation	LNInterest Rate Spread	LNMarket Capitalization	LNNon-performing Loans	LNTrade Openness
1	0.029	100.000	0.000	0.000	0.000	0.000	0.000	0.000
2	0.032	89.415	0.927	3.985	4.058	0.483	0.833	0.298
3	0.039	69.585	1.605	5.422	2.967	1.394	4.733	14.292
4	0.043	57.103	2.388	4.525	2.917	4.884	4.936	23.247
5	0.046	57.650	2.169	3.934	3.218	6.061	4.292	22.676
6	0.048	55.958	2.464	4.245	4.322	5.983	4.130	22.896
7	0.050	51.887	2.271	4.896	4.001	6.070	4.862	26.013
8	0.052	47.847	2.192	4.804	3.706	7.079	5.165	29.206
9	0.054	46.912	2.083	4.621	3.686	7.833	4.977	29.888
10	0.055	45.769	2.123	4.769	3.976	8.018	4.939	30.406

The variance decompositions show the effect of a shock in one variable on the other variables. The study first looked at the response of real GDP to its own shock. In the short run, the response of real GDP to its own shock was very high. In quarter two, for example, shocks to real GDP causes 89.4 percent fluctuations in real GDP (own shock). However, in the long run, the response of real GDP to its own shock reduced. For example, looking at quarter ten, a shock in real GDP causes 45.8 percent fluctuations in real GDP. In the short run, the effect on GDP due to shocks in the other variables was low and increased over the long-run. From quarter three, shocks of real GDP to itself reduced and fluctuations in real GDP due to shocks in the other variables increased. Apart from GDP's own shock fluctuations, the biggest shock effects to real GDP fluctuations were from trade openness. Shocks in trade openness led to 30.4 percent fluctuations in real GDP in the long run (quarter ten) as compared to 14.3 percent in the short run (quarter three).

In regards to shocks in the financial development indicators, shocks in market capitalization led to most fluctuations in real GDP in the long run. In quarter ten, for example, shocks in market capitalization led to 8.02 percent fluctuations in real GDP as compared to only 0.48 percent in the second quarter. From quarter three onwards, shocks in non-performing loans led to between 4 percent and 4.93 percent fluctuations in real GDP while shocks in interest rate spread led to between 2 percent and 4 percent

fluctuations in real GDP. Shocks in bank credit to private sector led to the least fluctuations in real GDP of upto 2.46 percent in the sixth quarter.

The reason why shocks to market capitalization would have a longer lasting effect on national income than the other financial development indicators would be the theoretical underpinnings that stock markets usually provide long-term funds for investment. These long-term funds would be key for long term growth due to increased investment (Arestis et al., 2001). Well performing stock markets reduce the cost of savings mobilization and ensure productive allocation of resources. Kenya's capital market has been growing speedily and is currently the second largest in Africa after South Africa's in terms of market capitalization (World Bank, 2013b).

Table 3.11: Variance Decomposition of Other Variables to GDP

Variance Decomposition of other variables to GDP						
Period	S.E	LNReal GDP	LNCredit to Private Sector	LNInflation	LNInterest Rate Spread	LNMarket Capitalization
1	74.628	8.399	0.005	35.004	0.178	0.274
2	37.297	9.634	0.594	32.454	0.671	7.619
3	23.321	10.032	0.501	28.874	2.075	18.383
4	16.555	10.067	0.438	26.939	2.005	18.814
5	15.824	9.8196	0.446	26.616	1.698	17.433
6	13.235	9.725	0.449	26.377	1.712	18.233
7	10.756	9.784	0.409	25.667	1.945	20.214
8	9.509	9.799	0.369	25.037	1.987	20.629
9	9.305	9.737	0.349	24.778	1.919	20.300
10	8.826	9.693	0.337	24.609	1.918	20.488

Shocks in real GDP led to increasing fluctuations in trade openness, increasing from 0.3 percent in quarter one to 20.5 percent in quarter eight. Fluctuations in inflation in response to shocks in real GDP were constant at 8 to 10 percent. As for the financial development indicators, shocks in real GDP led to higher fluctuations in bank credit to private sector in the short run. However, these fluctuations reduced in the long run standing at 8.8 percent in quarter ten as compared to 74.6 percent in the short run (quarter one). 35 percent fluctuations in market capitalization in quarter one was due to shocks in real GDP which reduced to 24.6 percent in quarter ten. Shocks in real GDP did not lead to large

fluctuations in interest rate spread and non-performing loans both in the short run and in the long run.

3.4.7 Empirical Results Incorporating Financial Innovation

The study then introduced a financial innovation dummy variable to represent financial innovation as explained earlier and ran the tests and the VECM model. The results for the VECM are reported in Table 3.12.

Table 3.12: VECM Long-run Relationship Results Incorporating Financial Innovation

Dependent Variable – LNReal GDP			
Variable	Coefficient	Standard error	t-statistic
CONSTANT	-12.5362		
LNInterest Rate Spread (lnINT)	-0.0808**	0.0410	-1.9672
LNNon-performing Loans (lnNPL)	-0.1038**	0.0286	-3.6303
LNMarket Capitalization (lnMKT)	0.0484**	0.0156	3.0971
LNInflation (ln π)	0.0102	0.0060	1.6827
LNTrade Openness (lnOPEN)	0.2676**	0.0965	2.7719

** indicates significance at 5% significance level respectively

The VECM results showed that controlling for financial innovation, bank credit to private sector, interest rate spread and non-performing loans were negatively related with real GDP in the long-run and all their coefficients were statistically significant. A one percent increase in credit to private sector, interest rate spread and non-performing loans led to 0.27 percent, 0.08 percent and 0.10 percent decline in GDP respectively. Further, the coefficients of market capitalization and trade openness were also significant and positively related with real GDP. A one percent increase in market capitalization and trade openness led to 0.05 percent and 0.27 percent increase in GDP respectively.

In the short-run, only the coefficients of bank credit to private sector, interest rate spread and trade openness were statistically significant. Bank credit to private sector and interest rate spread affects real GDP negatively while trade openness affects real GDP positively. A one percent increase in credit to private sector and interest rate spread, resulted in 0.37

percent and 0.20 percent decline in GDP respectively while a one percent increase in trade openness led to 0.29 percent increase in GDP. These findings are indicated in Table 3.13.

Table 3.13: Short – run Relationship Results Incorporating Financial Innovation

Dependent Variable – DLNReal GDP			
Variable	Coefficient	Standard error	t-statistic
DLNReal GDP (-1)	0.1294	0.1810	0.7147
DLNCredit to Private Sector (-1)	-0.3682**	0.1542	-2.3874
DLNInterest Rate Spread (-1)	-0.2046**	0.0743	-2.7535
DLNNon-performing Loans (-1)	-0.0509	0.0473	-1.0751
DLNMarket Capitalization (-1)	0.0215	0.0314	0.6847
DLNInflation (-1)	0.0033	0.0096	0.3385
DLNTrade Openness (-1)	0.2939**	0.0840	3.4978
Mobile Payments Dummy (MPAYDU)	0.0311**	0.0094	3.2958
Error Correction Term (ECT _{t-1})	-1.0979**	0.4713	-2.3297
R-squared	0.7569		
Adj. R-squared	0.7104		

** indicates significance at 5% significance level

Where D indicates first difference and LN is natural logarithm. The coefficient of financial innovation was significant. It demonstrated that financial innovation affects economic growth positively. Presence of M-Pesa increases economic growth by 3.16 percent. This implication stems from the channels of transfer and credit of M-Pesa use. With M-Pesa, people have more money for consumption and more credit for investment hence increasing economic growth. The granger causality test results indicated that the supply leading hypothesis was supported between market capitalization and interest rate spread and real GDP; demand following hypothesis was supported between non-performing loans and real GDP while bi-directional relationship existed between Bank credit to private sector and real GDP (Refer to Table A.7 in Appendix).

3.4.8 Post Estimation Tests

Non – normality of residuals is a violation of the classical linear regression model. Heteroscedasticity implies non-constant variance which could lead to invalid hypothesis testing and the normal t statistics for inference cannot be used. In addition, autocorrelation is a situation where the disturbances in various periods are correlated. This leads to biased

standard errors and t statistics. The residual normality test showed that the residuals were normal since the null hypothesis of normality was not rejected at five percent significance level with a probability value of 0.247. The residual LM test of testing for serial correlation indicated that there was no serial correlation in the residuals since the null-hypothesis was not rejected as the probability value was 0.161. The White heteroskedasticity test results showed that the residuals were free from heteroskedasticity at five percent significance level (Refer to Table A:10 in appendix).

3.5 Conclusions and Policy Implications

The VECM results indicated that all the financial development indicators had a significant effect on real GDP. Bank credit to private sector, interest rate spread and non-performing loans all had a negative effect on GDP while market capitalization had a positive effect. Bank credit to private sector had a negative effect on real GDP which could be an indication of inefficiencies in the sector. Non-performing loans which show the quality of financial assets and efficiency of the financial sector had a negative coefficient indicating that the lower the non-performing loans or the more the efficiency of the financial sector, the higher the real GDP. The interest rate spread also had a negative coefficient indicating that the lower the spread or the lower the transaction costs, the more savings can be channeled into productive and investment activities. Hence, the higher the real GDP, which implies higher economic growth. These results highlighted the quality of financial sector development, an aspect that has been ignored. It was established that it has a negative effect on economic growth when the quality is low and vice versa.

Trade openness was also found to be positively related with economic growth. Inclusion of financial innovation was also positively related with real GDP and positively influential to economic growth. This finding underscored the centrality of financial innovation, in this case mobile banking for the country's growth. Notably, introduction of financial innovation did not significantly change the VECM and the granger causality results.

Further, the granger causality results indicated that use of different financial development indicators gave different causality results. However, the supply leading hypothesis was predominant in Kenya. The supply leading hypothesis was supported when market capitalization and interest rate spread were used as financial development indicators while the demand following was supported when non-performing loans was used as a financial development indicator. Bank credit to private sector showed a bi-directional relationship/causality with real GDP. Thus, the choice of the financial development indicator was important in determining the nature of causality between financial development and economic growth. The results also supported that the presence of structural breaks do not significantly change the order of integration of variables although the results were important in determining the structural break dates which also help to link them with various occurrences.

The findings are distinct from other studies done in Kenya in a number of ways. First, they clearly show the importance of including financial innovations in the definition of financial development as they are important in improving economic growth. This is key in the Kenyan economy with the growing financial innovations. Secondly, the findings show that when the qualitative side of financial development is incorporated into the finance-growth equation, then the supply leading hypothesis is pre-dominant. The study used one of the traditional financial development indicators, credit to private sector and finds a bi-directional relationship as found by many other studies in Kenya (Odhiambo, 2005; Wolde-Rufael, 2009 and Onuonga, 2014). However, when the qualitative aspects of financial development are incorporated, then the supply leading hypothesis is supported. Hence, the lack of clarity on what is the nature of causality between financial development and economic growth can be resolved by ensuring that financial development is enhanced to include all aspects of financial development.

Interest rate spread and non-performing loans had significant and negative coefficients implying importance of quality of financial development. Thus, efforts should to be made by the government to create an enabling environment for the growth of the financial sector and to improve the quality and efficiency of the financial sector. Interest rate reforms intended to increase saving rate ought to be introduced since a high interest rate spread is a barrier to economic growth. The Central Bank should also consider setting ceilings for lending rates and set thresholds of interest rate spread. Further, proper monitoring and screening of borrowers by financial institutions is necessary as well as obtaining sufficient collateral for loans. Further, the credit reference bureaus ought to be strengthened to discourage defaulters. However, this needs to be done with caution so as not to threaten borrowers.

Market capitalization which is an indicator of stock market development had a significant coefficient and was found to enhance economic growth. Therefore, policies to grow the stock market by ensuring that a conducive environment is set to promote listing of companies at the stock market ought to be considered by the government. These could include policies on low corporate tax and foreign participation to encourage more listing of companies. This would encourage more long term funding for firms and hence growth.

The coefficient of credit to private sector was negatively significant implying that credit to private sector was detrimental to economic growth. This could be due to wastage, inefficiencies and low quality of the credit. Hence, a conducive environment need to be maintained for the private sector to ensure the credit is used for productive purposes and its quality so that it can influence a positive contribution to economic growth. One way is to ensure proper monitoring and evaluation of the credit extended by financial institutions and government. This would show where inefficiencies are evident and come up with ways of improvements.

Trade openness was found to be positively related to GDP as its coefficient was positively significant. Policies by the government directed towards improving exports are important.

This may include policies to support value addition to agricultural exports. This is important because it does not only increase the amount but the quality of trade. Further, more multilateral trading partnerships should be formed not just within Africa but also globally.

Financial innovation was seen to lead to higher growth. Its coefficient was positively significant. The government ought to create a conducive environment to enable the growth of financial innovations. A strong regulatory framework by the Central Bank which promotes the growth of the innovations should also be enacted. The banking sector needs to embrace these innovations for more growth. Policies that encourage growth of innovations such as tax exemptions, capital availability and a structure for reviewing growth of financial innovations ought to be enacted.

3.6 Contribution of the Study to knowledge

The study provided new insights to the finance growth nexus. The main value addition was the introduction of financial innovation into the relationship between financial development and economic growth with the growth in financial innovations. Financial innovation was found to promote economic growth. Further, with the debate between financial development and growth still ongoing, use of new indicators of financial development to incorporate quality and efficiency of financial development may be deemed important in understanding the relationship in a better way.

The quality and efficiency of financial development was found to be important for economic growth. Thus, from the findings, the study is important in contributing to the lack of clarity in the relationship between financial development and growth. Incorporating both the qualitative and quantitative aspects of financial development and incorporating financial innovation, then the supply leading hypothesis takes center stage. Financial development is key for economic growth. This implies that the relationship between

financial development and economic growth cannot be fully understood only when the quantitative aspects are considered but is fully understood when the qualitative, quantitative and efficiency aspects are considered.

Furthermore, ignoring the presence of structural breaks can lead to the use of wrong models leading to distorted results. This study contributed to literature by showing how structural breaks affect the results of the finance-growth relationship which has not been examined in Kenya. Annual data on financial development indicators was only available for the traditional financial development indicators like M2 and M3. Newer financial development indicators' data (as used in this study) was only available for fewer years and this gave an opportunity to use quarterly data which gives more observations (increased sample size) and thus taking care of vanishing degrees of freedom. Quarterly data also helps to capture intra-year dynamics especially for financial development indicators.

3.7 Limitations of the Study

The main limitation was data scarcity. For the financial development indicators data only dates back to 1995 when the Central Bank of Kenya established online recording. This does not avail enough data observations to allow for enough degrees of freedom. Accordingly, there was need to use variables whose data was available quarterly which was sufficient for analysis. On financial innovations, in this case, M-Pesa mobile banking, the data only dates back to the year 2007 when M-Pesa was introduced and hence the reason for the use of a dummy. The data used was believed to be reliable and the results fit for policy recommendations.

3.8 Areas for Further Research

There is a possibility of non-linear effects of the financial development indicators as well as control variables on economic growth. Hence, more research on threshold effects would be important to determine the exact relationships. Financial innovation was found to be important for financial development. This has not been exhaustively examined. More research would be needed to show the impact of the financial innovations on economic growth using actual data. Innovations in Kenya are on the rise for example the Equitel money, an innovation of Equity Bank. These ought to be incorporated into future research.

CHAPTER FOUR

FINANCIAL DEVELOPMENT AND POVERTY

4.1 Introduction

Several financial developments and innovations have been experienced in Kenya in the last two decades. These have been documented in chapter one. They have enhanced the number of those with financial access. They have also led to an increase in the number of those who have access to financial access which stood at 66 percent (FSD et al., 2013) and 75 percent (FSD et al., 2016) in 2013 and 2016 respectively. The ‘conduit effect’ theory posits that there is a relationship between financial development and poverty (Mckinnon (1973). Financial development allows people to finance their economic activities and hence they can sustain themselves. The trickle down hypothesis further shows that there is an indirect effect of financial development on poverty through growth. Thus, this chapter extends the analysis by demonstrating how the developments and innovations described in chapter one affects poverty.

Poverty can be classified as either absolute or relative. Absolute poverty is the inability to meet life’s basic needs. Relative poverty is in relation or comparison to others. Human poverty is the deprivation of the three (3) essential elements of human development which include: long and healthy life, education and decent standards of living due to low levels of income (UNDP, 1995). Many of the Kenyans still remain poor. In addition, majority of the poor are in the rural areas (Republic of Kenya, 2007). Table 4.1 reports the poverty status in Kenya.

Table 4.1: National Poverty Rates in Kenya

Year	Poverty rates	Source
1992	57.5%	Welfare Monitoring and Evaluation Survey, 1992
1994	42.1%	Welfare Monitoring and Evaluation Survey, 1994
1997	52.9%	Welfare Monitoring and Evaluation Survey, 1997
2005/2006	46.1%	KIHBS, 2005/06
2007	48.8%	Kenya Economic Report, 2013 Estimates
2008	50.8%	Kenya Economic Report, 2013 Estimates
2009	50.5%	Kenya Economic Report, 2013 Estimates
2010	49.8%	Kenya Economic Report, 2013 Estimates
2011	49.7%	Kenya Economic Report, 2013 Estimates
2012	49.8%	Kenya Economic Report, 2013 Estimates
2013	43.0%	World Bank, 2013 Estimates*

*Estimates

In 1994, absolute poverty in Kenya was 46.75 percent (Republic of Kenya, 1994) in the rural areas while it was 29 percent in the urban areas and 42.1% nationally. In 1997, the Welfare Monitoring and Evaluation Survey reported that 52.9 percent of the Kenyan population was poor (Republic of Kenya, 1997). However, poverty levels reduced and by 2006 (Republic of Kenya, 2007) poverty level was reported at 46 percent. This percentage is perceived to have come down according to the latest World Bank report to between 38-43 percent (World Bank, 2013a). Region wise, Kenya has seen an increase in poverty levels over time. Table 4.2 shows poverty across regions.

Table 4.2: Income Poverty (Percent) in Kenya by Regions: 1992-2006

Region	1992	1994	1997	2006
Central	35.8	31.9	35.32	30.4
Coast	43.5	55.6	69.08	69.7
Eastern	42.2	57.8	65.90	50.9
N. Eastern	-	58.0	73.06	73.9
Nyanza	47.4	42.2	70.95	47.6
Rift Valley	51.5	42.9	56.33	49.0
Western	54.8	53.8	66.11	52.2
Kenya	46.33	46.75	52.9	46

Source: KNBS (2008)

By 1997, every region had seen an increase in poverty levels. But by 2006, Central, Eastern, Nyanza, Rift Valley and Western all recorded a decline in poverty levels. Central

region has maintained the lowest levels of poverty over time. Furthermore, a large segment of the Kenyan population remains poor. Evidence shows that 46 percent of Kenyans live below the poverty line (Republic of Kenya, 2007). Recent estimates by the World Bank (2013a) show high poverty levels of between 38-43 percent. The poverty level in the country has been exacerbated by high levels of income inequality. Though a lot of efforts have been made to reduce poverty levels in Kenya, it remains paramount. A number of anti-poverty policies have been introduced in Kenya including the National Poverty Eradication Plan of 1999-2005 in which the government committed itself to poverty alleviation by 2015 and the Poverty Reduction Strategy Paper of 2000-2003 (Republic of Kenya, 2001).

Other ways of curbing poverty could be through financial interventions and non-financial public interventions (Yaron et al., 1997). The government of Kenya has tried these interventions without much success. The financial intervention channel has been through subsidized credit from the Agricultural Financial Corporation (AFC), Industrial Development Bank (IDB) and Industrial and Commercial Development Corporation (ICDC). Amidst growth in the financial sector, Kenya is still struggling with high levels of poverty. Figure 4.1 shows growth in the financial sector against poverty status in Kenya.

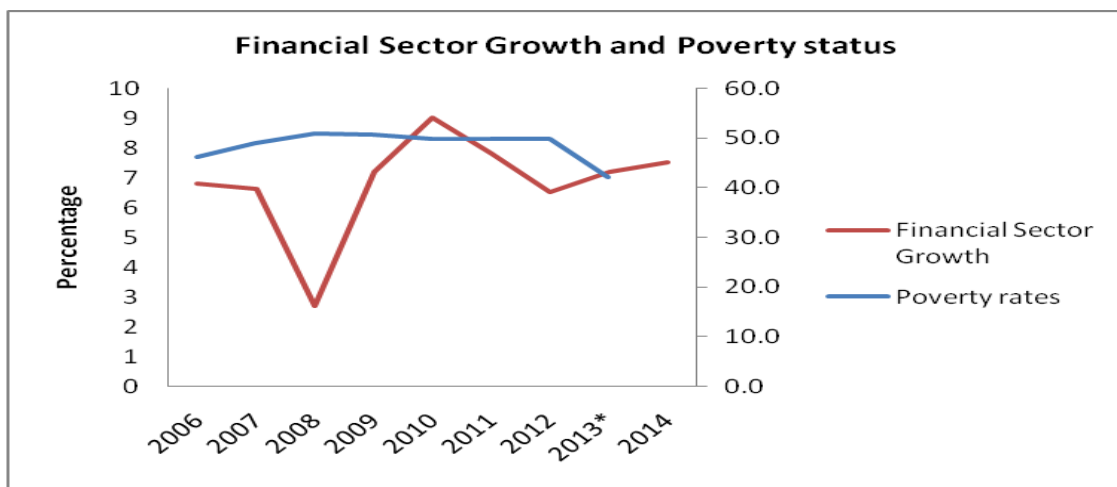


Figure 4.1: Relationship between Financial Sector Growth and Poverty Rates

Source: Kenya National Bureau of statistics (2014), KIPPRA (Various Kenya Economic Reports) and World Bank (2013a), * indicates World Bank, 2013 latest estimates

The financial sector has been growing with the exception of the year 2008 due to the post election violence effects and 2012 due to the effects of the global financial crisis and fears of the early 2013 general elections. The average growth rate of the financial sector has been at about seven percent. However, poverty status has remained quite high at the ranges of 46 percent. The 2013 poverty status is a World Bank estimate which indicates that poverty has reduced slightly. However, this needs to be confirmed by the data that is expected to be released by the KNBS through the Kenya Integrated Household and Budget Survey in 2017. From the figure, it is not clear whether growth in the financial sector has any impact on poverty status. It is this lack of clarity that motivates this study to look at how financial development affects poverty in Kenya.

There have been efforts to grow the financial sector in the economy with an aim of reducing poverty. Efforts were made to establish the Kenya Financial Sector Deepening programme in the year 2005 to aid development of the financial markets with an aim of stimulating wealth creation and reducing poverty. Even with all these efforts, many Kenyans are still stuck in poverty and with little access to financial services (Kibua, 2007). Financial access has increased with growth in mobile banking (FSD et al., 2016) but poverty remains high. Evidence on the relationship between financial development and poverty reduction particularly in Kenya is scant. Few studies such as Jalilian and Kirkpatrick (2002) and Odhiambo (2010a and 2010b) investigated this relationship but the unavailability of poverty data in various developing countries has made scholars to shy off from this new debate. Thus, the link between financial development and poverty reduction has been sidelined. In Kenya, few studies have investigated this relationship mainly focusing on microfinance and poverty (Okibo and Makaga, 2014 and Kibua, 2007).

The country has experienced major financial developments and innovations in the last decade. These developments and innovations may have had an effect on the poor in society. But, it is not clear whether they have had any effect on poverty in Kenya or if there actually is a failure of financial development to reduce poverty. Furthermore, the effect of

financial development on poverty is not yet known in terms of whether it is direct or indirect through economic growth. Hence, these gaps lead to several questions: Which channel of the effect of financial development on poverty dominates, the direct or the indirect?; How does financial innovations, specifically M-Pesa, effect poverty?; What is the nature of causality between financial development and poverty when the quality of the financial sector is considered?

The main objective of this chapter was to investigate the relationship between financial development and poverty in Kenya.

Specifically, the study sought to determine;

- i) The direct and indirect effect of financial development on poverty
- ii) The effect of financial innovation on poverty in Kenya
- iii) The causality between financial development and poverty in Kenya

4.1.1 Significance of the Study

The relationship between financial development and poverty is important especially for a country like Kenya. This study is important for policy makers in determining if financial sector development spurs poverty reduction. It is also important for the policy makers to establish how financial development reduces poverty, either directly or through economic growth. This enables prioritization of where to place policy emphasis. Policy makers also need to know how financial innovations impact on poverty reduction. The study also contributes to the debate between financial development and poverty. Furthermore, it is significant in demonstrating how quality and efficiency of financial development determines the dynamics of the finance-poverty nexus.

4.2 Literature Review

4.2.1 Theoretical Literature

The theory of how the poor benefit from finance was brought about by Keynes (1937) who discussed the motive of finance for money demand. The finance poverty theory can also be traced from McKinnon (1973) on the conduit effect. The proposition was that a rise in interest rate increases financial savings through financial intermediaries. Following from McKinnon, financial development affects poverty directly by allowing people to self-finance their economic activities. Thus, the theory linking financial development and poverty can be seen from two main fronts: the direct channel and the indirect channel. The first one indicates a direct relationship between financial development and poverty reduction while the second one is the trickledown theory whereby financial sector development trickles down to the poor in the society through its stimulus on economic growth. This follows the positive relationship existing in theory between financial development and economic growth.

The direct channel has to do with financial market failures which include information asymmetry especially in the credit market and high fixed costs of lending to small scale borrowers. Financial deepening enhances access to formal finance by the poor. The direct effect posits that financial development benefits the poor who do not have funds to self finance their own projects. This implies that, financial development benefits the poor since the poor are faced with credit constraints which are binding on them and thus they can't access credit or finance for development due to lack of collateral (This was supported by Aghio and Bolton, 1997). Thus, financial sector development reduces information asymmetry and transaction costs thus allowing the poor to access finance (supported by Fields, 2001). A poorly developed financial system creates more income inequality as it keeps capital funds from reaching the very poor. Finally, financial development increases productivity and increases the potential for the poor to achieve sustainable livelihoods (World Bank, 2001). This is because improvement in the financial sector increases the

accessibility of the poor to financial services and thus enhancing their productive capacity in terms of assets which then increases productivity and better sustainable lives. Thus, an underdeveloped financial system leads to continued poverty, increased income inequality and thus slows growth.

In regards to the trickle-down theory or the indirect channel from financial development to poverty through economic growth, there are a number of ways through which this happens. First, growth promotes employment creation for the poor. Two, countries with higher growth enables the governments to collect more revenues through taxes which can be invested in health, education and social capital and which is beneficial to the poor. In higher growth countries, the poor are also able to invest more in human capital and their lives are greatly improved (Perroti, 1993). Thirdly, growth is seen to reduce wage differentials between the skilled and unskilled population which is very beneficial to the poor. However, this does not happen at the initial stages of development but rather at later stages of development (Galor and Tsiddon, 1997). Finally, growth increases capital accumulation in countries and thus they have more funds for investment purposes by the poor which increases their incomes in the long term (Aghion and Bolton, 1997). This has been criticized by studies which claim that capital accumulation arising from growth generally benefits the haves and not the have-nots and thus can increase income inequality in the long term (Haber, 2004).

4.2.2 Empirical Literature

Literature on financial development and poverty reduction is grounded on the direct channel and the indirect channel through economic growth. The study thus reviewed the empirical literature based on the channels of effect and direction of causality between financial development and poverty reduction as well as measurement of financial development and poverty.

a) Channels of the Effect of Financial Development on Poverty

A number of studies have found support for the indirect channel through economic growth (Jalilian and Kirkpatrick, 2001, 2002 and 2005; Green et al., 2006; Odhiambo, 2009d and Imram and Khali, 2012). They concluded that financial development leads to poverty reduction by first affecting economic growth which then leads to poverty reduction. On the other hand, studies like Pradhan (2010), Odhiambo (2010a) and Dhrifi (2013) supported the theory that financial development does have a direct impact on poverty reduction. There are also a number of studies which confirmed both theories in their findings like Khan et, al. (2011), Dauda and Makinde (2014) and Kar et, al. (2015).

Several studies have also documented the indirect effect of financial development on poverty reduction through growth. For example, financial development affects economic growth through industrial growth (Imran and Khalil, 2012). Financial development is good for industrial growth through access to credit while industrial growth leads to poverty reduction in the long run. Additionally, Green et al. (2006) concluded that financial development affects poverty through the development of Micro and Small Enterprises (MSE). Financial sector development policies that encourage MSE growth do contribute to poverty reduction in developing countries. However, this fact can only be realizable if the MSE sector can be allowed access to credit that will foster its growth. This is because access to credit has been singled out as the major impediment to the growth of the MSE sector. Financial development has also been found to be pro-poor in developing countries (Jeanneney and Kpodar, 2011) since it increases the incomes of the poor through higher economic growth and increased access to finance and financial services for investment. This view was further held by Jalilian and Kirkpatrick (2001 and 2002).

The direct channel intimated that financial development affects poverty directly by allowing the poor to have access to credit (Dhrifi, 2013). Access to credit has been singled out as the main hindrance to investment. Dhrifi (2013) supported this link in 89 developing countries. The study found that the direct channel between financial development and

poverty reduction was robust and significant. The direct channel was through the access to credit, insurance and savings channel. Financial development gives a chance to the poor to accumulate savings for investment as well as avail micro insurance to cushion them from adverse effects. Khan et al. (2011) also supported the importance of non-life insurance access for the poor as an important way through which financial development affects poverty. Green et al. (2006) also supported this direct channel by emphasizing on access to credit.

The effect of inequality is seen to dampen the effect of financial development on poverty through economic growth (Jalilian and Kirkpatrick, 2005 and Jeanneney and Kpodar, 2011). Inequality leads to benefits of financial development accruing to only a small percentage of the population especially the high income population. Upto a certain level of economic development, financial development leads to poverty reduction through the growth channel after which due to inequality, financial development does not cause poverty reduction (Jalilian and Kirkpatrick, 2005). Further, Dhrifi (2013) who found support for the direct effect of financial development on poverty also found that inequality hampers this effect. Dauda and Makinde (2014) found support for the indirect effect of financial development on poverty in Nigeria. However, this effect is dampened by income inequality in the long run leaving the direct effect to be dominant in the long run. Policy makers should concentrate on tackling inequality.

Quality of institutions (Dhrifi, 2013) also matters for poverty. Financial institutions and hence the quality of financial development which is low is found to dampen the effect of financial development on the poor. Thus, including indicators which show the quality of financial development is important so as to capture this dampening effect. The quality of financial institutions can spur or deter physical and human capital investment as well as determine transaction costs which will hinder or encourage the poor to use financial services. Finally, financial instability affects the relationship between financial development and poverty. Jeanneney and Kpodar (2011) supported the indirect effect of

financial development on poverty. However, financial instability which sometimes follows financial development is found to be anti the poor as it stifles the positive effects of financial development on poverty reduction.

b) Direction of Causality between Financial Development and Poverty

The second strand of literature shows the direction of causality between financial development and poverty. A number of studies showed that financial development causes poverty reduction (Jalilian and Kirkpatrick, 2002, Jalilian and Kirkpatrick, 2005; and Jeanneney and Kpodar, 2011; Green et al., 2006; Odhiambo, 2009d; Pradhan, 2010; Odhiambo 2010a, 2010b and Imran and Khalil, 2012) while a few showed that poverty reduction can granger cause growth in the financial sector (Aye, 2013 and Uddin et al., 2013b). Further, other studies showed that there is a bi-directional relationship between financial development and poverty reduction (Sin-Yu and Odhiambo, 2011 and Uddin et al., 2013b) while others showed that there is no causality between financial development and poverty reduction (Fowowe & Abidoye, 2012 and Dandume, 2014).

Financial development causes poverty reduction directly through access to finance as some studies posited (Odhiambo, 2010a; Odhiambo, 2010b and Pradhan, 2010) while others found that poverty causes financial development through the growth route (Jalilian & Kirkpatrick, 2002; Jeanneney & Kpodar, 2011 and Aye, 2013). On the causality from poverty to financial development, Aye (2013) found that poverty granger causes financial development but conditional on economic growth. Uddin et al. (2013) further controlled for structural breaks in determining the causality between financial development and poverty and found causality running from poverty to financial development. Some studies have found that poverty is affected by other macro economic variables like trade openness and inflation and hence there is no causality between financial development and poverty reduction in SSA.

The direction of causality is found to be dependent on the financial development indicator used (Odhiambo, 2010a; Odhiambo, 2010b and Sin-Yu and Odhiambo, 2011). Odhiambo (2010a) for example conducted a study in Zambia using broad money supply, M2 and domestic credit to private sector. On the one hand, when the study used broad money supply, M2 as an indicator of financial development, it was found that poverty reduction led to the development of the financial sector. On the other hand, using domestic credit to the private sector and bank assets as indicators of financial development, results showed that financial sector development causes poverty reduction and concluded that it is financial development that does cause poverty reduction. Sin – Yu and Odhiambo (2011) found that in the long run, there is a bi-directional relationship between financial development and poverty when domestic credit to private sector was used as a proxy for financial development. There was also a weak bi-directional relationship in the short run when M2 was used as a proxy for financial development but a unidirectional relationship existed in the long run from poverty reduction to financial development.

c) Measurement of Financial Development and Poverty

Use of some financial development indicators and poverty measures has been criticized in literature. Some of the financial development indicators mostly used in literature include the monetization measure, broad money supply (Jeanneney and Kpodar, 2011; Odhiambo, 2009d; Odhiambo, 2010a; Odhiambo, 2010b; Pradhan, 2010; Sin-Yu and Odhiambo, 2011; Dhrifi, 2013; Dauda and Makinde, 2014 and Kar et al., 2015). This measure is a monetization measure and does not show us the intermediation from surplus sectors to deficit sectors. Further, this monetization measure is high in under developed and some developing countries due to high currency and thus not a good measure of financial development in these countries (Ang and Mckibbin, 2007; Dushku, 2010; Gehringer, 2013 and Dandume, 2014). Other studies used a financial depth measure, domestic credit (Dhrifi, 2013). This measure shows the intermediation between those who have and those who don't have. However, this measure includes credit to the public sector which may crowd out private investment. The private sector is assumed to be more competitive and

thus able to allocate resources more efficiently. Thus, many other studies have used credit to private sector as a measure of financial development (Jeanney and Kpodar, 2005; Odhiambo, 2010a; Sin-Yu and Odhiambo, 2011; Uddin et al., 2012; Imran and Khalil, 2012; Fowowe and Abidoeye, 2012; Dandume, 2014 and Kar et al., 2015).

Other financial development indicators used include Bank deposits to GDP (Jalilian and Kirkpatrick, 2001; Jalilian and Kirkpatrick, 2002; Khan et al., 2011 and Dandume, 2014). This measure was proposed to be a better measure of financial development since it excludes currency which is high in developing countries. It also shows the ability of the banking industry to mobilize savings and channel it to deficit productive sectors. Other variables used include Net Foreign Assets (Jalilian and Kirkpatrick, 2001 and Jalilian and Kirkpatrick, 2002), liquid assets to GDP (Jeanneney and Kpodar, 2011) which shows the liquidity of the banking industry, domestic money bank assets (Jalilian and Kirkpatrick, 2002; Odhiambo, 2010a and Khan et al., 2011) which shows the total assets of the banking industry and hence the stability of the industry, Central Bank assets (Khan et al., 2011), real interest rate (Khan et al., 2011 and Dandume, 2014) as well as other non-bank indicators like non-life insurance penetration, stock market turnover and bond market capitalization (Khan et al., 2011).

Moreso, due to the various criticisms that come with the use of various financial development indicators and due to the fact that these financial development indicators cannot fully indicate the extent of financial development, some studies have chosen to use a financial development index calculated through the use of Principal Component Analysis using a number of these financial development indicators (Dhrifi, 2013 and Uddin et al., 2013b). Use of different financial development indicators lead to different conclusions in regards to the relationship between financial development and poverty.

These indicators show the financial depth, the liquidity of the banking sector, return on savings as well as the contribution of non-bank sectors. These also do not show how

savings are converted into investments. They further do not show the quality of financial development but just the quantity. Financial development should not only show the expansion of the financial sector in terms of quantity, it is also important to show the quality and efficiency of this expansion. From the above discussion, the efficiency and quality of financial development seem to have been ignored while it has been raised as important in the relationship between financial development and poverty (Dhrifi, 2013). Thus, it was important to include these aspects of financial development in the relationship between financial development and poverty. Thus, the study adopts new financial development indicators including non-performing loans and interest rate spread as well as credit to private to show how savings are converted to investment.

On poverty measurement, per capita consumption has been used severally in literature to measure poverty (Odhiambo, 2009d; Odhiambo, 2010a; Odhiambo, 2010b; Sin-Yu Ho and Odhiambo, 2011; Uddin et al., 2012 and Kar et al., 2015). However, this measure is a broader measure of welfare and not a direct measure of poverty. This may be necessitated by the fact that poverty data in developing countries and especially in Africa is wanting (Devarajan, 2013). Other literature has used Gini co-efficient as a measure of poverty (Jalilian and Kirkpatrick, 2001 and Khan et al., 2011). This measure is however a measure of income inequality and may not be a direct measure of poverty. Due to the limitations of per capita consumption and Gini Coefficient as measures of poverty, studies have used various other measures of poverty.

Head count ratio has been used (Jeanneney and Kpodar, 2011; Pradhan, 2010; Fowowe and Abidoye, 2012; Dauda and Makinde, 2014 and Dandume, 2014) to show the proportion of the population living below the poverty line – or on less than \$ 1.25 per day and average (per capita) incomes of the poor (Jalilian and Kirkpatrick, 2001; Jalilian and Kirkpatrick, 2002 and Jeanneney and Kpodar, 2011). In Kenya, there are no studies done using head count ration, poverty gap, poverty gap squared as measures of poverty to determine the effect of financial development on poverty. This could be due to the scarcity

of this kind of data. Thus, this study broke the norm in Kenya to use head count ration to analyse this relationship. The headcount ratio was calculated using the decomposition method of income changes and gini-coefficient changes.

d) Data and Methodology

Other aspects of data and methodologies used lead to different results in regards to the relationship between financial development and poverty. Several studies used time series data to investigate this relationship. A number of methods have been used like granger causality based on the (vector) error correction model (Odhiambo, 2009d; Odhiambo, 2010b and Kar et al., 2015), Granger causality models with cointegration and error correction models (Pradhan, 2010 and Imran and Khalil, 2012), ARDL (Odhiambo, 2010a; Sin–Yu and odhiambo, 2011; Uddin et al., 2012; Uddin et al., 2013b and Dandume, 2014), VAR and Impulse Response Analysis (Dauda and Makinde, 2014). The use of these methodologies leads to either the indirect effect or the direct effect as well as different causality between financial development and poverty.

Other studies used panel and cross sectional analysis and found different results in regards to the relationship between financial development and poverty. Jalilian and Kirkpatrick (2001 and 2002) used OLS and panel 2SLS and found support for the indirect effect through economic growth. Jeanneney and Kpodar (2011) also found support for the indirect effect while using OLS and a dynamic panel GMM model. Jalilian and Kirkpatrick (2005) further found support for the indirect effect using a reduced form model and an explicit log-linear functional form equation. Aye (2013) also agreed with the indirect effect of financial development on poverty through growth using GMM methodology. However, Dhrifi (2013) found support for the direct effect using simultaneous equations estimated through 3SLS while Khan et al. (2011) found support for both the direct and indirect channels using OLS method of estimation.

In Kenya, studies on financial development and poverty done at a macro level are few (Kibua, 2007 and Odhiambo, 2010b). Kibua (2007) in examining how access to financial services reduces poverty found that in Kenya, the financial products including savings offered by commercial banks are not in tune with the needs of the poor. Access to loans is out of reach of the rural poor and they generally don't have access to affordable financial services. The study however found that the poor borrow to invest in productive activities. Odhiambo (2010b) included a third variable (savings) to check the direction of causality between financial development and poverty. The study found support for causality from financial development to poverty reduction. It used the monetization measure as an indicator of financial development and per capita consumption as a measure of poverty.

Other studies done in Kenya on the relationship between financial development and poverty were based on microfinance and include Hospes et al. (2002), Bakhtiari (2006), Omunjala and Fondo (2014) and Okibo and Makanga (2014). Hospes et al. (2002) in evaluating the impact of microfinance found that it is key in poverty reduction. Bakhtiari (2006) indicated that microfinance has gained popularity as one of the leading ways of reducing poverty. Besides, Kaburi et al. (2013) found that the rural poor do not have access to formal financial services due to for example the fear of default by formal financial institutions. Hence micro finance becomes very important in Kenya. Micro finance was found to empower the rural poor. Other studies done at regional level included Kiiru (2007), Okibo and Makanga (2014) and Omunjala and Fondo (2014). Kiiru (2007) found that microfinance is helpful in reducing poverty in Makueni district as it increases the households' income. Okibo and Makanga (2014) found that granting small loans to women in the rural areas was used for productive investments including starting businesses, expanding business as well as for educating their children. Thus micro finance is very important in reducing poverty among the poor rural women in Kiambu district.

Tables 4.3 and 4.4 shows a summary of the literature in regards to channel of the effect of financial development on poverty and direction of causality between the two.

Table 4.3: Summary of Findings of the Effect of Financial Development on Poverty

Studies Supporting the Indirect Channel of the Effect of Finance on Poverty through Economic Growth (Trickle down hypothesis)		
Author	Methodology	Findings
Imran and Khalil (2012)	Time series; cointegration, ECM	A well functioning financial sector is key for industrial growth and industrial growth is important for poverty reduction
Odhiambo (2009d)	Time series; Trivariate granger causality based on the ECM	In both the short and the long run, financial development leads to growth while growth leads to poverty reduction. It is the real sector rather than the financial sector that leads to poverty reduction.
Jalilian and KirkPatrick (2005)	Pooled panel data, reduced form model, generic econometric model and explicit log-linear functional form equation	Upto a certain level of development, financial development leads to poverty reduction. However, the effect of financial development on poverty reduction is neutralized by inequality
Jalilian and Kirkpatrick (2002)	OLS, 2SLS using panel data	Indirect trickle-down effect of growth to poverty reduction through financial development using a sample of 26 developing countries.
Jalilian and Kirkpatrick (2001)	OLS, Panel and 2 SLS	Financial development directly leads to poverty reduction and further the effect happens indirectly through economic growth
Studies Supporting the Direct Channel between Finance and Poverty		
Author	Methodology	Findings
Dhrifi (2013)	3SLS using a financial deepening index	There is a direct effect from financial development to poverty reduction while considering access to credit services, insurance and savings channels
Odhiambo (2010a)	Time series; cointegration-ARDL	Financial sector development directly leads to poverty reduction in Zambia when domestic credit to private sector and domestic money bank assets are used as indicators of financial development
Pradhan (2010)	Cointegration and granger causality tests	Financial development is important and has a direct impact on poverty reduction
Green et al. (2006)	Previous literature	Financial sector developments and policies that affect Medium and Small Enterprises lead to poverty reduction, Thus supporting the direct route channel
Studies Supporting both the Direct and Indirect Channels between Finance and Poverty		
Author	Methodology	Findings
Kar et al. (2015)	Cointegration and Granger causality based on VECM	Indirect channel through growth is confirmed and the direct channel though evident, is weak in the short run.
Dauda and Makinde (2014)	VAR and Impulse Response	In the short run, the indirect channel dominates while in the long run, the direct channel takes over
Khan et al. (2011)	OLS	Financial development leads to growth while growth leads to poverty reduction. Further, the negative relationship between financial development and poverty reduction is verified

Table 4.4: Summary of Findings of the Relationship between Finance and Poverty

Studies Showing a Bi-directional Causality between Finance and Poverty		
Author	Methodology	Findings
Uddin et al. (2012)	Time series; ARDL bounds testing approach	Bi-directional causality between finance and poverty
Sin-Yu and Odhiambo (2011)	ARDL	Bi-directional relationship in the short run but the direction of causality is dependent on the financial development indicator used.
Studies Showing Causality from Finance to Poverty Reduction		
Author	Methodology	Findings
Imran and Khalil (2012)	Time series; cointegration, ECM	Causality from finance to poverty reduction
Odhiambo 2010a	Time series; cointegration-ARDL	Causality from finance to poverty reduction in Zambia
Odhiambo 2010b	Time series; cointegration, ECM	Causality from finance to poverty reduction in Kenya
Pradhan (2010)	Cointegration and granger causality tests	Financial development causes poverty reduction
Odhiambo (2009d)	Time series; Trivariate granger causality based on the ECM	Causality from finance to poverty reduction in SA
Green et al. (2006)	Previous literature	Causality from finance to poverty reduction
Jalilian & Kirkpatrick (2005)	Pooled panel data, reduced form model, generic econometric model and explicit log-linear functional form equation	Causality from finance to poverty reduction upto a certain level of economic development.
Jeanneney and Kpodar (2011)	Panel data; OLS, Dynamic Panel GMM	Causality from finance to poverty reduction but the impact is dampened by financial instability
Studies Showing Causality from Poverty Reduction to Financial Development		
Author	Methodology	Findings
Uddin et al. (2013b)	ARDL approach to cointegration, Zivot-Andrews structural break stationarity test, OLS and ECM, VECM granger causality and Innovative Accounting Approach for robustness of causality	Poverty reduction leads financial development
Aye (2013)	Hsiao granger causality within the VAR and VECM framework	Poverty reduction causes financial development but conditional on growth
Studies Showing no Causality between Finance and Poverty		
Author	Methodology	Findings
Dandume (2014)	ARDL, Toda and Yamamoto No causality Test based on VAR	Financial development does not cause poverty reduction
Fowowe and Abidoye (2012)	Panel data; GMM	Financial development does not lead to poverty reduction in SSA

4.2.3 Overview of Literature

Both theoretical and empirical literature show that financial development contributes to poverty reduction. Some studies indicated that this happens indirectly through the economic growth channel while others a direct channel through reduction in information asymmetry and costs. Furthermore, different studies found support for causality from financial development to poverty reduction, from poverty reduction and a bi-directional relationship. There are no studies done in Kenya to determine whether its the direct or indirect effects of financial development on poverty that prevail.

The cause of the differing results on both the channel of effect on poverty by financial development and the direction of causality between the two could be the use of financial development indicators which are inappropriate for a developing country, for example Odhiambo, 2010b uses M2 as an indicator of financial development. This measure may be inappropriate in developing countries since the largest component of M2 is currency and does not appropriately show financial development (Dushku, 2010). Also, the studies done in Kenya and many others on finance and poverty at a macro level have used per capita consumption as a proxy for poverty. This measure has been criticized since it is a direct measure of welfare and not poverty. Even with scanty availability of poverty time series data, the study went ahead to calculate the poverty levels while making some realistic assumptions as well as incorporating appropriate financial development indicators and considering the quality aspects.

In addition, not considering the effect of structural breaks may lead to wrong conclusions especially when it comes to the order of integration of variables. Moreover, the fact that the effect of financial development on poverty reduction in developing countries cannot be excluded from financial innovation and financial access, it was important to consider financial innovations which tend to increase access to financial services which most of the studies on financial development and poverty reduction do not include. Avais (2014) indicated that financial innovation may be the only way that the poor can access financial

services. This is because innovative financial products are designed in a way that they can target the poor. Thus, this study filled the gaps including, use of appropriate financial development indicators, inclusion of financial innovation and robustness by using both per capita consumption as well as head count ratio poverty measure and incorporating structural breaks.

4.3 Methodology

4.3.1 Theoretical Framework

The theoretical link between finance and poverty can be traced back to the Mckinnon conduit effect (Mckinnon 1973). The theory showed that financial development leads to increase in domestic savings which is good for the poor as it then increases investment undertaken by the poor. Thus, the theoretical link between financial development and poverty reduction was positive. This was further exemplified by Jeanneney and Kpodar (2011). This direct effect between financial development and poverty reduction can be represented as:

$$P_t = f(FD_t, X_t) \dots\dots\dots 4.1$$

Where P_t is poverty, FD_t is financial development and X_t are other control variables affecting poverty.

Jeanneney and Kpodar (2011) in addition introduced the indirect effect of financial development on poverty reduction through economic growth. More so, there is a lot of literature that showed the importance of economic growth for poverty reduction (Nallari and Griffith, 2011; Chhibber and Nayyar, 2007; Loayaza and Raddatz, 2006; Kraay, 2004; Lopez, 2004 and Dollar and Kraay, 2002). These studies concluded that growth has a positive and significant impact on poverty reduction. Thus, the indirect effect can be represented by:

$$P_t = f(Y_t) \dots\dots\dots 4.2$$

Where P_t is poverty and Y_t is income growth.

However, literature shows that economic growth is a necessary but not sufficient condition for poverty reduction (Moges, 2013; DFID, 2004 and Dollar and Kraay, 2002). Thus, equation 4.2 becomes:

$$P_t = f(Y_t, X_t) \dots\dots\dots 4.3$$

Where X represents other variables which affect and complement economic growth in influencing poverty.

The indirect channel between financial development and poverty reduction can first be considered by examining the effect of financial development on economic growth (this had been examined in detail in chapter 3) which then has implications for poverty reduction. Following Jalilian and Kirkpatrick (2001), this relationship is described by the following system of equations:

$$y = \alpha_1 + \beta V_1' + \delta W_1' + \varepsilon_1 \dots\dots\dots 4.4$$

$$p = \alpha_2 + \beta V_2'' + \delta W_2'' + \varepsilon_2 \dots\dots\dots 4.5$$

Where y represents economic growth while p is a measure of poverty. V and W are vectors of financial development indicators and other factors that affect poverty and economic growth respectively. Jalilian and Kirkpatrick (2001) indicated that growth and poverty are mostly affected by the same variables and the V and W vectors may include the same variables but the effects would differ. Assuming the absence of simultaneity, then equations 4.4 and 4.5 reduces to a reduced form equation as:

$$P = \alpha + \beta V + \delta W + \varepsilon \dots\dots\dots 4.6$$

4.3.2 Model Specification

In equation 4.3, financial development was our main variable of interest and it would be included in the X vector. In equation 4.6, it would be represented in the V vector. A number of financial development indicators have been used in the literature for example broad money supply (M2), domestic credit (Kar et al., 2011 and Odhiambo, 2009) to show the effect of financial development and poverty reduction. However, these measures have been criticized in the literature since they are not appropriate financial development indicators for underdeveloped countries (Dushku, 2010). In underdeveloped countries, the currency composition in M2 is quite large and thus this measure does not show how the financial intermediary channels funds from depositors to investors and thus the poor (Khan and Senhadji, 2003).

This study utilized a new set of financial development indicators including non-performing loans to show the efficiency of the financial sector, interest rate spread to show the transactions cost as well as efficiency of the sector and how this may affect the poor's access to credit as well as some of the indicators used in literature, bank credit to private sector to show how funds are channeled from the ones who have to the ones who don't have (poor). Market capitalization even if it had been included in the previous analysis is left out in this chapter since there is a postulation that stock markets which are part of the formal financial sector are not consistent with the needs of the poor but rather of the rich (Bakhtiari, 2006). The study also added a measure of financial innovation (Krishnan, 2011) since there has been a number of financial innovations in Kenya as these have led to an increased access to financial services. The intuition is that financial innovations are seen to be good for the poor.

Due to possible simultaneity, equation 4.6 was not estimated. Thus, following Dauda and Makinde (2014) and Jalilian and Kirkpatrick (2001), an explicit linear equation derived from equations 4.1 and 4.2 was estimated. Jalilian and Kirkpatrick (2001) asserted that developing countries are more concerned than the developed ones with the Mckinnon

conduit effect or the direct channel rather than the indirect channel. This is because the financial sector is more developed and vibrant in developed countries. Thus, the study estimated an equation for the direct channel but include economic growth to capture the indirect effect as follows:

$$P_t = \alpha + \beta GDPPC_t + \delta FD_t + \phi Z_t + \theta FI_t + \varepsilon_t \dots\dots\dots 4.7$$

Where P_t is poverty, $GDPPC_t$ is Gross Domestic Product per capita, FD_t is the financial development indicators which include non-performing loans (NPL), interest rate spread (INT) and bank credit to private sector (CPS), FI is the financial innovation dummy and Z_t is other variables that affect poverty. Further, there is support in literature that inflation negatively influences the poor (Easterly and Fischer, 2001 and Dollar and Kraay, 2002). Other studies found that poverty is affected by trade openness which affects the savings ratio of the population (Athukorala and Sen, 2004 and Christiaensen et al., 2003). Thus, the study introduced these two variables as control variables to have:

$$P_t = \alpha + \beta GDPPC_t + \delta FD_t + \phi INF_t + \sigma TO_t + \theta FI_t + \varepsilon_t \dots\dots\dots 4.8$$

Where INF is inflation and TO is trade openness and FD_t is a vector of financial development indicators including credit private sector, interest rate spread and non-performing loans.

Equation 4.8 is expanded to include the financial development indicators and introducing logarithms, the following equation is given:

$$\ln P_t = \alpha + \beta \ln GDPPC_t + \gamma \ln CPS_t + \delta \ln NPL_t + \pi \ln INT_t + \phi \ln INF_t + \sigma \ln TO_t + \theta FI_t + \varepsilon_t \dots\dots\dots 4.9$$

Poverty was represented by head count ratio and per capita consumption as a measure of welfare for robustness. $\delta, \pi, \gamma, \theta$ gives us the direct effect while the coefficient β gives the

indirect effect of financial development on poverty through growth. Taking the logarithms of GDP per capita ensures that we have economic growth. It is assumed that financial development is beneficial to the poor as it has a positive impact on economic growth.

4.3.3 Estimation and Testing

a) Descriptive Statistics

Descriptive statistics for all the variables were conducted to determine the statistical properties of the model before running any estimation. This involved testing for the skewness, kurtosis, normality of the variables and the spread of the data by determining the mean and first movement from the mean.

b) Unit Root Tests

The study conducted unit root tests to eliminate the possibility of spurious regressions. It used the usual Philip Perron (PP) test (Phillip and Perron, 1988) to determine presence of unit root. Phillip Perron test results are preferred to ADF unit root test results because even though the two tests give consistent results, the PP test has higher unit root detection abilities (Balioune-Lutz, 2008). In addition, ignoring the presence of structural breaks could lead to rejection of the null hypothesis (there is unit root) thus giving erroneous order of integration of variables. Thus, the study went ahead to test for unit root using tests that endogenously take into account the presence of structural breaks. It used the Zivot-Andrews test (Zivot and Andrews, 1992) to test for unit root. This test considers only one structural break which is determined endogenously. However, there are tests like Clemente-Montanes-Reyes (1998) and Lumsdaine and Papell (1997) which takes into account the presence of two structural breaks. However, these tests give similar results as evident from chapter three. Thus, this study conducted only the Zivot – Andrews test. A detailed description of the test was contained in chapter three.

c) Cointegration Analysis

It was important to test for cointegration since many macro-economic variables are likely to have a stable long run relationship (Camillo, 2015). However, cointegration analysis is conditional on variables having a unit root otherwise the normal OLS is used for analysis. The intuition is that variables that are cointegrated will not move far away from each other and thus their deviations are stationary in the long- run. This concept has been clearly brought out by Murray (1994) in studying the drunk and her dog who will not lose sight of each other. Variables which are non- stationary, a linear or many linear combinations of these becomes stationary. This study used the Johansen cointegration test based on Johansen (1988) and Johansen and Juselius (1990) which was based on the VAR model.

The Johansen test has two statistics, trace and max-eigen statistics which indicate whether there is cointegration or not in the variables. The statistics are derived from observing the rank of a long-run coefficient matrix which comprises a combination of the cointegrating vectors as well as the amount of each cointegrating vector in each equation of the VAR/VECM. The trace statistic is a joint test based on the null hypothesis that there is a number of cointegrating equations equals to or less than the rank (r) against an alternative hypothesis that the number of cointegrating equations is more than r . The max eigen statistic is based on a null hypothesis that the number of cointegrating equations is r against an alternative hypothesis that the number of cointegrating equations is equal to $r+1$.

d) VAR Model

Equation 4.9 was estimated using the VAR model introduced by Sims (1980). The VAR model is advantageous because it does not require strong restrictions on parameters to be imposed. It usually tests for joint behavior of variables which are treated as endogenous from theory. The VAR methodology extends the Univariate Autoregressive Model by including more than one varying variables. The choice of VAR was necessitated by the fact other time series estimation methods like Autoregressive Lag Model requires variables to be integrated of different orders, mainly $1(0)$ and $1(1)$. OLS would give spurious

regressions when variables are not stationary. A variation of the VAR model is the VECM which allows the VAR model to determine relationships when the variables are cointegrated or have a long run relation. The VECM allows for the errors in the short run to be corrected in the long run by incorporating an error correction term as an explanatory variable in the long run model.

The VECM is given by:

$$\Delta \ln Z_t = \sum_{i=1}^k \Delta A_i \ln Z_{t-i} + \theta FI_t + \Pi ECM_{t-1} + \varepsilon_t \dots\dots\dots 4.10$$

Where Z_t is a vector of variables which include poverty, financial development indicators (credit to private sector, non-performing loans, interest rate spread), economic growth and the control variables which include trade openness and inflation. Z_{t-i} includes all the lagged variables while FI indicate the financial innovation dummy. ECM is the error correction term where Π is the coefficient of the error correction term and it gives the speed of adjustment (of deviations) from the short run to the long run equilibrium.

The study then ran the granger causality test based on the VAR/VECM to determine the causality between the variables. Further, tests for normality of residuals and heteroscedasticity were performed.

4.3.4 Definition and Measurement of Variables

Poverty is a multi-dimensional concept and in this study two measures of poverty were used as the dependent variable. One of the measures which have been used in literature is per capita consumption. However, this measure has been criticized in literature since it is a general measure of welfare. Thus, the study went further to use head count ratio measure of poverty for analysis. Head count ratio is defined as the number of the poor that lives below the poverty line. It is calculated using the following formula:

$$P_{\alpha} = \frac{1}{N} \sum_{i=1}^t \left[\frac{Z-Y}{Z} \right]^{\alpha} \dots\dots\dots 4.11$$

Where α is taken to be zero to give the head count ratio. Z is the poverty line, Y is income and N is total population.

Since time series data on poverty in Kenya is scanty and thus getting annual headcount ratio data was not possible, the study predicted head count poverty ratios based on the methodology used by Ali and Thorbecke (2000) and Mwabu et al. (2003). The study used the poverty changes decomposition method which follows from the notion that what cause changes in poverty over time is mostly changes in income growth and income distribution (Mwabu et al., 2003 and Ali and Thorbecke, 2000) where the effect is negative for positive changes in income growth and positive for positive changes in inequality. This relationship is specified as:

$$P_i = \alpha + \beta g_i + \delta Gin_i + \varepsilon_i \dots\dots\dots 4.12$$

Where P is poverty in year i and Gin is the Gini-coefficient (measure of income distribution). β and δ gives the effects of Economic growth and income distribution on poverty for a certain year and α is a constant. Thus the changes in poverty can be given by the following equation which shows changes in both income growth and income distribution. α is a constant while ε is the error term with an expectation of zero.

$$\Delta P = \beta \Delta GDP + \alpha \Delta Gin \dots\dots\dots 5.13$$

Where Δ means change. The co-efficients α , β and δ are hard to get in some countries since annual data is unavailable mostly in these underdeveloped and some developing countries like Kenya. Thus, this study followed Mwabu et al. (2003) by obtaining these coefficients from Ali and Thorbecke (2000) who estimated poverty regressions to determine the state and path of poverty in Sub Saharan African countries, Kenya included. This cross-country study results showed that values of α , β and δ were more or less the same across the

various countries. Further, Mwabu et al. (2003) and Odhiambo et al. (2005) made the assumptions that the coefficients can be used for different countries and for post Ali and Thorbecke study's period. The idea is that poverty elasticities to income growth and inequality were found to be almost the same across different countries and across regions in one country. Thus, the study followed the same assumptions and continued to predict the poverty rates using the coefficients α , β and δ which are reported in Tables A.11, A.12 and A.13 (Appendix). Changes in poverty were calculated using equation 4.12. However, changes in inequality are hard to get in Kenya since there is no quarterly Gini coefficients data and even the yearly ones are intermittent. The study thus ignored the changes the Gini coefficient and used only changes in income growth to predict headcount ratio. The predicted head count ratio is given in Table A.20 (Appendix).

Per capita consumption is defined as the value of all goods and services purchased by households divided by population. It is used as a measure of poverty and justified in literature since World Bank defines poverty as "the inability to attain a minimal standard of living" which is defined in consumption terms. Further, it is taken to be more reliable and correct than income (Woolard and Leibbrandt, 1999 and Odhiambo, 2009). Per capita consumption is a measure of welfare and not a direct measure of poverty. It is used as a welfare measure having implications on poverty. Spicker (2002) implied that welfare and the welfare state usually help in reducing poverty. Welfare is designed to stop people from falling into poverty. Further, Fording and Berry (2007) found that increased welfare is important for poverty reduction although the effect of welfare programs on poverty has reduced over time. Thus, the study used per capita consumption which is a measure of welfare with an implied poverty effect.

However, the per capita consumption data is on an annual basis while quarterly data was required. The study thus used the quadratic match sum formula in Eviews statistical programme. This formula is advantageous when the data points being interpolated to a higher frequency are relatively few and fairly even or consistent. Quadratic match sum

usually has a quadratic polynomial for each of the original data series. Picking three adjacent data points, one before and one after (and for end points taking data points from the side where data is available), a quadratic polynomial is fitted to produce the quarterly data points such that either the sum or the average^e of these quarterly points equals the low frequency data observed.

GDP per capita is defined as the Gross Domestic Product divided by the total population. It is a measure of the total output or total product of a country. Its measurement is the same as the per capita consumption. Financial development is proxied by bank credit to private sector to GDP, non- performing loans to total loans and interest rate spread. These are as defined in chapter two and Table 3.5. Further, financial innovation is defined as the creation of a new product or institution into the financial system. In this case, financial innovation is represented by M-Pesa volumes since its onset in 2007 but due to unavailability of enough data observations, the study introduced a financial innovation or M-Pesa dummy to represent existence (takes the value of 1) and absence (takes the value of 0) of M-Pesa and hence presence and absence of M-Pesa volumes. The presence of M-Pesa as a financial innovation is important since it has benefitted people through the channels of increased transactions, transfers, savings and credit. These channels have not only increased access to credit but also dealt with the problems of non-convexities in the financial sector through its flexibility in terms of lending amounts and collateral.

It is theoretically expected apriori that GDP per capita, bank credit to private sector, financial innovation and trade openness would be beneficial to the poor by enabling them to self-finance themselves (Mckinnon, 1973), offering them proper access to good and services and improve their wellbeing. Hence, the relationship between these variables and head count ratio was expected to be negative but positive with per capita consumption. Interest rate spread, non-performing loans and inflation were expected apriori to be deleterious to the poor since interest rate spread show high transaction costs, non-performing loans, the inefficiency of the financial sector and inflation erodes the

purchasing power of the poor. Therefore, they were expected to be positively related with head count ratio and negatively related with per capita consumption. Table 4.5 summarises these definitions and measurements.

Table 4.5: Definition and Measurement of Variables

Variable	Definition and measurement	Expected Sign (With HCR)	Expected Sign (With PCC)	Literature Source
Per Capita Consumption (PCC)	The value of all goods and services purchased by households divided by population.	Dependent variable		Woolard and Leibbrandt (1999), Odhiambo (2009), World Bank (1990)
Head Count Ratio (HCR)	Ratio of the population which is poor to the total population. Detailed explanation of the measurement is given in section 4.3.4	Dependent variable		Jeanneney & Kpodar (2011), Jalilian and Kirkpatrick (2001)
GDP Per Capita	As defined in Chapter two, Table 2.1	Negative (Trickle down hypothesis)	Positive (Trickle down hypothesis)	Khan et al. (2011), Kar et al. (2015)
Credit to Private Sector	As defined in Chapter three, Table 3.2	Negative	Positive	Imral & Khalil (2012), Kar et al. (2015)
Non - Performing Loans	As defined in Chapter three, Table 3.2	Positive	Negative	Dudian and Popa (2013), Lawrence (2007)
Interest Rate Spread	As defined in Chapter three, Table 3.2	Positive	Negative	Dandume (2014)
Financial Innovation	Dummy that takes the value 1 after introduction of M-Pesa and 0 otherwise	Negative	Positive	This measure is new literature and it is justified in (Krishnan, 2011 and Abraham, 2015)
Inflation	As defined in Chapter three, Table 3.2	Positive	Negative	Easterly and Fischer (2001), Jeanneney and Kpodar (2011), Dollar and Kraay (2002)
Trade Openness Index	As defined in Chapter three, Table 3.2	Negative	Positive	Dauda and Makinde (2014)

All the variables are in logarithm form as described in section 2.3.3 in chapter 2 apart from the financial innovation dummy. The study uses LN to represent natural logarithm.

4.3.5 Data Set and Description

The study used quarterly time series data for the period between the year 2001 and 2014 being the only period quarterly data for all variables was available. All the financial development indicator variables were as per chapter two and three and data was obtained from Central Bank of Kenya annual, quarterly or monthly reports. Data on consumption per capita and GDP per capita was obtained from World Development Indicators (WDI).

Poverty data (Head Count Ratio) was estimated from the changes in income growth whose data was obtained from KNBS, quarterly statistical releases.

4.4 Empirical Results and Discussion

4.4.1 Descriptive Statistics

The mean, standard deviation, skewness and kurtosis are reported in Table 4.6. Since the same data was used for the financial development indicators and other control variables as in chapter two and three, only results for the indicators of poverty were reported here.

Table 6: Descriptive statistics for the poverty variables

Variables	Mean	Max	Min	Std. Dev.	Skewness	Kurtosis	Pr(JB-stat)
LNPer capita Consumption	9.51	9.71	9.51	0.08	0.6028	2.2698	3.656[0.160]
LNHead Count Ratio	3.87	3.93	3.81	0.03	0.0250	2.8940	0.314[0.854]

The variables were closely dispersed from their mean as indicated by their small standard deviations. The variables were not highly skewed since their skewness values were close to zero. The kurtosis values were not far from three. Per capita consumption and head count ratio were both normally distributed at 5 percent significance level. Non-normality of variables may imply non-normality of residuals which may cause the inference from the usual t - statistics and f - statistics to be invalid. Thus, the variables were good for further analysis.

4.4.2 Correlation Matrix

Correlation shows the linear association between pair of variables and highly correlated variables could lead to invalid t statistics and thus cannot be used for inference. The correlation matrix showed that the variables were not highly correlated and thus there was no multicollinearity problem for both the per capita consumption and head count ratio

models. However, the positive and negative relationships between the variables were evident as indicated in Table A.12 and A.13 in Appendix.

4.4.3 Unit Root Tests

a) Optimal Lag Length

It was important to determine the optimal lag length for all the variables in order to continue with further tests on unit root. As for the financial development indicators and the control variables, the optimal lag length had been determined in chapter three. GDP per capita, Credit to Private Sector, non-performing loans, interest rate spread, inflation and trade openness had 2, 3, 1, 3, 1, 4 and 3 optimal lag length respectively (Refer to Table A.1 in appendix). As for per capita consumption, all the optimal lag length selection criterias showed the same lag length of two while for the headcount ratio was found to have an optimal lag of one.

b) Graphical Representation of the Variables

Before running the unit root tests, a graphical analysis of the variables was important to show whether the variables have a deterministic trend or not. The graphs showed that both per capita consumption and GDP per capita have a trend. However, it was not possible to tell whether headcount ratio has a trend or not. These graphs were indicated in Appendix.

c) Unit Root Test Results

The study estimated the Phillip Perron unit root tests and the Zivot – Andrews test which takes into account the presence of structural breaks and the results were given in Tables 5.7 for Phillip Perron test. All the financial development indicators and control variables had been tested for unit root and the results showed that they were all integrated of order 1 (Refer to Tables 2.2 and 3.3 in chapter two and three respectively). Therefore, we show results for per capita consumption and headcount ratio.

Table 4.7: Phillip Perron Unit Root Test Results

Variables	At levels				1 st difference				Order of integration
	Constant		Trend & Intercept		Constant		Trend & Intercept		
	t-stat	5% Critical value	t-stat	5% Critical value	t-stat	5% Critical value	t-stat	5% Critical value	
LNPer Capita Consumption	0.895	-2.916	-1.866	-3.495	-3.037	-2.916	-3.529	-3.495	1(1)
LNHead Count Ratio	-1.831	-2.915	-2.126	-3.493	-7.204	-2.916	-7.139	-3.495	1(1)

Phillip Perron test for unit root showed that per capita consumption and Head Count Ratio had a unit root but were stationary at first difference at 5 percent significance level. Test results for Zivot Andrews did not show any different results from the Phillip Perron results in terms of presence of unit root. The variables were integrated of order one. The test also endogenously determined the years of structural break for each variable with per capita consumption having a structural break at quarter two of 2007 and head count ratio at quarter three of 2005. We also show results for Zivot-Andrews unit root test for the two variables. These are shown in Table 4.8.

Table 4.8: Zivot-Andrews Unit Root Test Results for Poverty Measures

Variables	Year of structural break	Trend & Intercept				Order of integration
		Level		First Difference		
		t-stat	5% Critical value	t-stat	5% Critical value	
LNPer Capita Consumption	2007q2	-3.121	-5.08	-6.899	-5.08	1(1)
LNHead Count Ratio	2005q3	-3.578	-5.08	-8.097	-5.08	1(1)

The results showed that the per capita consumption and head count ratio were not stationary at levels but stationary at first difference. Thus, they reinforced the results of the Phillip-Perron unit root test.

4.4.4 Estimations using Head Count Ratio

The study started by using headcount ratio as a measure of poverty to determine the relationship between financial development and poverty. The estimation results were reported as follows:

a) Cointegration Test Results

Johansen cointegration test was run to determine the presence of cointegration among the various variables. This was necessary since the variables were not stationary at levels and they were found to be integrated of order 1. Hence it was necessary to test for the long run relationship of these variables. The results were presented in Table 4.9.

Table 4.9: Johansen Test Results for the Head Count Ratio Model

Hypotheses	Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.01 Critical Value
$H_0: r=0$ $H_1: r>0$	None ***	0.807691	189.0672	135.9732
$H_0: r\leq 1$ $H_1: r>1$	At most 1	0.442992	101.6887	104.9615
$H_0: r\leq 2$ $H_1: r>2$	At most 2	0.416530	70.67440	77.81884
$H_0: r\leq 3$ $H_1: r>3$	At most 3	0.277497	42.12002	54.68150
$H_0: r\leq 4$ $H_1: r>4$	At most 4	0.236640	24.89320	35.45817
$H_0: r\leq 5$ $H_1: r>5$	At most 5	0.180416	10.58187	19.93711
$H_0: r\leq 6$ $H_1: r>6$	At most 6	0.000699	0.037073	6.634897
Hypotheses	Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.01 Critical Value
$H_0: r=0$ $H_1: r=1$	None ***	0.807691	87.37843	52.30821
$H_0: r=1$ $H_1: r=2$	At most 1	0.442992	31.01432	45.86900
$H_0: r=2$ $H_1: r=3$	At most 2	0.416530	28.55438	39.37013
$H_0: r=3$ $H_1: r=4$	At most 3	0.277497	17.22682	32.71527
$H_0: r=4$ $H_1: r=5$	At most 4	0.236640	14.31133	25.86121
$H_0: r=5$ $H_1: r=6$	At most 5	0.180416	10.54479	18.52001
$H_0: r=6$ $H_1: r=7$	At most 6	0.000699	0.037073	6.634897

*** denotes rejection of the null hypothesis at the 1% level

The results indicated that there was one cointegrating equation. Thus, there was a long run link among the variables since both the trace and the max-eigen statistics indicate the presence of one cointegrating equation. Therefore, the study went further to run the VECM model to correct for the errors to long run equilibrium.

b) Optimal Lag Length of the Model

The study tested for the optimal lag length of the model before running the estimations and the results showed that lags two, three and four were significant (See Table A.16 in Appendix). LR test statistic gave an optimal lag length of three, Schwarz information criterion indicated two optimal lag length while Final prediction error, Akaike Information Criterion and Hannan-Quinn Information Criterion each indicated a lag length of four. The study confirmed which of the model at each lag was stable and free from autocorrelation problems. Therefore, the LM test for autocorrelation and graphs for stability were conducted. The results indicated that all the models at each lag were stable. The study then tested for autocorrelation problems in each model and the results indicated that the model at lag three and lag four had autocorrelation problems and only the model at lag two was free from autocorrelation. The optimal lag length was hence determined as two (Refer to Table A.17 and Figures A.24, A.25 and A.26 in Appendix). This was important for our model as instability could imply explosiveness and the model may not be used for forecasting. Hence, our model was good.

c) Vector Error Correction Model Regression Results

The long-run VECM results were presented in Table 4.10:

Table 4.10: VECM Long-run Results with Head Count Ratio

Dependent Variable – LNHead Count Ratio			
Variable	Coefficient	Standard error	t-statistic
CONSTANT	-17.33		
LNGDP Per Capita (lnGDPPC)	-1.2175**	0.1485	-8.1965
LNCredit to Private Sector (lnCPS)	-0.2991**	0.0293	-10.2047
LNInterest Rate Spread (lnINT)	0.0146**	0.0055	2.6656
LNNon-performing Loans (lnNPL)	0.0263	0.0133	1.0975
LNInflation (ln π)	0.0902**	0.0323	2.7939
LNTrade Openness (lnTO)	0.6639**	0.1026	6.4707

** indicates significance at 5% significance level

The long run relationship results indicated that GDP per capita was negatively related to poverty and its coefficient was statistically significant. This was consistent with the trickle

down hypothesis of financial development on poverty through growth. A one percent increase in GDP per capita reduces poverty by 1.22 percent which is a very high elasticity. This indicated that growth is good for the poor and is in line with various studies in literature (Imral and Khalil, 2012; Jalilian and KirkPatrick, 2005; Loayaza and Raddatz, 2006 and Dollar and Kraay, 2002) that showed the importance of growth for poverty. On the financial development indicators, the coefficient of non-performing loans was positive and not statistically significant but the one for credit to private sector was significant and negatively related to poverty while the coefficient of interest rate spread was significant and positively related to poverty. Credit to private sector is thus good for the poor as it reduces poverty. This was expected from theory and literature since credit can be used to smooth consumption and for investment purposes (Dembiermont, 2013) and thus increasing incomes of the poor. This implies that they can invest more as they continue borrowing and eventually leave the poor well off than without access to credit.

Interest rate spread was positively related to poverty and the coefficient was statistically significant. An increase in interest rate spread by one percent increases poverty by 0.01 percent. According to theory, high interest rate spread indicates high transaction costs hence an inefficient financial sector (Holden and Prokopenko, 2001). These results were consistent with Khan et al. (2011) and Dandume (2014) that a high interest rate spread is bad for the poor. The coefficients of the control variables were significant in affecting poverty. Trade openness was positively related with head count ratio and the coefficient was significant. Trade is theoretically supposed to reduce poverty due to increased productivity and growth as argued by Adam Smith. As trade openness increases by one percent, head count ratio increases by 0.66 percent. This implied that trade is bad for the poor. Singh and Le Goff (2013) indicated that trade maybe bad for the poor if it is not accompanied by other policies in other sectors especially the financial sector and if it is not complemented by other investments like in human capacity as well as governance building. Inflation is also bad for the poor as indicated by Easterly and Fischer (2001). The coefficient of inflation was statistically significant and positive. A one percent increase in

inflation leads to 0.09 percent increase in poverty. Inflation reduces the purchasing power for the poor thus making them worse off.

Thus, the results supported the trickle down hypothesis that financial development affects poverty through economic growth. Further, the effect of financial development on poverty was indicated by two of the financial development indicators (credit to private sector and interest rate spread) implying that financial development is important for poverty reduction both directly and also through economic growth.

d) Short -run Relationship Results

It was necessary to show the short-run relationships between financial development and poverty after showing the long-run relationships so as to give the error correction model results. The short-run analysis uses differenced variables which is represented by D. These were shown in Table 4.11

Table 4.11: Short-run Relationship on VECM with Head Count Ratio

Dependent Variable – DLNHead Count Ratio			
Variable	Coefficient	Standard error	t-statistic
DLNHead Count Ratio (-1)	0.0050	0.2355	0.2124
DLNHead Count Ratio (-2)	0.2101**	0.0088	2.3825
DLNGDP Per Capita (-1)	-1.1108	0.8126	-1.3671
DLNGDP Per Capita (-2)	-1.3071**	0.5124	-2.5511
DLNCredit to Private Sector (-1)	-1.6439**	0.6568	-2.5028
DLNCredit to Private Sector (-2)	-0.0406	0.0968	-0.4196
DLNInterest Rate Spread (-1)	0.4209**	0.1254	3.3580
DLNInterest Rate Spread (-2)	0.0114	0.0108	1.0453
DLNNon-performing Loans (-1)	-0.0598	0.0422	-0.1419
DLNNon-performing Loans (-2)	0.0956**	0.0465	2.0553
Mobile Payments Dummy (MPAYDU)	-0.1873**	0.0814	-2.2995
Error Correction Term (ECM _{t-1})	-0.0741**	0.0254	-2.9103

** indicates significance at 5% significance level

On the short run relationship, the coefficient of head count ratio was significant at lag two implying that poverty affects itself negatively with a lag. Poverty today causes more poverty tomorrow. This is according to the poverty trap theory (Sachs, 2005) which

proposes that poverty begets poverty or the fact that poverty today leads to the persistence of poverty. This is the reason for inclusion of the lagged head count ratio. A one percent increase in poverty today leads to a 0.21 percent increase in poverty two quarters after. One reason why this increase in poverty would be less would be the accompanying effects of the indirect effect where growth significantly lowers poverty. GDP per capita also affects poverty negatively in lag two. The coefficient was also statistically significant. A one percent increase in GDP per capita reduces headcount ratio by 1.30 percent.

The trickledown effect of economic growth on poverty happens with two lags. On financial development indicators, all the coefficients of the variables were significant. The effect of credit to private sector was negative meaning that it is good for the poor in the short run. An increase in credit to private sector by one percent reduces poverty by 1.64 percent. This was consistent with existing literature (Kar et al., 2015 and Imral and Khalil, 2012). Access to credit leads to increased investment activities which is good for the poor. Interest rate spread was positively related to poverty in the short run implying that lower transaction costs promote the poor to access credit. The control variables were not statistically significant in the short run.

Financial innovation (represented by MPAYDU dummy) was negatively related to poverty and the coefficient was statistically significant. Use of M-Pesa reduces poverty by 17.30 percent. This finding was as expected that financial innovations are good for the poor. In our study, it implied that the introduction of M-Pesa has been beneficial to the poor. This beneficial impact can be seen from several fronts both from the transfers channel and the credit channel. Transfers through M-Pesa increase the incomes of the poor for both consumption and investments purposes. This result could also imply that once the poor receive transfers, they use it for food consumption hence reducing food poverty. On the credit channel, M-Pesa through M-Shwari has increased the poor's access to credit. M-

Shwari allows flexibility, requires no collateral and deals with the non convexities¹⁷ of the financial sector which is associated with market failures. This is because monthly income as a prerequisite to borrowing is not required. Further, M-Shwari allows people to borrow low amounts of between Kenya shilling 50 to 100,000. The formal financial sector does not allow access to credit of such small amounts; hence M-Shwari has closed this gap and thus dealt with the non-convexities of the formal financial sector.

In the head count ratio model, the error correction coefficient was negative and significant. It showed that, in each quarter 7.4 percent of the deviations were corrected. This implied that for the system to equilibrate in the long run, it would take about 14 quarters or about three and a half years.

e) VEC Granger Causality Results

The results of the granger causality using Wald test to show the direction of causality between financial development and poverty were indicated in Table 4.12. The variables were in first difference and natural logarithm.

¹⁷ Indicate the situation where the formal financial sector is unable to take care of the needs of the poor. It only affords credit for the rich and the middle income leaving out the poor.

Table 4.12: Granger Causality Results with Head Count Ratio

Dependent Variable	χ^2 - statistics of lagged first differenced term [p-value]							ECT _{t-1} Co-efficient
	Head Count Ratio	GDP Per Capita	Credit to Private Sector	Inflation	Interest rate Spread	Non-performing Loans	Trade Openness	
Head Count Ratio	–	6.48** [0.0390]	6.26** [0.0438]	5.95* [0.0512]	6.34** [0.0421]	1.13 [0.5690]	4.02 [0.1342]	-0.23** (-2.15)
GDP Per Capita	2.34 [0.3100]	–	6.35** [0.0418]	1.28 [0.5258]	6.27** [0.0434]	1.52 [0.4655]	9.30*** [0.0095]	-0.05** (-2.64)
Credit to Private Sector	4.43 [0.1089]	1.95 [0.3756]	–	0.09 [0.9577]	9.90*** [0.0071]	5.13* [0.0769]	9.67*** [0.0080]	0.26 (1.96)
Inflation	0.39 [0.8226]	1.67 [0.4328]	0.41 [0.8149]	–	3.03 [0.2197]	1.97 [0.3742]	5.20* [0.0740]	-0.33 (-1.12)
Interest Rate Spread	0.81 [0.6676]	0.31 [0.8572]	1.11 [0.5716]	2.05 [0.3577]	–	1.36 [0.5073]	1.11 [0.5745]	-1.01 (-0.55)
Non-performing Loans	0.04 [0.9781]	5.00* [0.0818]	5.95* [0.0510]	5.91* [0.0520]	0.77 [0.6797]	–	2.96 [0.2272]	-0.97 (-1.78)
Trade Openness	0.02 [0.9924]	0.40 [0.8175]	4.63** [0.0986]	0.10 [0.9465]	2.68 [0.2619]	5.37* [0.0684]	–	-0.46** (-2.07)

Note: *, ** and *** denotes significance at 10%, 5% and 1% significance level, respectively. The figures in the squared brackets [...] indicate the p-values while the figures in the parenthesis (...) indicate the t-statistic.

From the main variables of interest, GDP per capita granger causes poverty implying that it was economic growth which causes poverty reduction. Two of the financial development indicators, credit to private sector and interest rate spread also granger causes poverty and hence financial development was important in poverty reduction. On the control variables, inflation also causes poverty and hence important in also reducing poverty. Poverty does not granger cause any of the variables. Thus, the uni-directional causality was supported from financial development to poverty and from economic growth to poverty.

f) Post Estimation Results

The residual normality test showed that the residuals were normally distributed since the null hypothesis of normality was not rejected. The probability value was 0.1550. The White heteroskedasticity test results showed that the residuals were free from heteroskedasticity since the null hypothesis was not rejected with a probability value of 0.7688 (Refer to Table A: 20 in appendix).

4.4.5 Estimations Using Per Capita Consumption

The study then determined the relationship between financial development and poverty using per capita consumption.

a) Cointegration Test Results

The unit root tests indicated that the variables were not stationary and were integrated of order 1. Thus, there was need to test if there was a long run relationship among the variables, that is, cointegration. The study thus conducted the Johansen cointegration test and the results were reported in Table 4.13 for the model with per capita consumption.

Table 4.13: Johansen Cointegration Test Results of Per Capita Consumption Model

Hypotheses	Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.01 Critical Value
$H_0: r=0 \quad H_1: r=1$	None ***	0.8641	211.9884	135.9732
$H_0: r=1 \quad H_1: r=2$	At most 1	0.5321	104.2104	104.9615
$H_0: r=2 \quad H_1: r=3$	At most 2	0.3329	63.1931	77.8188
$H_0: r=3 \quad H_1: r=4$	At most 3	0.2971	41.3258	54.6815
$H_0: r=4 \quad H_1: r=5$	At most 4	0.2400	22.2860	35.4581
$H_0: r=5 \quad H_1: r=6$	At most 5	0.1287	7.46402	19.9371
$H_0: r=6 \quad H_1: r=7$	At most 6	0.0004	0.02341	6.63489
Hypotheses	Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.01 Critical Value
$H_0: r=0 \quad H_1: r>0$	None ***	0.8641	107.7780	52.3082
$H_0: r \leq 1 \quad H_1: r > 1$	At most 1	0.5321	41.0172	45.8690
$H_0: r \leq 2 \quad H_1: r > 2$	At most 2	0.3329	21.8673	39.3701
$H_0: r \leq 3 \quad H_1: r > 3$	At most 3	0.2971	19.0397	32.7152
$H_0: r \leq 4 \quad H_1: r > 4$	At most 4	0.2400	14.8220	25.8612
$H_0: r \leq 5 \quad H_1: r > 5$	At most 5	0.1287	7.4406	18.5200
$H_0: r \leq 6 \quad H_1: r > 6$	At most 6	0.0004	0.0234	6.63489

Trace and Max-Eigen tests indicate 1 cointegrating eqn(s) at the 0.01 level

*** denotes rejection of the hypothesis at the 0.01 level

Both the trace and Max-Eigen statistics indicated that there was one cointegrating vector. Thus, there was a long-run relationship or link among the variables as cointegration was found. Thus, the VAR model could not be used. The study therefore estimated the VECM that corrects for the error between the short run and the long run.

b) Optimal Lag Length

Before running VECM model, the study tested for the optimal lag length of the model and the results were given in Table A.14 in Appendix. LR test statistic, Final prediction error, Akaike information criterion and Hannan-Quinn information criterion for determining the lag length all indicated an optimal lag length of four while the Schwarz information criterion indicated a lag length of two. The study therefore went further to determine which of these lags gave a stable model and free of autocorrelation. The results for stability and autocorrelation were given in Table A.15 and Figure A.23 in Appendix. The stability tests showed that the model at both lags was stable but the model at lag four suffered from autocorrelation problems. Therefore the optimal lag length was determined as two.

c) Vector Error Correction Model Regression Results

Table 4.14: VECM Results – Long-run Relationship with Per Capita Consumption

Dependent Variable – LNPer Capita Consumption			
Variable	Coefficient	Standard error	t-statistic
CONSTANT	1.34**		
LNGDP Per Capita (lnGDPPC)	-1.2392**	0.0752	-16.4841
LNCredit to Private Sector (lnCPS)	-0.0150	0.0158	-0.9523
LNInterest Rate Spread (lnINT)	-0.0065**	0.0026	-2.5488
LNNon-performing Loans (lnNPL)	-0.0159**	0.0069	-2.2921
LNInflation (ln π)	-0.0512**	0.0169	-3.0305
LNTrade Openness (lnTO)	0.3840**	0.0549	6.9998

** indicates significance at 5% significance level

The results indicated that the coefficient of two of the three financial development indicators were significant. Bank credit to private sector coefficient was not significant. It does not affect per capita consumption which implies that households perhaps borrow

funds in order to smooth consumption (Dembiermont, 2013). However, the results showed that an increase in credit to private sector does not affect per capita consumption. This could be associated with high debt repayments especially for the low income groups and hence does not affect consumption. This was consistent with Li and Johnson (2007) who concluded that consumption is more sensitive to high debt service ratios especially for households with high liquid assets mainly the poor.

Interest rate spread was negatively related with per capita consumption. This implied that an increase in interest rate spread would be detrimental to the welfare of the poor. The coefficient was statistically significant and indicated that an increase in interest rate spread by one percent led to a 0.01percent decline in per capita consumption. The higher the difference between the deposit and lending rates, the less the poor are able to access credit to smooth their consumption and invest in productive activities. High interest rate spread is an indication of high transaction costs and hence inefficiency in the financial sector. A market concentration that has oligopolistic tendencies leads to higher interest rate spreads (Were and Wambua, 2013). In Kenya, the banking industry has oligopolistic tendency with six banks (KCB, National Bank, Barclays, Standard Chartered, Co-operative bank and Equity bank) dominating the industry as explained in chapter one. The assets of these banks control more than half of the total banking industry assets. These banks maintain low savings rates and high lending rates and crowds out the efforts of the smaller banks in raising deposit rates. Thus a high interest rate spread exists. Were and Wambua (2014) found that big banks have a higher spread than small banks in Kenya.

Theory indicates that high interest rate spreads is a sign of inefficiency which implies that financial intermediaries are unable to deal with the problems of information asymmetries (Holden and Prokopenko (2001). These results were consistent with Khan et al. (2011) and Dandume (2014) that interest rate spread is bad for the poor in terms of reducing their welfare. The coefficient of non performing loans was negative and significant. A one percent increase in non-performing loans led to 0.02 percent decline in per capita

consumption. This was consistent with theory which indicates that inefficiency caused by high non-performing loans leads to higher information asymmetries (Holden and Prokopenko (2001). Non-performing loans causes inefficiency in the banking sector (Karim, 2010 and Espirza and Prasad, 2010). This would imply that the higher the non-performing loans, the higher the inability to pay and the lower the per capita consumption.

These two findings supported the direct channel of the effect of financial development on poverty through welfare as indicated by per capita consumption and as supported by a number of studies (Dhrifi, 2013; Odhiambo, 2010a). On the other hand, the coefficient of GDP per capita was negatively and significantly related to per capita consumption. Increase in economic growth by one percent reduced per capita consumption by 1.23 percent. According to the absolute income hypothesis, as income increases, consumption spending is expected to increase. Thus, this result was inconsistent with the absolute income hypothesis. This may be due to an uncontrolled variable which affects per capita consumption like inequality. This could be related to Kuznets (1955) theory of growth and inequality which posits that, in the early stages of development, growth is accompanied by inequality which may not allow the poor to reap the benefits of growth. This could be the case in Kenya since the country still experiences high levels of inequality. The rich may crowd out the benefits to the poor. This finding was also inconsistent with that obtained from head count ratio model. It may indicate the drawbacks of using per capita consumption which includes both consumption for the poor and the rich.

Moreover, Todaro (1997) argued that instead of the trickle-down benefits, economic growth can actually trickle – up to the very rich and middle class and leave the poor worse off. United Nations (1997) further asserted that economic growth is not beneficial to the poor and may actually aggravate the problems of the poor. UNDP (2011) found that an increase in income inequality redistributes income from the poor who have high propensity to consume to the rich meaning that the ones who want to spend don't have the funds to spend and this may reduce aggregate demand.

With regard to the control variables, the coefficient of inflation was negative and statistically significant. Inflation reduces people's disposable income as well as their real income thus eroding the purchasing power of people and hence reducing consumption and as a result welfare. Thus, the argument brought about by Jeanneney and Kpodar (2011) and Dollar and Kraay (2002) that inflation is bad for the welfare of the poor was supported. A one percent increase in inflation reduced per capita consumption by 0.05 percent. In addition, the coefficient of trade openness was significant and positive implying that trade openness (an indicator of a country's openness and willingness to trade with other countries) increases welfare.

Theoretically, an increase in trade can increase exports which come with increased incomes and hence higher consumption (Giles and Williams, 2000). As trade openness increases by one percent, per capita consumption increases by 0.38 percent. This would imply that an increase in trade would lead to more exports giving more incomes to the people and hence increasing the consumption of citizens in a country. This was consistent with theory and previous studies, (See for example Dollar and Kraay, 2002), who supported that high trade volumes and openness impact positively on growth and hence on the welfare of the poor.

d) Short-run Relationship Results

After running the VECM, it was important to show both the short run and long run relationships so as to show the error correction results. The short run results showed how the dependent variable is related with the other variables in the short run using differenced variables. The study reported the short run relationships among the key interest variables in Table 4.15.

Table 4.15: VECM Results – Short-run Relationship with Per Capita Consumption

Dependent Variable – DLNPer Capita Consumption			
Variable	Coefficient	Standard error	t-statistic
CONSTANT	-0.0337**	0.0278	-0.6705
DLNPer Capita Consumption (-1)	0.7518**	0.2743	2.7411
DLNPer Capita Consumption (-2)	0.1284	0.4203	0.3056
DLNGDP Per Capita (-1)	0.4707**	0.1594	2.9533
DLNGDP Per Capita (-2)	0.2382	0.4482	0.5316
DLNCredit to Private Sector (-1)	0.0341	0.0231	1.4733
DLNCredit to Private Sector (-2)	0.9527**	0.4358	2.1859
DLNInterest Rate Spread (-1)	0.0020	0.0026	0.7737
DLNInterest Rate Spread (-2)	-0.6625**	0.2880	-2.3004
DLNNon-performing Loans (-1)	-0.0008	0.0088	-0.0946
DLNNon-performing Loans (-2)	0.7516**	0.3643	2.0634
Mobile Payments Dummy (MPAYDU)	0.0014	0.0027	0.5289
Error Correction Term (ECT _{t-1})	-0.1246**	0.0457	-2.7261

** indicates significance at 5%

Where D represents first difference of variables. The findings indicated that in the short run, the lag of per capita consumption had a positive impact on itself, that is, high per capita consumption today leads to higher per capita consumption tomorrow hence higher welfare. On the financial development indicators, all of them had a short run relationship with per capita consumption and the coefficients were all statistically significant. Credit to private sector in lag one affected per capita consumption positively and thus it is good for welfare. A one percent increase in credit to private sector leads to 0.95 percent increases in per capita consumption. This was as expected since credit is used to smooth consumption and for investment purposes (Dembiermont, 2013).

Interest rate spread in lag one was found to affect per capita consumption negatively and thus not good for the welfare of the poor. If interest rate spread increases by one percent, per capita consumption reduces by 0.14 percent. Interest rate spread is an indication of high transaction costs which hinder the poor from borrowing to smooth their consumption and invest in productive activities. Non-performing loans in the second lag were found to be positively related with per capita consumption implying that high non-performing loans increase per capita consumption. A one percent increase in non-performing loans increases per capita consumption by 0.75 percent. This was contrary to theory and expected findings

(Lawrence, 1995) that credit constraints as indicated by high non-performing loans reduce consumption. This could imply inefficiencies in the financial sector and thus presence of leaks and failures in the market which allows the poor to access loans without proper screening, monitoring and collateral and thus increasing funds for consumption through increased credit. However, this situation cannot be sustained in the long run since this would imply that non-performing would rise further thus making it worse for the poor and causing more inefficiencies in the financial sector.

Unexpectedly, the coefficient of financial innovation dummy was not significant indicating that financial innovation doesn't have any effect on per capita consumption. However, financial innovation still has an economic significance as it would be expected that financial innovation increases consumption (Bayoumi, 1990). This finding could imply that M-Pesa is used for savings, investment or further international remittance purposes and not consumption especially for the high income group. This could be due to the fact that per capita consumption includes consumption of both the poor and the rich and the consumption of the rich may not change since they use the M-Pesa transfers for other purposes and not consumption. This could be the main reason for lack of consistency with the results obtained with head count ratio. The error correction term coefficient was negative and significant. It showed the speed of adjustment to long-run equilibrium. The results indicated that for the per capita consumption system to go back to long-run equilibrium it would require about six quarters or about one and a half years since the system corrects 12 percent of the deviations per quarter.

e) VEC Granger Causality Results

The study ran the granger causality Wald test based on the VEC to show the causality between the various interest variables with an aim of finding out what was the causality between financial development and per capita consumption. The variables are in first difference and natural logarithm. The results were shown in Table 4.16.

Table 4.16: Granger Causality Test Results of the Per Capita Consumption Model

Dependent Variable	χ^2 - statistics of lagged first differenced term [p-value]							ECT _{t-1} Co-efficient
	Per Capita Consumption	GDP Per Capita	Credit to Private Sector	Inflation	Interest rate Spread	Non-performing Loans	Trade Openness	
Per Capita consumption	–	1.63 [0.2006]	5.79** [0.0161]	0.01 [0.9221]	8.05*** [0.0046]	3.93** [0.0473]	7.36*** [0.0067]	-0.12** (-2.73)
GDP Per Capita	0.48 [0.4872]	–	3.06* [0.0801]	6.39** [0.0115]	5.53** [0.0186]	0.63 [0.4250]	6.75*** [0.0094]	-0.41** (-2.29)
Credit to Private Sector	0.38 [0.5360]	8.76 [0.0031]	–	0.01 [0.9323]	0.09 [0.7554]	0.13 [0.7151]	0.01 [0.9226]	0.83 (1.34)
Inflation	0.26 [0.6063]	0.09 [0.7679]	0.00 [0.9614]	–	2.01 [0.1564]	7.75 [0.0054]	0.00 [0.9797]	2.31 (2.50)
Interest Rate Spread	1.95 [0.1631]	1.04 [0.3085]	1.37 [0.2413]	0.63 [0.4268]	–	0.62 [0.4313]	0.21 [0.6398]	-10.30 (-1.43)
Non-performing Loans	0.16 [0.6840]	0.36 [0.5472]	0.30 [0.5809]	0.44 [0.5047]	0.42 [0.5151]	–	3.53* [0.0600]	-0.42 (-0.17)
Trade Openness	6.32** [0.0119]	9.63*** [0.0019]	3.01* [0.0828]	2.28 [0.1304]	1.16 [0.2825]	2.28 [0.1304]	–	-2.58** (-4.71)

Note: *, ** and *** denotes significance at 10%, 5% and 1% significance level, respectively. The figures in the squared brackets [...] indicate the p-values while the figures in the parenthesis (...) indicate the t-statistic.

The results indicated that among the financial development indicators, there was a unidirectional causality from bank credit to private sector, interest rate spread and non-performing loans to per capita consumption indicating that all the financial development indicators lead per capita consumption. Further, there was a bi-directional causality between trade openness and per capita consumption. Thus, for the financial development indicators, it was supported that it is financial development that granger causes per capita consumption as a measure of poverty.

f) Post Estimation Test Results

The normality of residuals and heteroscedasticity tests were conducted. The results indicated that the model had no heteroscedasticity problems since the null hypothesis of no heteroscedasticity was not rejected. Further, the residuals were not normally distributed at

5 percent significance level since the null hypothesis of normality was rejected as the probability value was 0.007. However, this was not a problem since the data set was sufficient to produce unbiased estimates of the model (Refer to Table A:21 in appendix).

4.5 Conclusion and Policy Implications

The main objective of this chapter was to determine the effect of financial development on poverty and establish the channels through which this effect takes place. The study used several indicators of financial development including bank credit to private sector, interest rate spread and non-performing loans. The study also used headcount ratio as well as per capita consumption to determine this relationship. The study used the VECM to analyse this relationship and several diagnostic tests were also carried out.

The findings showed that financial development was a contributor to poverty reduction. The direct channel was supported by the financial development indicators whose coefficients were significant. Credit to private sector was negatively related to poverty both in the long run and in the short run. It also reduces poverty. Interest rate spread was positively and significantly related to poverty implying that an increase in the interest rate spread increases poverty. Non-performing loans were also bad for poverty in the short run. High transaction costs and low quality of assets (an indication of inefficiency) increases poverty. This was a new finding in the relationship between financial development and poverty in Kenya. In addition, financial innovation was found to be negatively related with poverty implying that introduction of new financial products among other innovations helps in reducing poverty. This was a new finding indicating the importance of M-Pesa financial innovation for poverty reduction.

The results also indicated that the indirect channel or the trickle down hypothesis of the effect of financial development on poverty was present both in the long run and in the short run. Growth leads to poverty reduction. On the causality relationships, economic growth was found to granger cause poverty while credit to private sector and interest rate

spread as indicators of financial development were found to granger cause poverty. Therefore, a one way causality was supported from financial development to poverty and from economic growth to poverty.

The results using per capita consumption also supported the direct channel of the effect of financial development on poverty. Interest rate spread and non-performing loans were found to have a negative effect on per capita consumption in the long run. This was a significant finding as it touches on the efficiency and quality of financial development. Trade openness was also found to reduce poverty. On the granger causality results, only a one way causality from financial development to per capita consumption was found thus supporting the studies that indicate a one way causality from financial development to poverty reduction. However, it was noted that there are enormous drawbacks of using per capita consumption and the study relied on the results of the head count ratio model.

Findings indicated that financial development was important for poverty reduction. Policies should be put in place to encourage the growth of the financial sector by the government. This could be through encouraging use of technological innovations, providing short term borrowing and others. Interest rate spread was negatively related with poverty and had a significant coefficient. The Central Bank ought to consider reduction of the interest rate spread by coming up with interest rate policies that would raise the savings rate since a wide interest rate spread is bad for poverty. These include tax exemption on certain types of savings account and promoting the use of financial technological innovations for saving. They may also consider setting an interest rate spread threshold which financial institutions should not go beyond.

Non-performing loans were found to negatively impact poverty and the coefficient was significant. Efficiency of the financial sector needs to be enhanced by ensuring proper screening of customer loans, monitoring of credit as well as putting appropriate measures for collateral by the financial institutions. The Central Bank should also ensure that proper

supervision of the financial institutions is maintained to deal with non-performing loans. Non performing loans are not good for poverty since they form a vicious cycle of non-performing loans and poverty.

The size of financial development as given by credit to private sector was important for poverty since its coefficient was significant and negative. Therefore, policies to increase the credit to private sector should be put in place by the government through the Central Bank to ensure the government does not hinder this credit by borrowing too much and thus crowding out the private sector. Further, financial institutions should ensure enabling procedures for the private sector to access credit. The Central Bank should also ensure that borrowing rates are not so exorbitantly high that they block borrowers.

The coefficient of GDP Per Capita was significant and negative. It measured economic growth and hence it was important for poverty reduction. Policies that promote growth through innovations need to be put in place by the government. Policies that raise growth such as an enabling macro economic environment need to be put in place too. Moreover, policies to maintain low inflation by the Central Bank should also be formulated. Furthermore, other factors that negatively affect growth like income inequality need to be addressed and policy makers need to target a growth pattern that is more inclusive. Policies like tax reforms and welfare transfers. In addition, it is important to invest in education and development of skills to increase the employability of the population.

The significance of trade openness was shown with a significant and negative coefficient. Policies should be set by the government to improve bilateral and multilateral trade. Export promotion strategies ought to be introduced. Policies on value addition especially for agricultural production ought to be enacted. Kenya should sign trade agreements which promote affordable but beneficial trade.

Financial innovation was found to have a significant and negative coefficient. Hence, it was important for reducing poverty. The government should not only support financial innovation but also create a favourable environment for their growth. There should be efforts by the government to give tax exemptions for financial innovations. Finally, the Central Bank and the CCK ought to maintain a regulatory system whose flexibility allows growth of financial innovations. This is important since the formal financial sector may not fully meet the needs of the poor yet these innovations fill this gap.

4.6 Contribution of the Study

The study was important as it contributes to the finance – poverty nexus and fills the gap that has not been addressed in Kenya. Since data on poverty is scarce, scholars have shied away from country specific studies on financial development and poverty. This study was useful in filling this gap. One of the main contributions was to determine whether the direct or the indirect channels of financial development on poverty exist in Kenya. It used appropriate indicators of financial development. Both the channels were supported from the findings indicating the importance of financial development. It also contributed to showing whether the quality of financial development affects poverty. Financial innovation is on the move in Kenya. This study demonstrated how these innovations affect poverty. Further, the consideration of structural breaks was important to show whether they significantly change the results.

4.7 Limitations of the Study

The main limitation of the study was data scarcity. For example, data for financial innovation was not available for the whole period of the study, 2000 to 2014. Poverty data is wanting in all African countries and Kenya is not an exception. However, this data limitation was addressed by using a dummy and also predicting quarterly poverty rates using the decomposition method as explained in variable measurement. However, it is believed that this data is reliable and policy recommendations can be made from the results of the data.

4.8 Areas for Further Research

There is need to conduct thresholds effects especially for financial development indicators so as to know the level at which financial development indicators affect poverty. This would also be important for the control variables. Further research using other measures of poverty which show the depth and severity of poverty for robustness are important. This is because very little literature on this area exists and thus the relationship may not be fully understood. Data may not be available at the moment but with the completion of the next KIHBS in 2017, recent data would be available. Literature on financial sector inefficiency and how it affects poverty is missing in Kenya hence there's need for further research to shed light on this relationship.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND POLICY IMPLICATIONS

5.1 Introduction

This chapter concluded the thesis by a way of summarizing the study, giving conclusions and policy implications. It also discussed the limitations of the study and areas of further research. The contribution of the study to knowledge was also indicated.

5.2 Summary of the Thesis

The study addressed the debate on the relationship between financial development and economic growth. It also addressed the relationship between financial development and poverty which has been largely ignored. It started by determining the drivers of financial development. The study incorporated financial innovations which have taken off. The main objectives of the study were; to analyse the determinants of financial development; to determine the effect of financial development on economic growth; and to determine the effect of financial development on poverty.

The first chapter introduced financial developments and innovations in Kenya. This chapter laid an important basis for the three essays in the thesis. The first essay (chapter two) sought to determine the drivers of financial development in Kenya using the ARDL model and quarterly data for the period 2000 to 2014.

Three hypotheses (economic institutions, endowment and openness hypothesis) were tested and the results revealed two distinct findings. The credit to private sector model supported the openness hypothesis that openness is important for financial development. Conversely, the non-performing loans model supported the economic institutions and endowment hypotheses which show that institutional quality is important for financial development. These findings were as expected since trade would be important for the

quantitative side of financial development while institutional quality would be more important for the qualitative and efficiency of financial development.

The level of financial development was also found to be driven by a number of other factors. These factors included GDP per capita, democratic accountability, mobile technology and inflation. Higher GDP per capita, less inflation, better democratic accountability and more uptake of mobile technology were found to promote financial development by increasing credit to private sector and reducing non-performing loans. The results of the market capitalization model were weak since the results indicated that there was no long-run relationship between market capitalization and its determinants.

The second essay's (chapter three) main objective was to determine the relationship between financial development and economic growth while using efficiency measures as well as controlling for financial innovation. The essay utilized cointegration analysis, granger causality, Vector Error Correction Model as well as the variance decomposition in determining this relationship. Quarterly data for the period 2000 to 2014 was used for all the variables obtained from CBK, NSE, KNBS and WDI.

The findings indicated that financial development was important for economic growth. Interest rate spread, non-performing loans and credit to private sector were negatively related with economic growth while market capitalization influences economic growth positively. On causality, the supply leading hypothesis was found to be predominant. Credit to private sector and economic growth had a bi-directional relationship. The choice of financial development indicator is therefore important for determining the causality between financial development and economic growth. The new finding indicated the importance of the quality and efficiency of the financial sector growth for economic growth. Further, financial innovation was significant and influences economic growth positively. This is a new contribution for policy makers and researchers in establishing the relationship between financial development and economic growth.

The third essay (chapter four) sought to determine the effect of financial development on poverty in Kenya. It introduced the use of efficiency measures of financial development as well as controlled for financial innovation. The study used cointegration analysis, granger causality and Vector Error Correction Model to determine this relationship. Quarterly data for the period 2000 to 2014 was used for all the variables obtained from CBK, KNBS and WDI. Head count ratio was predicted using the (poverty changes) decomposition method.

The VECM results indicated that the indirect channel or the trickle down hypothesis of the effect of financial development on poverty through economic growth was present while using head count ratio. The direct channel was also supported by the financial development indicators. Credit to private sector was negatively related to poverty both in the long and short run while interest rate spread and non-performing loans were positively related with head count ratio implying they increase poverty. Financial innovation, in specific M-Pesa was found to be important for poverty reduction.

On the causality relationships, economic growth was found to granger cause poverty reduction while credit to private sector and interest rate spread were found to granger cause poverty. Thus, a one way causality was supported from financial development to poverty and from economic growth to poverty. Trade openness was also found to have a positive impact on poverty in the long run. Further analysis using per capita consumption supported the direct effect of financial development on poverty reduction.

5.3 Conclusions

The objectives of the study were to determine the drivers of financial development, as well as determine the effect of financial development on economic growth and poverty. This was done using the ARDL model, the VECM, cointegration analysis and granger causality. The study had three main conclusions. One, financial development is dependent on economic growth, institutional quality, trade openness, democratic accountability, inflation and mobile technology depending on the indicator of financial development used. It helped create an understanding of why Kenya is at its current level of financial development. Two,

financial development influences economic growth positively and the supply leading hypothesis is predominant in Kenya. Three, financial development reduces poverty both through the direct channel and the indirect channel through economic growth. It was clear that the quality and efficiency of the financial sector are important for both economic growth and poverty reduction. Furthermore, financial innovation is important for improving economic growth and for poverty reduction.

It is therefore inherent that both the financial and the real sectors are important in Kenya. Moreover, the quality and efficiency aspects of financial development are important for growth and poverty reduction. The study thus met the three objectives which were set out at the beginning and also made a contribution to literature and policy in Kenya.

5.4 Policy Implications

Institutional quality was found to be a significant determinant of financial development since the coefficient was significant. Policies that improve the institutional environment in the financial sector should be pursued by the government, the Central Bank and financial institutions. The government should ensure proper functioning of legal and regulatory institutions to guarantee protection of property rights and enforcement of credit contracts. There is also need to enforce anti corruption policies so as to enhance transparency and accountability in business transactions. More credit reference bureaus should be established to reduce default on credit.

Trade was a driver of financial development and it was found to be significantly and positively related to financial development. Policies should be directed at the long term benefits of trade since the effect was in the long term. The government should formulate more export promotion strategies. This would require policies to increase value addition especially for primary agricultural products. There should also be efforts to reduce imports of financially dependent goods and services.

Both GDP per capita and inflation were found to have significant coefficients and were important determinants of financial development. GDP per capita was positively related while inflation was negatively related with financial development. Based against this background, policies to ensure a good macro-economic environment are important. Growth of the real economy is important as it increases the GDP per capita of individuals. Strengthening legal and other institutions, maintaining a good macro environment and improving human capital development are some of the policies which can ensure continued growth in GDP per capita. Policies to maintain inflation at threshold levels such as inflation targeting should be pursued by the Central Bank.

The political economy is important for financial development as it promotes well functioning economic institutions. This was derived from the findings where the democratic accountability coefficient was significant and positive. The government should come up with laws and policies which enhance democratic space and create a conducive political environment. So far, the new Kenyan Constitution of 2010 has been important in enhancing democracy and decentralizing power through devolution. Other policies include a system of political checks and balances, an increase in citizens' voice, increased accountability, increased individual rights and reduced influence by interest groups.

Mobile technology also promotes financial development as shown through the significant and positive coefficient. The government should create a conducive environment for mobile phone innovations. Policies aimed at increasing the use of mobile technology in the financial sector should be encouraged. So far, Kenya is leading in the use of mobile money through M-Pesa and such innovations should be encouraged to tap fully into the benefits of technology. Such policies include licensing and tax exemptions for new innovations in mobile technology use. The CBK has so far ensured an enabling environment for banks to work with Safaricom Ltd and other MNOs in advancing the use of mobile banking.

Based on the conclusions that the Mckinnon hypothesis prevails, it is important for the policy makers to support the growth of the financial sector. Non-performing loans had a significant coefficient and negatively affected economic growth and poverty. Efficiency and quality in the financial sector especially in the banking sector needs to be enhanced. Increase in non-performing loans was found to be detrimental to the poor and to economic growth. The banking sector needs to address the inefficiency leaks such as the non-performing loans by increasing screening of borrowers at the onset. Proper monitoring of loan repayments as well as obtaining proper collateral for the loans need to be adhered to. Competition in the banking industry may have led to laxity in the lending processes. For example, laxity in the Know Your Customer requirements. The Central Bank ought to ensure that lending and other banking procedures are followed. It should also ensure that credit reference bureaus are operational and sufficient to handle defaulters.

Interest rate spread was found to be significant and having a negative effect on economic growth and poverty. Financial sector reforms should be undertaken including interest rate reforms by the Central bank of Kenya to reduce the interest rate spread which impacts negatively on the poor possibly by setting interest rate ceilings on lending rates or setting certain thresholds for interest rate spread. In addition, policies that would raise the savings rate need to be encouraged like setting higher Treasury Bill rates by the Central Bank. Once the gap or spread between deposit and lending rates is reduced, then there can be more efficient allocation of resources to the most productive sectors.

The coefficient of credit to private sector was significant and negative, implying that credit to private sector was detrimental to economic growth. This may be due to wastage and inefficiencies. Thus, financial institutions, the Central Bank and the government ought to ensure proper monitoring, evaluation and supervision of these funds as well as proper supervision of the financial sector by the Central Bank. This would curtail credit wastage especially during years when the country undergoes a general election. In regards to the poverty model, the coefficient was negative and significant. For this reason, policies to

increase the credit to private sector should be put in place by the CBK to ensure that the government does not crowd out the private sector. This may pinch-hit the benefits gained by the private sector where resource allocation is more competitive. In addition, financial institutions should ensure an enabling environment for the private sector to access credit. The Central Bank should also ensure that borrowing rates are not too high. Thus, policies to maintain favorable interest rates should be considered.

Stock market development was found to be important for economic growth since the coefficient of market capitalization was significant and positive. Hence, it is important that a conducive environment prevails in the stock market. This would enable increased company listing and their ability to access long term finance. Low corporate tax and foreign participation policies should be put in place by the government. These would ensure that more corporate organizations use this form of funding and list at the stock exchange.

Moreover, financial innovations were found to positively impact on poverty reduction and economic growth. The coefficient was significant and positive on economic growth and negative on poverty. The growth of M-Pesa and other forms of innovations in Kenya should be supported by all stakeholders since they lead to increased access to financial services especially by the poor. A stable regulatory (institutional and legal) framework between the CBK and the CCK need to always exist to regulate M-Pesa and other innovations. This would ensure fraud issues are taken care of and users continue to appreciate the product. Further, a conducive environment needs to exist for both financial institutions and non-financial institutions to tap onto benefits of M-Pesa and other financial innovations. The Central Bank should also have flexible but vigilant regulations so as to allow other financial innovations which are beneficial to the economy. The government may support financial innovations through tax exemption policies, capital availability and structural reviews.

In addition, the findings indicated that economic growth was important for poverty reduction since the coefficient was significant and negative. Hence, the government should come up with policies which promote growth through innovations (like M-Pesa). Further, other policies which promote economic growth need to be put in place, for example policies like inflation targeting to maintain a good macro economic environment. Furthermore, the government should invest in education and human resource development. This makes citizens more professionally productive and useful to economic growth.

Trade openness was important for both economic growth and poverty with a positive and negative significant coefficient on economic growth and poverty respectively. The government should ensure trade policies focusing on trade agreements, both bilateral and multilateral to increase trade in Kenya. However, the benefits from trade to poverty are not spontaneous; but rather work together with other policies including good financial sector reforms like liberalization and prudential supervision, investments in human resource capacity as well as improved governance. Thus, government policy makers in trying to improve the trade conditions in Kenya should also formulate policies that grow the financial sector to ensure the positive effects of trade openness are sustained.

5.4 Contribution of the Study to Knowledge

The study contributes new knowledge to the finance-growth nexus. It deviates from existing studies in Kenya by incorporating the quality of the financial sector which has been left out in the Kenyan literature. Use of variables like non-performing loans and interest rate spread is vital as they take into account the quality of financial development; not just the quantity. It also contributes further to the debate on finance and growth in Kenya by incorporating the financial innovation aspect of financial development to show how financial innovation affects economic growth as well as poverty. Financial innovation increases economic growth while reducing poverty. From literature, there are conflicting findings on the nature of causality and this study is instrumental in contributing to this lack of clarity. The study findings conclude that this lack of clarity can only be settled when we

incorporate multi-dimensional aspects of financial development including quality and efficiency and not just the quantitative aspects of financial development. Incorporating these aspects, then the supply leading hypothesis is pre-dominant.

The study also contributes new knowledge on why the level of financial development is at its current level by determining what drives financial development. Institutional quality is important for the quality of financial development while more openness is key for quantitative financial development. These are key for policy and literature. The relationship between financial development and poverty has been ignored in Kenya and this study comes in to shed light on this relationship. It shows that both the indirect and direct channels of the effect of financial development on poverty reduction are evident. Furthermore, ignoring the presence of structural breaks could lead to wrong inferences and wrong results. It may even be the reason for the mixed results on the relationship between financial development and growth. This is a worthy contribution on the impact of structural breaks.

5.5 Limitations of the Study

The main limitation was data scarcity. Some of the data sets were not available on a quarterly basis, hence there was need to convert annual to quarterly data. On financial innovations, in our case, M-Pesa volumes, the data only dates back to the year 2007 when M-Pesa was introduced and hence the reason for the use of a dummy. Time series data on poverty was scarce and hence the study chose to predict quarterly poverty rates using the decomposition method. The study could not capture financial openness also due to scarcity of data. However, the results of the study were reliable as it is believed that the data used certainly provide credible information for giving policy recommendations on the relationship between financial development, growth and poverty.

5.6 Areas for further research

There is need to consider threshold effects of financial development so as to determine at which levels (based on financial development indicators), financial development is important for economic growth and poverty. This is also important for classifying countries that are more financially developed from those that are less financially developed. Research on how innovations affect not just economic growth and poverty but other macroeconomic variables like unemployment is important. This is possible with availability of actual data. In addition, more research on financial sector efficiency and how it affects poverty is important in Kenya since this literature is lacking. Finally, it would be important to check for robustness to different measures of poverty including poverty gap, poverty gap squared and severity dimensions of poverty and how they are affected by financial sector developments and innovations. Other robustness checks would include robustness to different estimation methods to validate the findings.

REFERENCES

- Abraham, T. W. (2015), "Financial Innovation and Poverty Reduction: Evidence from Rural Northern Nigeria", MFW4A Working Paper No. 1, July 2015. Available at: <http://www.mfw4a.org/>; accessed: 6.2.2016
- Abzari, M., Zarei, F. and Esfahani, S. S. (2011), "Analyzing the Link between Financial Development and Foreign Direct Investment among D-8 Group of Countries". *International Journal of Economics and Finance* 3(6): 148-156
- Acemoglu, D., Johnson, S. and Robinson, J. A. (2001), "The Colonial Origins of Comparative Development: An Empirical Investigation". *American Economic Review* 91: 1369 – 1401
- Acemoglu, D., Johnson, S. and Robinson, J. A. (2004), "Institutions as the Fundamental Cause of Long-Run Growth", NBER Working Paper 10481
- Adams, R. and Page, J. (2005), "International Migration, Remittances and Poverty in Developing Countries," World Bank Policy Research Working Paper 3179
- Adamopoulos, A. (2010), "Financial Development and Economic Growth: A comparative study between 15 European Union member-states", *International Research Journal of Finance and Economics*, 35: 144-149.
- Adnan, N. (2011), "Measurement of Financial Development: A Fresh Approach", 8th International Conference on Islamic Economics and Finance, UK
- Aduda J., Masila, J. and Onsongo, E. (2012), "The Determinants of Stock Market Development: The Case for the Nairobi Stock", *International Journal of Humanities and Social Science* 2: 214-230
- Agbetsiafa, D. K. (2003), "The Finance Growth Nexus: Evidence from sub-Saharan Africa", *International Advances in Economic Research* 9(2): 271-288

- Aggarwal, R., Demirguc-Kunt A. and Peria, M. S. M. (2006), “Do Workers' Remittances Promote Financial Development?” World Bank Policy Working Paper No. 3957
- Aggarwal, R., Demirguc-Kunt A. and Peria, M. S. M. (2011), “Do Remittances Promote Financial Development?” *Journal of Development Economics* 96(2): 255-264
- Aghion, P. and Bolton, P. (1997), “A theory of trickle-down theory and development”, *The Review of Economic Studies* 64(2): 151-172
- Aizenman, J. (2004), “Financial Opening and Development: Evidence and Policy Controversies”, *American Economic Review* 94(2): 65-70
- Aizenman, J. and Noy, I. (2006), “Endogenous Financial and Trade Openness: Efficiency and Political Economy Considerations”, NBER Working Paper 2004/04
- Aker, J. C. (2010). “Information from Markets Near and Far: The Impact of Mobile Phones on Agricultural Markets in Niger”, *American Economic Journal: Applied Economics* 2: 46–59
- Akinboade, O.A. (1998), “Financial Development and Economic Growth in Botswana: A Test for Causality”, *Savings and Development* 22(3): 331-348.
- Akinlo, A. E. and Egbetunde, T. (2010), “Financial Development and Economic growth: The Experience of 10 Sub-Saharan African countries Revisited”, *The Review of Finance and Banking*, 2 (1): 17-28.
- Akosah, N. K. (2013), “Dynamics of Inflation and Financial Development: Empirical Evidence from Ghana”. *Journal of Economics and Sustainable Development* 4: 20-37
- Ali, A. and Thorbecke, E. (2000), “The State and Path of Poverty in Sub-Saharan Africa”, *Journal of African Economies* 9(1): 1–40.
- Allaro, H. B., Kassa, B. and Hundie, B. (2011), “A Time Series Analysis of Structural Break Time in the Macroeconomic Variables in Ethiopia”, *African Journal of Agricultural Research* 6(2): 392-400

- Al-Nasser, O. and Jackson, D. (2012), "The Impact of Financial Sector Performance in Latin American Countries". University of Texas-Pan American, Edinburg
- Alter, A. and Yontcheva, B. (2015), "Financial Inclusion and Development in the CEMAC". IMF Working Paper No. WP/15/235
- Amanja, D. and Morrissey, O. (2005), "Fiscal Policy and Economic Growth in Kenya". Credit Research Paper No. 05/06. June, 2005. Available at: <http://www.nottingham.ac.uk/credit/documents/papers/05-06.pdf>. accessed: 16.10.2013
- Ang, J.B. and McKibbin, W. J. (2007), "Financial Liberalization, Financial Sector Development and Growth: Evidence from Malaysia," *Journal of Development Economics*, 84(1): 215-233
- Antzoulatos, A., Kyriazis, D. and Tsoumas, C. (2008), "Financial Development and Asymmetric Information". MPRA Paper No. 23013
- Arcand, J., Berkes, E. and Panizza, U. (2012), "Too Much Finance?" International Monetary Fund, Working Paper 12:161
- Arestis, P. and Demetriades, P. (1997), "Financial Development and Economic Growth: Assessing the Evidence". *The Economic Journal* 107: 783-799.
- Arestis, P., Demetriades, P. and Luintel, K. B. (2001), "Financial Development and Economic Growth: The Role of Stock Markets" *Journal of Money, Credit and Banking* 33(1): 16-41.
- Athukorala, P. and Sen, K. (2005). "Saving, Investment and Growth in India", *Economic Development and Cultural Change* 52(4):896-900
- Avais, M. (2014), "Financial Innovation and Poverty Reduction", *International Journal of Scientific and Research Publications* 4(1): 2250-3153
- Ayadi, R., Arbak, E., Naceur, S. B. and De Groen, W. P. (2013), "Determinants of Financial Development Across the Mediterranean" MEDPRO Working Paper No. 29

- Aye, G. C. (2013), "Causality between Financial Deepening, Economic Growth and Poverty in Nigeria", *The business and Management Review* 3(3): 1-11
- Bakhtiari, S. (2006), "Microfinance and Poverty Reduction: Some International Evidence", *International Business & Economics Research Journal* 5(12): 65-71
- Baliamoune-Lutz, M. (2008). "Financial Development and Income in North Africa". *International Advances in Economic Research*, 14(4): 422-432.
- Baltagi, B. H., Demetriades, P. and Law, S. H. (2009), "Financial Development and Openness: Evidence from Panel Data" *Journal of Development Economics* 89: 285-296
- Baltagi, B. H., Demetriades, P. and Law, S. H. (2007), "Financial Development, Openness and Institutions: Evidence from Panel Data". Conference on New Perspectives on Financial Globalization. Washington D.C
- Bayoumi, T. (1990), "Financial Innovation and Consumption in the United Kingdom, IMF Working Paper No. WP/90/95.
- Beccalli, E. (2007), "Does IT Investment Improve Bank Performance? Evidence from Europe". *Journal of Banking and Finance* 31(7): 2205–2230.
- Becerra, O., Cavallo, E. and Scartascini, C. (2012), "The Politics of Financial Development: The Role of Interest Groups and Government Capabilities". *Journal of Banking and Finance* 36: 626–643
- Beck, T. (2002), "Financial development and international trade: is there a link?" *Journal of International Economics*, 57: 107-131
- Beck, T., Levine, R. and Loayza, N. (2000), "Finance and the sources of growth", *Journal of Financial Economics* 58(1-2): 261-300
- Beck, T., Demirgüç-Kunt, A. and Levine, R. (2001) "The Financial Structure Database," in A. Demirguc-Kunt and R. Levine (eds.) *Financial Structure and Economic Growth: A Cross-Country Comparison of Banks, Markets, and Development*, Cambridge, MA, The MIT Press.
- Beck, T., Fuchs, M., Singer, D. and Witte, M. (2014), "Making cross-border banking work for Africa". Technical report, The World Bank/KfW

- Beji, S. (2007), “Financial Openness and Financial Development in the South Mediterranean Sea Countries: Institutional Approach and Calculation of Development Thresholds”. *European Research Studies* 11: 107-127.
- Bencivenga, V. R. and Smith, B. D. (1992), “Deficits, inflation and the banking system in developing countries: The optimal degree of financial repression”. *Oxford Economic* 44: 767-790
- Bencivenga, V. R. and Smith, B. D. (1991), “Financial Intermediation and Endogenous Growth”, *The Review of Economic studies*, 58: 195-209.
- Ben-David, D. and Papell, D.H. (1995), “The Great Wars, the Great Crash and the Unit Root Hypothesis”, *Journal of Monetary Economics* 36: 453-475.
- Berger, A. N. (2003), “The Economic Effects of Technological Progress: Evidence from the Banking Industry”. *Journal of Money, Credit and Banking* 35(2): 141–176
- Bittencourt, M. (2008), “Inflation and Financial Development: Evidence from Brazil”, UNU-WIDER, Research Paper No. 2008/14
- Blach, J. (2011), “Financial Innovations and their Role in the Modern Financial System – Identification and Systematization of the Problem”, *Financial Internet Quarterly, e-Finanse* 7(3): 13-26
- Bleaney, M. F. (1996), “Macroeconomic Stability, Investment and Growth in Developing Countries”. *Journal of Development Economics* 48: 461–477
- Boudriga, A., Taktak, N. B. and Jellouli, S. (2010), “Problem Loans in the MENA Countries: Bank Specific Determinants and the Role of the Business and the Institutional Environment”. Economic Research Forum, Working Paper No. 547
- Boudriga, A., Taktak, N. B. and Jellouli, S. (2009), “Banking Supervision and Non-performing Loans: A Cross Country Analysis”. *Journal of Financial Economic Policy* 1(1): 286-318
- Boyd, J. H., Smith, B. D. and Levine, R. (2001), “The Impact of Inflation on Financial Sector Performance”. *Journal of Monetary Economics* 47: 221-248.

- Boyd, J. H., Smith, B. D. and Levine, R. (1996), "Inflation and Financial Market Performance". Pennsylvania State University
- Brown, R. P., Carmignani F. and Fayad G. (2011), "Migrants' Remittances and Financial Development: Macro- and Micro-level Evidence of a Perverse Relationship". Department of Economics, OxCarre Research Paper 59
- Buku, M. and Meredith, M. (2013), "Safaricom and M-Pesa in Kenya: Financial Inclusion and Financial Integrity" *Washington Journal of Law, Technology & Arts*, 8(3): 376-400
- Calderon, C. and Lin, L. (2003), "The Direction of Causality between Financial Development and Economic Growth", *Journal of Development Economics* 72: 321-334.
- Camillo, A. (2015), "Handbook of Research on Global Hospitality and Tourism Management" Woodbury University, USA
- Capital Markets Authority (2013), Annual Report, 2013. Nairobi, Capital Markets Authority.
- Caporale, G. M., Rault, C., Sova, R. and Sova, A. (2009), "Financial Development and Economic Growth: Evidence from Ten New EU Members", Discussion paper 940, German Institute of Economic Research, Berlin.
- Central Bank of Kenya (2015), "Annual Report: July 2014- June 2015". Nairobi: Central Bank of Kenya
- Central Bank of Kenya (2014a), Bank Supervision Annual Report, Annual Report: July 2013- June 2014". Nairobi: Government Printers
- Central Bank of Kenya (2014b), "Annual Report: July 2013- June 2014". Nairobi: Central Bank of Kenya
- Central Bank of Kenya (2013a), Annual Report, 2013. Nairobi, Central Bank of Kenya.
- Central Bank of Kenya (2013b), Statistical Bulletin, March 2013, Nairobi, Central Bank of Kenya.
- Central Bank of Kenya (2012), "Annual Report: July 2011- June 2012". Nairobi: Central Bank of Kenya

- Central Bank of Kenya (2010), Annual Report: July 2009- June 2010". Nairobi: Government Printers
- Central Bank of Kenya (2009), Annual Report: July 2008- June 2009". Nairobi: Government Printers
- Chen, P. and Gupta, R. (2006), "An Investigation of Openness and Economic Growth using Panel Estimation", University of Pretoria, Working Paper No. 2006-22.
- Chhibber, A. and Nayyar, G. (2007), "Pro-Poor Growth: Explaining the Cross-Country Variation in the Growth Elasticity of Poverty", BWPI Working Paper 14, The World Bank.
- Chinn, M. D. and Ito, H. (2006), "What matters for Financial Development? Capital Controls, Institutions and Interactions? Escholarship, University of California
- Cho, Y. (1986), "Inefficiencies from Financial Liberalization in the Absence of Well-Functioning Equity Markets", *Journal of Money, Credit & Banking*, 18: 191-199.
- Chowdhury, M. B. (2011), "Remittances Flow and Financial Development in Bangladesh", *Economic Modelling* 28: 2600-2608
- Christiaensen, L., Demery, L. and Paternostra, S. (2003), "Macro and Micro Perspectives of Growth and Poverty in Africa", *The World Bank Economic Review*, 17(3): 17-347
- Chuah, H. L. and Thai, V. (2004), "Financial Development and Economic Growth: Evidence from Causality Tests for the GCC Countries", IMF Working Paper, WP/04/XX.
- Chukwu, J. O. and Agu, C. C. (2009), "Multivariate Causality between Financial Depth and Economic Growth in Nigeria". *African Review of Money Finance and Banking* 7-21
- Clemente, J., Montanes, A. and Reyes, M. (1998). "Testing for a unit root in variables with a double change in the mean", *Economics Letters* 59: 175-182.

- Commercial Bank of Africa (2014), “Annual Report: January – December 2014”. Nairobi:
Commercial Bank of Africa
- Communications Authority of Kenya (2014), “Sector Statistics Report”. Nairobi:
Communications Authority of Kenya
- Communications Authority of Kenya (2012), “Sector Statistics Report”. Nairobi:
Communications Authority of Kenya
- Crichton, N. and De Silva, C. (1989), “Financial Development and Economic Growth: Trinidad and Tobago, 1973-1987”, *Social and Economic Studies* 38 (4): 133-162.
- Curak, M., Pepur, S. and Poposki, K. (2013), “Determinants of Non-performing Loans: Evidence from South-eastern European Banking Systems”. *Banks and Bank Systems* 8(1): 45-53
- Dabla – Norris, E., Ji, Y., Townsend, R. M. and Unsal, D. F. (2014), “Financial Deepening, Growth, and Inequality: A Structural Framework for Developing Countries”, International Monetary Fund
- D’alfonso, E. and Moretti, L. (2012), “The finance-growth nexus in CEE: New evidence from a survey-based indicator of external finance dependence”, *Economics Bulletin* 32(3): 2688-2699
- Dandume, M. Y. (2014), “Financial Sector Development, Economic Growth and Poverty Reduction: New Evidence from Nigeria”, *Journal of the Faculty of Economics Fakültesi Dergisi and Administrative Sciences* 4(2): 1-20
- Dauda, R. O and Makinde, K. O. (2014), “Financial Sector Development and Poverty Reduction in Nigeria: A Vector Autoregression Analysis (1980-2010)”, *Asian Economic and Financial Review* 4(8): 1040-1061
- Dekle, P. and Pundit, M. (2015), “The Recent Convergence of Financial Development in Asia” ADB Economics Working Paper Series No. 440
- Dembiermont, C., Drehmann, M. and Muksakunratana, S. (2013), “How much does the private sector really borrow? A new database for total credit to the

- private nonfinancial sector”, *BIS Quarterly Review* 65-81. Available at: http://www.bis.org/publ/qtrpdf/r_qt1303h.pdf.
- Demetriades, P. O. and Andrianova, S. (2005), “Sources and Effectiveness of Financial Development: What We Know and What We Need to Know.” UNU – WIDER World Institute for Development Economic Research Working Papers RP2005/76
- Demetriades, P. O. and Law, S. H. (2006), “Openness, Institutions and Financial Development.” WEF Working Papers 0012
- Demetriades, P. and Hussein, K. (1996), “Does Financial Development Cause Economic Growth? Time Series Evidence from 16 Countries”, *Journal of Development Economics* 51: 387-411.
- Demirgüç-Kunt, A., López Córdova, E., Martínez Pería, M. S. and Woodruff, C. (2011), “Remittances and Banking Sector Breadth and Depth: Evidence from Mexico”. *Journal of Development Economics* 95(2): 229-241.
- Devarajan, S. (2013), “Africa's Statistical Tragedy”, *Review of Income and Wealth*, 59: S9–S15
- DFID (2004), “The Importance of Financial Sector Development for Growth and Poverty Reduction”, Policy Division Working Paper. Available at: <http://purl.umh.edu/12886>; accessed: 18.9.2015
- Dhrifi, A. (2013), “Financial Development and Poverty: What Role for Growth and inequality?”, *International journal of Academic Research in Accounting, Finance and Management Science* 3(4), 119-129
- Dickey, D.A. and Fuller, W. A. (1979), ”Distribution of the Estimators for Autoregressive Time Series with a Unit Root”, *Journal of the American Statistical Association*, 74: 427—431.
- Djankov, S., McLiesh, C. and Shleifer, A. (2007), “Private credit in 129 countries”, *Journal of Financial Economics*, 84(2): 299-329
- Do, Q. and Levchenko, A. A. (2004), “Trade and financial development”, The World Bank Working Paper, No. 3347

- Dollar, D. and Kraay, A. (2002), "Growth is good for the poor", *Journal of Economic Growth*, 7:195-225
- Duasa, J. (2006), "Determinants of Malaysian Trade Balance: An ARDL Bound Testing Approach". 6th Global Conference on Business and Economics, USA
- Dudian, M. and Popa, R. A. (2013), "Financial Development and Economic Growth in Central and Eastern Europe", *Theoretical and Applied Economics*, 8(585): 59-68.
- Dushku, E. (2010), "Financial Development and Economic Growth: The Albanian Case" Discussion Paper, Bank of Albania
- Easterly, W. and Levine, R. (1997), "Africa's Growth Tragedy: Policies and Ethnic Divisions". *Quarterly Journal of Economics* 112:1203–1250.
- Easterly, W. and Levine, R. (1994), "Africa's growth tragedy". Paper presented at the African Economic Research Consortium (AERC) workshop. Nairobi, Kenya, May.
- Easterly, W. and Fischer, S. (2001), "Inflation and the Poor", *Journal of Money, Credit, and Banking* 33(2): 160-178.
- Effiong, E. L. (2015), "Financial Development, Institutions and Economic Growth: Evidence from Sub-Saharan Africa. MPRA Paper No. 66085
- Elbadawa, I. A. and Ndulu, B. (1994), "Long-term Development and Sustainable Growth in Sub-Saharan Africa", Mimeo, African Economic Research consortium (AERC)
- Engle, R.F. and Granger, C. J. (1987), "Cointegration and Error-correction - Representation, Estimation and Testing", *Econometrica* 55 (2): 251-78.
- English, B. W. (1999), "Inflation and Financial Sector Size". *Journal of Monetary Economics* 44: 379-400
- Erosy, I. (2011), "The Impact of Financial Openness on Financial Development, Growth, and Volatility in Turkey: Evidence from the ARDL Bounds Tests". *Ekonomiska Istrazivanja* 24(3): 33-44

- Esso, L. J. (2010), “Re-examining the Finance-Growth Nexus: Structural Break, Threshold Cointegration and Causality Evidence from the Ecowas”. *Journal of Economic Development* 35(3): 57-79
- Fawcett, A. J. (2007), “Principles of Assessment and Outcome Measurement for Occupational Therapists and Physiotherapists: Theory, Skills and Application”. London: John Wiley and Sons Ltd.
- Fernandez, A. and Tamayo, C. E. (2015), “From Institutions to Financial Development and Growth: What are the Links?” *Journal of Economic Surveys*, 29(1): 1-41
- Financial Sector Deepening Kenya (FSD), Central Bank of Kenya and Kenya National Bureau of Statistics, (2016), “The 2016 FinAccess Household Survey infographics sheet”. Nairobi, Kenya: FSD Kenya.
- Financial Sector Deepening Kenya (FSD), Central Bank of Kenya and Kenya National Bureau of Statistics (2013), “FinAccess National Survey: Profiling developments in financial access and usage in Kenya”. Nairobi, FSD Kenya.
- Financial Sector Deepening Kenya (FSD), Central Bank of Kenya and Kenya National Bureau of Statistics (2009), “FinAccess National Survey: Dynamics of Kenya’s Changing Financial Landscape”. Nairobi, FSD Kenya.
- FitzGerald, V. (2006) “Financial Development and Economic Growth: A Critical View”. Department of International Development (QEH), Working Paper No. 153.
- Fording, R. and Berry, W. (2007), “The Historical Impact of Welfare Programs on Poverty: Evidence from the American States”, *The Policy Studies Journal* 35(1): 37-60.
- Fowowe, B. and Abidoye, B. (2010) “A Quantitative Assessment of the Effect of Financial Development on Poverty in African Countries”, Iowa State University and University of Ibadan

- Galor, O. and Tsiddon, D. (1997), “The Distribution of Human Capital and Economic Growth”, *Journal of Economic Growth* 2: 93-12
- Gautam, B. P. (2014), “Financial Development and Economic Growth in Nepal”. NRB Working Paper No. 25, December 2014, Rastra, Nepal
- Gehring, A. (2013), “Financial Liberalization, Financial Development and Productivity Growth – An Overview”, Economics Discussion Papers, No 2013- 46, Kiel Institute for the World Economy
- Ghatak, S. and Siddiki, J. (1999), “Financial Liberalisation and Endogenous Growth: The case of Bangladesh”, Kingston University, School of Economics Working Paper, London, UK
- Ghosh, A. and Steven, P. (1998), “Inflation, Disinflation and Growth,” IMF Working Paper, Washington
- Gichuhi, M. M. (2013), “The role of financial systems in the Kenyan economy Challenges and possible interventions (A theoretical review)”, *Prime Journal of Business Administration and Management* 3(10): 1197-1201
- Giles, J.A. and Williams, C. L. (2000), “Export-led Growth: A Survey of the Empirical Literature and Some Non-causality Results: Part 1” *Journal of International Trade and Economic Development* 9: 261–337.
- Ginebri, S., Petrioli, G. and Sabani, L. (2001), “Financial Deepening, Trade Openness and Growth: A Multivariate Cointegrated Analysis of the Complementary Effects”, CIDEI Working Paper No.62, Rome, Italy.
- Girma, S. and Shortland, A. (2008), “The Political Economy of Financial Development”. *Oxford Economic Papers* 60(4): 567-596
- Githaiga, P. N. and Kabiru, C. G. (2014), “Remittances as a Determinant of Financial Sector Development”. *Journal of Business, Economics and Finance* 3(4): 398-424
- Giuliano, P. and Ruiz-Arranz, M. (2006), “Remittances, Financial Development and Growth”. IZA discussion Paper No. 2160, Institute for the Study of Labour (IZA).

- Graff, M. and Karmann, A. (2003), “What Determines the Finance-growth Nexus? An Endogenous Growth Model and Empirical Evidence”, Dresden Discussion Papers in Economics 15/03.
- Granger, C. W. (1988) “Some Recent Developments in a Concept of Causality”, *Journal of Econometrics*, 39: 199-211.
- Green, C. J. Kirkpatrick, C. H. and Murinde, V., (2006) “Finance for Small Enterprise Growth and Poverty Reduction in Developing Countries”, *Journal of International Development*, 18: 1017-1030.
- Greiner, A., Semmler, W. and Gong, G. (2004), “The Forces of Economic Growth: A Time Series Perspective”, Princeton University Press, Princeton
- Gries, T. and Meierrieksy, D. (2010), “Institutional Quality and Financial Development in Sub-Saharan Africa”. CSAE Conference: Economic Development in Africa. Oxford
- Grossman, G., and Helpman, E., (1990), “Trade, Innovation and Growth”, *The American Economic Review*, 80: 86-91.
- Gujarati D. N. and Porter, D. C. (2009), “Basic Econometrics”. Boston, Mass: McGraw-Hill
- Habibullah, M. S. and End, Y. (2006), “Does Financial Development Cause Economic Growth? A Panel Data Dynamic Analysis for the Asian Developing Countries”, *Journal of the Asia Pacific Economy*, 11(4): 377-393.
- Harris, R. and Sollis, R. (2003), “Applied Time Series Modelling and Forecasting”, John Wiley, New York
- Harrison, P., Sussman, O. and Zeira, J. (1999), “Finance and growth: Theory and new evidence”, *Finance and Economics Discussion Series 35*, The Federal Reserve Board
- Haslog, J. and Koo, J. (1999), “Financial Repression, Financial Development and Economic Growth”. Federal Reserve Bank of Atlanta, Working Paper, 99-02

- Hauswald, R. and Marquez, R. (2003), “Information Technology and Financial Services”. *Competition Review of Financial Studies* 16(3): 921–948
- Heger, N., Hodler, R. and Lobsiger, M. (2007), “What Determines Financial Development? Culture, Institutions or Trade”. NCCR Trade Working Paper No 2007/05
- Herzer, D. and Morrissey, O. (2011), “Long-Run Aid Effectiveness”. Paper 144 presented at the CSAE Conference 2011: Economic Development in Africa, Oxford.
- Holden, P. and Prokopenko, V. (2001), “Financial Development and Poverty Alleviation: Issues and Policy Implications for Developing and Transition Countries”, IMF Working Paper No. WP/01/160
- Hospes, O., Musinga, M. and Ong’ayo, M. (2002), “An Evaluation of Micro Finance Programmes in Kenya as Supported by the Dutch Co-Financing Programme”, Netherlands Co-Financing Programme report, Netherlands.
- Hsiao, C. (1979), “Autoregressive Modelling of Canadian Money and Income Data”, *Journal of the American Statistical Associations*, 74: 553-560.
- Huang, Y. (2010a), “Determinants of Financial Development”, London: Palgrave MacMillan
- Huang, Y. (2010b), “Political Institutions and Financial Development: An Empirical Study”. *World Development* 38(12): 1667–1677.
- Huang, Y. (2005a), “What Determines Financial Development?”. Discussion Paper No. 05/580, Department of Economics, University of Bristol.
- Huang, Y. (2005b), “Will Political Liberalisation Bring About Financial Development?”. In Bristol Economics Discussion Papers 05/57, University of Bristol.
- Huybens, E. and Smith, B. D. (1999), “Inflation, Financial Markets Long-run Real Activity”. *Journal of Monetary Economics* 43: 283-315
- Ilyina, A. and Samaniego, R. (2011), “Technology and Financial Development”. *Journal of Money, Credit and Banking* 43(5): 899–921.

- Imran, K and Khalil, S. (2012), “Contribution of Financial Development in Poverty Reduction through Industrial Growth”, *International journal of Asian Social Science*, 2(5): 567-576.
- Insurance Regulatory Authority (2015), Annual Report, 2015. Nairobi, Insurance Regulatory Authority
- Insurance Regulatory Authority (2014), Annual Report, 2014. Nairobi, Insurance Regulatory Authority
- Jack, W. and Suri, T. (2011), “Mobile Money: The Economics of M-PESA.” National Bureau of Economic Research Working Paper 16721.
- Jalil, A. and Feridun, M., (2011), “Impact of financial development on economic growth: empirical evidence from Pakistan”. *Journal of the Asia Pacific Economy* 16 (1): 71–80.
- Jalil, A., Ma, Y. and Naveed, A. (2008), “The Finance-Fluctuation Nexus: Further Evidence from Pakistan and China”. *International Research Journal of Finance and Economics* 14: 212-231
- Jalilian, H. and Kirkpatrick, C. (2005), “Does Financial Development Contribution to Poverty Reduction?”, *Journal of Development Studies*, 41(4): 636-656.
- Jalilian, H. and Kirkpatrick, C. (2002), “Financial Development and Poverty Reduction in Developing Countries”, *International Journal of Finance and Economics*, 7(2): 97-108.
- Jalilian, H. and Kirkpatrick, C. (2001), “Financial Development and Poverty Reduction in Developing Countries”, Finance and Development Research Programme, Working paper series No. 30
- Japelli, T. and Pagano, M. (1994), “Saving, growth and Liquidity Constraints”, *Quarterly Journal of Economics* 109: 83-109
- Jeanneney, S.G. and Kpodar, K. (2011), “Financial Development, Financial Instability and Poverty”, Working Paper, CSAE WPS/2005-09, University of Auvergne, Clermont-Ferrand.

- Johansen, S. (1988), "Statistical Analysis of Cointegration Vectors", *Journal of Economic Dynamic and Control* 12: 231-54.
- Johansen, S. and Juselius, K. (1990), "Maximum Likelihood Estimation and Inference on Cointegration with Application to the Demand for Money". *Oxford Bulletin of Economics and Statistics*, 52: 169-210.
- Judson, R. and Orphanides, A. (1996), "Inflation, Volatility and Growth" Board of Governors of the Federal Reserve System, Finance and Economics Discussion Series, 96/19
- Jung, W. (1986), "Financial Development and Economic Growth: International Evidence", *Economic Development and Cultural Change* 34(1): 333-346.
- Kaburi, S., Ombasa, B., Omato, D., Mobegi, V. and Memba, F. (2013), "An Overview of the Role of Microfinance in Eradicating Poverty in Kenya: A Lesson to be Learnt from the Emerging Economies", *International Journal of Arts and Commerce* 2(5): 34-39.
- Kamarck, A. M. (1976), "The Tropics and Economic Development". Baltimore, MD: John Hopkins University Press
- Kar, M. and Pentecost, E. J. (2000), "Financial Development and Economic Growth in Turkey: Further Evidence on the Causality Issue", Economic Research Paper No.00/27, Department of Economics, University of Loughborough University.
- Kar, M., Agir, H. and Peker, O. (2015), "Financial Development and Poverty Reduction in Turkey", ResearchGate, available at: <http://www.researchgate.net/publication/267302766>; accessed: 8.9.2015
- Kar, M., Agir, H. and Peker, O. (2011), "Financial Development and Poverty Reduction in Turkey: The First TurgutOzal International Conference on Economics and Politics, Inonu University, Malatya, Turkey.
- Kargbo, M. (2012), "Impact of Foreign Aid on Economic Growth in Sierra Leone: Empirical Analysis" UNU – WIDER, Working Paper No. 2012/07

- Kargbo, M. and Adamu, P.A. (2010), “Financial Development and Economic Growth in Sierra Leone”. *Journal of Monetary and Economic Integration*, 9(2): 30– 61.
- Karim, M. Chan, S. and Hasan, S. (2010), “Bank Efficiency and Non Performing Loans: Evidence from Malaysia and Singapore”, *Prague Economic Papers* 2: 118-132.
- Kariuki, F. (2015), “Sustainability in the Financial Sector in Kenya”. Kenya Bankers’ Association, Working Paper No. WPS/01/15. Nairobi: Kenya Bankers’ Association
- Keho, Y. (2009), “Inflation and Financial Development: Cointegration and Causality Analysis for the UEMOA Countries”. *International Research Journal of Financial Economics* 1: 118-123.
- Kenya Institute for Public Policy Research and Analysis (2014), Kenya Economic Report: Navigating Global Challenges while Exploiting Opportunities for Sustainable Growth, Nairobi: KIPPRA.
- Kenya Institute for Public Policy Research and Analysis (2013), Kenya Economic Report: Creating an Enabling Environment for Stimulating Investment for Competitive and Sustainable Counties, Nairobi: KIPPRA.
- Kenya National Bureau of Statistics (2015), Economic Survey. Nairobi, Kenya National Bureau of Statistics.
- Kenya National Bureau of Statistics (2014), Nairobi, Kenya National Bureau of Statistics, available at: <http://www.knbs.co.ke>
- Kenya National Bureau of Statistics (2010), Economic Survey. Nairobi, Kenya National Bureau of Statistics.
- Kenya National Bureau of Statistics (2009), Kenya Population and Housing Census. Nairobi, KNBS.
- Kenya National Bureau of Statistics (2006), Kenya Integrated Household Budget Survey Report. Nairobi: Ministry of Planning and National development, June 2006, available at: <http://www.knbs.co.ke>

- Kenya National Bureau of Statistics (2005), Economic Survey. Nairobi, Kenya National Bureau of Statistics.
- Keynes, J. M., (1937), “The ‘Ex ante’ Theory of the Rate of Interest”, *Economic Journal* 47(14): 215–223.
- Keynes, J. M. (1936), “The General Theory of Employment, Interest and Money”. London: Macmillan.
- Khan, M.A. (2008), “Financial development and economic growth in Pakistan: evidence based on Autoregressive Distributed Lag (ARDL) approach”, *South Asia Economic Journal* 9 (2): 375–391.
- Khan, H. G., Khan, A. Z., Ahmad, A. and Siraj, A. E. (2011), “Financial Sector Development and Poverty Reduction”, *Global Journal of Management and Business Research*, 11(5): 58-62
- Khan, M. S. and Senhadji, A. S. (2003). Financial Development and Economic Growth: A Review and New Evidence, *Journal of African Economies* 12(2): 89-110
- Khan, M. S., Senhadji, A. S. and Smith, B. D. (2001), “Inflation and Financial Depth” International Monetary Fund, Edition 1
- Kibua, T. N. (2007), “Poverty Reduction through Enhanced Access to Financial Services: Case studies of Botswana, Kenya and Namibia”. Institute of Policy Analysis and Research Occasional Paper No. 010/2007
- Kiiru, J. M. (2007), “The Impact of Microfinance on Rural Poor Households’ Income and Vulnerability to Poverty: Case Study of Makueni District, Kenya”, Center for Development Research, University of Bonn, Germany.
- Kim, D., Lin S. and Suen, Y. (2010), “Dynamic Relationship between Inflation and Financial Development”. *Journal of Economic Literature* 14: 343-364
- Kimenyi, S. M. and Ndung'u, S. N. (2009), "Expanding the Financial Services Frontier: Lessons From Mobile Phone Banking in Kenya," Washington, Brookings Institution.

- King, R. G. and Levine, R. (1993a), “Finance and Growth: Schumpeter Might Be Right”.
Quarterly Journal of Economics 108: 717-732
- King, R. G. and Levine, R. (1993b), “Finance, Entrepreneurship and Growth: Theory and Evidence”. *Journal of Monetary Economics* 32(3): 513-542
- Klein, N. (2013), “Non-Performing Loans in CESEE: Determinants and Impact on Macroeconomic Performance”. IMF Working Paper No. WP/13/72
- Klein, M. W. and Olivei, G. P. (2008), “Capital Account Liberalization, Financial Depth and Economic Growth”. *Journal of International Money and Finance* 27: 861–875.
- Klein, M. W. and Olivei, G. P. (1999), “Capital Account Liberalization, Financial Depth and Economic Growth” NBER Working Paper 7384, Cambridge, Mass
- Koivu, T. (2002), “Does financial sector development affect economic growth in transition countries?”, Paper presented at Nordic Conference in Development Economics, Bergen, Norway
- Kodongo, O., Natto, D. and Biekpe, N. (2015), “Explaining Cross-border Bank Expansion in East Africa. *Journal of International Financial Markets, Institutions and Money*, 36:71-84
- Kose, A., Prasad, E. and Taylor, A. (2009), “Thresholds in the Process of International Financial Integration”. Institute for the Study of Labour (IZA), Discussion Paper No. 4133
- Kraay, A. (2004), “When Is Growth Pro-Poor? Cross-Country Evidence.” Policy Research Working Paper 3225, World Bank, Washington, DC.
- Krishnan, K. (2011), “Financial Development In Emerging Markets: The Indian Experience”, Working Paper 276, Asian Development Bank Institute.
- Krueger, O. and Tornell, A. (1999), “The Role of Bank Restructuring in the Recovery from Crises: Mexico 1996 – 98”, Working Paper 7042, NBER
- Kuznets, S. (1955), “Growth and Income Inequality”, *American Economic Review* 45(1): 1-28

- La Porta, R., Lopez-de, S. F. and Shleifer, A. (2002), "Government Ownership of Banks". *The Journal of Finance* 57(1): 265–301
- La Porta, R., Lopez-de-Silanes, F., Shleifer, A. and Vishny, R. W. (1997), "Legal Determinants of External Finance". *The Journal of Finance*, LII (3), 1131-1150.
- Law, S. H. (2008), "Does a Country's Openness to Trade and Capital Accounts Lead to Financial Development? Evidence from Malaysia". *Asian Economic Journal* 22(2): 161-177.
- Law, S. H. and Demetriades, P. (2006), "Openness, Institutions and Financial Development". Working Paper 0012. London: University of London.
- Law, S. H. and Habibullah, M. S. (2009), "The Determinants of Financial Development: Institutions, Openness and Financial Liberalization". *South African Journal of Economics* 77(1): 45-58
- Lawrence, E. (1995), "Consumer Default and the Life Cycle Model", *Journal of Money, Credit and Banking* 27: 939-954.
- Lee, C. C. and Wong S. Y. (2005), "Inflationary Threshold Effects in the Relationship between Financial Development and Economic Growth: Evidence from Taiwan and Japan". *Journal of Economic Development* 30: 49-70.
- Le Goff, M. and Singh, R. J. (2013), "Can Trade Reduce Poverty in Africa?", in Economic Premise, World Bank, April 2013, No. 114, available at: <http://siteresources.worldbank.org/EXTPREMNET/Resources/EP114.pdf>; accessed: 3.9.2015
- Levchenko, A. and Quy, T. (2004), "Trade and Financial Development", Policy Research Working Paper. World Bank Press.
- Levine, R. (2003), "Stock Markets Liquidity and Economic Growth: Theory and Evidence", in Luigi Paganetto and Edmond S. Phelps (eds), Finance, Research, Education and Growth, Palgrave Macmillan, New York.
- Levine, R. (2001), "International Financial Liberalisation and Economic Growth", *Review of International Economics* 9: 688 – 702

- Levine, R. (1998), "The Legal Environment, Banks, and Long-Run Economic Growth". *Journal of Money, Credit and Banking* 30(3): 596-613
- Levine, R. (1997), "Financial Development and Economic Growth", *Journal of Economic Literature* 3(2): 688-727.
- Levine, R. (1991), "Stock Markets, Growth and Tax Policy". *Journal of Finance* 46(0): 1445-65.
- Levine, R. and Zervos, S. (1998), "Stock Markets, Banks and Economic Growth", *American Economic Review*, 98: 537-58.
- Levine, R. and Zervos, S. (1996), "Stock Market Development and Long Run Growth", *World Bank Economic Review* 10 (2): 323-339
- Li, G. and Johnson, K. (2007), "Do High Debt Payments Hinder Household Consumption Smoothing?" Finance and Economics Discussion Series Divisions of Research & Statistics and Monetary Affairs Federal Reserve Board, Washington, D.C.
- Liang, Q. and Teng, J. Z. (2006). "Financial Development and Economic Growth: Evidence from China". *China Economic Review*, 17(4), 395-411
- Loayza, N. and Claudio, R. (2006), "The Composition of Growth Matters for Poverty Alleviation." Policy Research working Paper 4077, World Bank, Washington, DC
- López, J. H. (2004), "Pro-Growth, Pro-Poor: Is There a Tradeoff?" Policy Research Working Paper 3378, Washington, DC, World Bank.
- Luintel, R. and Khan, M. (1999), "A Quantitative Re-assessment of the Finance-growth Nexus: Evidence from a Multivariate VAR", *Journal of Development Economics* 60: 381-405.
- Lutkepohl, H., Saikkonen, P. and Trenkler, C. (2001a), "Maximum Eigenvalue Versus Trace Tests for the Cointegrating Rank of a VAR Process", *Econometrics Journal* 4: 287-310
- Makri, V., Tsagkanos, A. and Bellas, A. (2014), "Determinants of Non-Performing Loans: The case of Eurozone". *Pandemoniacus* 2:193-206

- Marinc, M. (2013), "Banks and Information Technology: Marketability vs. Relationships". *Electronic Commerce Research* 13(1):71–101
- Matadeen, J. and Seerannah, B. (2013), "Financial Development, Financial Openness and Trade Openness: Evidence from Mauritius". ICITI, Mauritius.
- Mbulawa, S. (2015), "Determinants of Financial Development in Southern Africa Development Community (SADC): Do Institutions Matter?", *European Journal of Accounting Auditing and Finance Research* 3(6): 39-62
- McKinnon, R. I. (1973), "Money and Capital in Economic Development", Washington D.C: The Brookings Institution.
- Meierrieks, D. (2014), "Financial Development and Innovation: Is There Evidence of a Schumpeterian Finance-Innovation Nexus?", *Annals of Economics and Finance* 15(2): 343–363
- Menyah, K., Nazlioglu, S. and Wolde-Rufael, Y. (2014), "Financial development, trade openness and economic growth in African countries: New insights from a panel causality approach," *Economic Modelling, Elsevier*, 37: 386-394.
- Messai, A. S. and Jouini, F. (2013), "Micro and Macro Determinants of Non-performing Loans". *International Journal of economics and Financial Issues* 3(4):852-860
- Ministry of Finance (2009), "Ministry of Finance Audit Findings on M-Pesa Money Transfer Services". Nairobi: Ministry of Finance. Available at: <http://kenyapolitical.blogspot.com/2009/01/ministry-offinance-audit-findings-on-m.html>, accessed on 27.06.2015, accessed on 18.05.2015
- Mishkin, F. S. (2007), "The Economics of Money and Financial Markets", New Jersey: Pearson/Addison Wesley.
- Mittal, R. (2014), "The Effects of Market Capitalization Ratio on GDP Growth And Capital Market Robustness In Newly Industrialized Countries", *UChicago Undergraduate Business Journal*, 1-15

- Moges, A. G. (2013), "Economic Growth, Inequality and Poverty in Developing Countries: Policy Issues and Challenges", *The International Journal of Economic Policy Studies* 8(3): 41-66
- Mohtadi, H. and Agarwal, S. (1998). "Stock Market Development and Economic Growth: Evidence from Developing Countries" Working Paper, Department of Economics, University of Wisconsin-Milwaukee
- Murray, M. P. (1994), "A drunk and her Dog: An illustration of Cointegration and Error Correction", *The American Statistician* 48(1): 37-39
- Mwabu, G., Kimenyi, S. M., Kimalu, P. K., Nafula, N., Manda, D.K. (2003), "Predicting Household Poverty: A Methodological Note with a Kenyan Example", *African Development Review* 15(1):77-85
- Naceur, S. B. & Ghazouani, S. (2005). "Does Inflation Impact on Financial Performance in the MENA Region?". *Journal of Middle East Economics and Finance* 3: 219-22
- Nairobi Securities Exchange (2012), Annual Report and Financial Statement. Nairobi: Longhorn Publishers Limited.
- Nairobi Securities Exchange (2013), Annual Report and Financial Statement. Nairobi: Longhorn Publishers Limited
- Nairobi Securities Exchange (2014), Annual Report and Financial Statement. Nairobi: Longhorn Publishers Limited
- Nairobi Securities Exchange (2015), Annual Report and Financial Statement. Nairobi: Longhorn Publishers Limited
- Nallari, R. and Griffith, B. (2011), "Understanding Growth and Poverty: Theory, Policy, and Empirics", The World Bank, Washington D.C. Available at: <https://openknowledge.worldbank.org/handle/10986/2281>; accessed: 3.9.2016
- Narayan, P. K. and Smyth, R. (2006). "Higher Education, Real Income and Real Investment in China: Evidence from Granger Causality Tests", *Education Economics* 14: 107-125.

- Ndikumana, L. (2005), "Financial Development, Financial Structure, and Domestic Investment: International Evidence", *Journal of International Money and Finance* 24: 651-673.
- Newey, W. K. and West, K.D. (1987), "A Simple, Positive Semi-Definite, Heteroskedasticity and Autocorrelation Consistent Covariance Matrix", *Econometrica* 55: 703-8.
- Nyamongo, E. Misati, R., Kipyegon, L. and Ndirangu, L. (2012), "Remittances, Financial Development and Economic Growth in Africa". *Journal of Economics and Business* 64(3): 240-260.
- Nyamongo, E. and Ndirangu, L. (2013), "Financial Innovations and Monetary Policy in Kenya", MPRA Paper No. 52387
- Odedokun, M. O. (1996), "Alternative Econometric Approaches for Analyzing the Role of the Financial Sector in Economic Growth: Time-series Evidence from LDCs", *Journal of Development Economics* 50(1): 119-146.
- Odhambo, N. M. (2010a), "Are Banks And Stock Markets Positively Related? Empirical Evidence from South Africa", *Journal of Applied Business Research*, 26(6): 17 –26
- Odhambo, N. M. (2010b), "Financial Deepening and Poverty Reduction in Zambia: An Empirical Investigation", *International Journal of Social Economics*, 37(1):41 – 53
- Odhambo, N. M. (2010c), "Is Financial Development a Spur to Poverty Reduction? Kenya's Experience", *Journal of Economic Studies*, 37(3): 343 – 353
- Odhambo, N. M. (2010d). "Finance-Investment-Growth Nexus in South Africa: An ARDL-bounds Testing Procedure". *Economic Change and Restructuring* 43: 205–219
- Odhambo, N. M. (2009a), "Energy Consumption and Economic Growth in Tanzania: An ARDL Bounds Testing Approach", *Energy Policy*, Vol. 37(2): 617-622.
- Odhambo, N. M. (2009b). "Finance-growth nexus and inflation dynamics in Kenya: an empirical investigation", *Savings and Development*, 33(1): 7-25.

- Odhiambo, N. M. (2009c). Interest rate reforms, financial deepening and economic growth in Kenya: an empirical investigation, *The Journal of Developing Areas*, 43(1), 295-313.
- Odhiambo, N. M. (2009d), "Financial-growth-poverty Nexus in South Africa: A dynamic causality linkage", *Journal of Social Economics*, 38: 320 – 325
- Odhiambo, N. M. (2008a), "Financial development in Kenya: a dynamic test of the finance-led growth hypothesis", *Economic Issues* 13(2), 21-36.
- Odhiambo, N. M. (2008b), "Financial Depth, Savings and Economic Growth in Kenya: A Dynamic Causal Linkage", *Economic Modelling* 25: 704-713.
- Odhiambo, N. M. (2007), "Supply-leading versus demand-following hypothesis: Empirical Evidence from SSA countries". *African Development Review* 19: 257-280
- Odhiambo, N. M. (2005), "Financial Development and Economic Growth in Tanzania: A Dynamic Causality Test", *African Finance Journal* 7(1): 1-17.
- Odhiambo, N. M. (2004), "Is Financial Development Still a Spur to Economic Growth? A Causal Evidence from South Africa" *Savings and Development* 28(1): 47-62
- Odhiambo, N. M. (2002). "Financial sector reforms, Savings and Economic Development in Kenya", *African Review of Money Finance and Banking*: 26: 5-22.
- Odhiambo, W., Omiti, J. and Muthaka, D. (2005), "Quantitative and Qualitative Methods for Poverty Analysis", Kenya Institute for Public Policy Research and Analysis, Nairobi, Kenya. Available at: <http://www.saga.cornell.edu/saga/q-qconf/proceed.pdf>; accessed: 7.9.2015
- Oke, B. O., Uadiale, O. M., and Okpala, O. P. (2011), "Impact of Workers' Remittances on Financial Development in Nigeria". *International business Research*, 4(4), 218-225

- Okibo, B. W. and Makanga, N. (2014), "Effects of Micro Finance Institutions on Poverty Reduction in Kenya", *International Journal of Current Research and Academic Review* 2(2): 76-95
- Olweny, T. and Kimani, D. (2011), "Stock market performance and economic growth: empirical evidence from Kenya using causality test approach", *Advances in Management & Applied Economics* 1(3): 153-196.
- Onuonga, S. M. (2014), "Financial Development and Economic Growth in Kenya: An Empirical Analysis 1980–2011". *International Journal of Economics and Finance* 6(7): 226-241
- Osoro, C. and Jagongo, A. (2013), "Investors Perceptives on the NASI AND THE NSE 20 Share Index as Performance Measurement Indicators at the Nairobi Securities Exchange In Kenya". *International Journal of Humanities and Social Science* 3(18): 153-162
- Ozturk, N. and Karagoz K. (2012), "Relationship between Inflation and Financial Development: Evidence from Turkey" *International Journal of Alanya Faculty of Business* 4: 81-87
- Patrick, H. (1966), "Financial Development and Economic Growth in Underdeveloped Countries", *Economic Development and Cultural Change* 14(2): 174-189
- Perron, P. (1997), "Further Evidence on Breaking Trend Functions in Macroeconomic Variables", *Journal of Economics* 80(2): 355-385.
- Perron, P. (1989), "The great crash, the oil price shock and the unit root hypothesis", *Econometrica* 57: 1361-1401
- Perron, P. and Vogelsang, T. (1992). "Nonstationarity and level shifts with an application to purchasing power parity", *Journal of Business and Economic Statistics* 10: 301-320.
- Pesaran, M. and Pesaran, B. (1997), "Working With Microfit 4.0: Interactive Economic Analysis", Oxford University Press, Oxford.

- Pesaran, M. H. and Shin, Y. (1999), “An Autoregressive Distributed Lag Modelling Approach to Cointegration Analysis”, in *Econometrics and Economic Theory in the 20th Century: The Ragnar Frisch Centennial Symposium*, eds. Storm, S., Cambridge University Press, Chapter 11, pp.1-31.
- Pesaran, M. H., Shin, Y. and Smith, R. (2001), “Bound Testing Approaches to the Analysis of Level Relationship”. *Journal of Applied Econometrics* 16: 174-89.
- Phillips, P. C. B. and Perron, P. (1988), “Testing for a Unit root in Time Series Regression”, *Biometrika* 75: 335-346.
- Pradhan, R. P. (2010), “The Nexus between Finance, Growth and Poverty in India: The cointegration and Causality approach”, *Asian Social Science* 6(9): 114-122.
- Putsis, W. P. (1996), “Temporal aggregation in diffusion models of first-time purchase: Does choice of frequency matter?” *Tech. Forecasting Soc. Change* 51(3): 265–279.
- Rajan, R. & Zingales, L. (2003). “The great reversals: the politics of financial development in the twentieth century”. *Journal of Financial Economics* 69(1), 5-50
- Rajan, R. and Zingales L. (1998), “Financial Dependence and Growth” *American Economic Review* 88 (3): 559-586
- Reed, L., Marsden, J., Ortega, A., Rivera, C. and Rogers, S. (2013), “The state of the Microcredit Summit Campaign”, Microcredit Summit Campaign, Washington DC. Available at: <http://stateofthecampaign.org/read-the-full-report/>, accessed on 4.6.2015
- Republic of Kenya (2007), Kenya Integrated Household Budget Survey (KIHBS) 2005/06: Basic Report. Nairobi: Kenya National Bureau of Statistics, June 2006, available at: <http://www.knbs.co.ke>; accessed: 4.3.2014
- Republic of Kenya (2001), Poverty Reduction Strategy Paper, 2001-2004. Nairobi: Ministry of Finance and Planning. June, 2001
- Republic of Kenya (1997), Welfare Monitoring & Evaluation Survey, Basic Report. Nairobi: Kenya National Bureau of Statistics

- Republic of Kenya (1994), Welfare Monitoring & Evaluation Survey, Basic Report.
Nairobi: Kenya National Bureau of Statistics
- Robinson, J. (1952), "The Generalization of the General Theory", in *The Rate of Interest and Other Essays*, ed. Robinson J. 67-142, London, Macmillan
- Ronge, E., Ndirangu, L. and Nyangito, H. (2002), "Review of Government Policies for the Promotion of Micro and Smallscale Enterprises. Kenya Institute for Public Policy, Discussion Paper No. 20
- Pradhan, R. P (2010), "The Nexus between Finance, Growth and Poverty in India: The Cointegration and Causality Approach", *Asian Social Science* 6(9): 114-122
- Sachs, J. (2005). "The End of Poverty: Economic Possibilities of our Times". Yewyork: Penguin Press.
- Safaricom Limited (2015), "Annual Report 2015". Nairobi: Safaricom Limited
- Safaricom Limited (2014), "Annual Report 2014". Nairobi: Safaricom Limited
- Schumpeter, J. A (1911), "The theory of Economic Development". Cambridge, MA: Harvard University Press
- Seetanah, B., Padachi, K., Hosany, J. and Seetanah, B. (2010), "Determinants of financial development: The case of Mauritius", Finance and Corporate Governance Conference 2011 Paper, available at: <http://dx.doi.org/10.2139/ssrn.1724404>, accessed: 27.2.2016
- Sen, A. (2003), "On unit root tests when the alternative is a trend break stationary process", *Journal of Business and Economic Statistics* 21: 174-184.
- Shan, J. and Jianhong, Q. (2006), "Does Financial Development 'Lead' Economic Growth? The Case of China", *Annals of Economics and Finance* 1: 197-216
- Shan, J., Morris, A. and Sun, F. (2001), "Financial Development and Economic Growth: An Egg-and-Chicken Problem?" *Review of International Economics*, 9: 443-54.

- Sharma, P. and Nguyen, D. T. (2010), "Law and Banking Development in a South Pacific Island Economy: The Case of Fiji, 1970-2006". *Journal of the Asia Pacific Economy* 41 12(5): 192-216
- Shaw, E. S. (1973), "Financial Deepening in Economic Development", New York, Oxford University Press.
- Siegle, J. T., Weinstein, M. M. and Halperin, M. H. (2004), "Why Democracies Excel". *Foreign Affairs* 83(5): 57-71
- Simiyu, R., Osero, S. and Oduyo, F. (2014), "The Effect of Automation on Trading Volumes of Listed Companies at the Nairobi Securities Exchange, Kenya", *Research Journal of Finance and Accounting* 5(10): 21-33
- Sims, C. A. (1980), "Macroeconomics and Reality," *Econometrica*, 48: 1-48.
- Sin-Yu, H. and Odhiambo, N. M. (2011), "Finance and Poverty Reduction in China: An Empirical Investigation". *International Business & Economics Research Journal*, 10(8): 103-114
- Singh, A. (1997), "Stock Market, Financial Liberalisation and Economic Development", *Economic Journal* 107 (May): 771-82. South Africa Official Year Book, Various issues.
- Skarica, B. (2014), "Determinants of Non-performing Loans in Central and Eastern European Countries". *Financial Theory and Practice* 38 (1): 37-59
- Solow, R. and Swan, T. (1956), "A Contribution to the Theory of Economic Growth", *The Quarterly Journal of Economics* 70(1): 65-94
- Spicker, P. (2002), "Poverty and the Welfare State: Dispelling the Myths", Working Paper. London: Catalyst.
- Standley, S. (2010), "What are the Determinants of Financial Market Development in Sub-Saharan Africa?". Washington, D. C: International Monetary Fund.
- Stiglitz, J. E. and Weiss, A. (1981), "Credit Rationing in Markets with Imperfect Information". *American Economic Review* 53: 393-410
- Stulz, R. M. and Williamson R. (2003), "Culture, Openness and Finance". *Journal of financial Economics* 70: 313-349

- Suleiman, A. and Abu-Qarn, A. (2008), "Financial Development and Economic Growth: Time Series Evidence from Egypt", *Journal of Policy Modelling* 30(5): 887-898.
- Takaendesa, P. and Odhiambo, N. M. (2007), "Financial Sector Development and Economic Growth: An Empirical Analysis of Two Southern African Countries", *Journal for Studies in Economics and Econometrics* (SEE) 31(3).
- Takyi, P. O. and Obeng, C. K. (2013), "Determinants of Financial Development in Ghana". *International Journal of Development and Sustainability* 2(4): 2324-2336
- Todaro, M.P. (1997), "Economic Development", 6th edition, New York: Longman
- Trew, A. W. (2006), "Finance and Growth: A Critical Survey", Centre for Dynamic Macroeconomic Analysis Working Paper Series, CDMA05/07.
- Uddin, G. S., Bo, S. and Shahbaz, M. (2013a), "The Causal Nexus between Financial Development and Economic Growth in Kenya", MPRA 49262 13:26 UTC
- Uddin, G. S., Shahbaz, M. and Arouri, M. (2013b): "Financial Development and Poverty Reduction Nexus: A Cointegration and Causality Analysis in Bangladesh", *Asian Social Science* MPRA Paper No. 49264
- Uddin, G. S., Kyophilavong, P. and Sydee, N. (2012), "The causal Nexus of Banking Sector Development and Poverty Reduction in Bangladesh", *International Journal of Economics and Financial Issues* 2(3): 304-311.
- United Nations (1997), Human Development Report. New York: Oxford University Press
- United Nations Development Programme (1995), Human Development Report 1995. New York: Oxford University Press
- United Nations Development Programme (2011), "Towards Human Resilience: Sustaining MDGs Progress in an Age of Economic Uncertainty". New York, USA.
- Vinayagathan, T. (2013), "Inflation and Economic Growth: A Dynamic Panel Threshold Analysis for Asian Economies". GRIPS Discussion Paper 12-17, Japan

- Voghouei, H., Azali, M. and Jamali, M. A. (2011a), “A Survey of the Determinants of Financial Development”. *Asian-Pacific Economic Literature* 25(2): 1–20
- Voghouei, H., Azali, M. and Law, S. H. (2011b), “Does the Political Institutions Matter for Financial Development?” *Economic Papers* 30(1): 77–98
- Voghouei, H., Azali, M. and Law, S. H. (2010), “The Effect of Dynamic Legal Tradition on Financial Development: Panel Data Evidence”. *European Journal of Law and Economics*, doi: 10.1007/s10657-010-9191-x
- Waqabaca, C. (2004), “Financial Development and Economic Growth in Fiji”, Working Paper 2004/03 (December), Economics Department, Reserve Bank of Fiji.
- Were, M. and Wambua, J. (2013), “Assessing the Determinants of Interest Rate Spread of Commercial Banks in Kenya: An Empirical Investigation”, Kenya Bankers Association Working Paper Series No. WPS/01/13.
- Were, M. and Wambua, J. (2014), “What Factors Drive Interest Rate Spread of Commercial Banks? Empirical Evidence from Kenya”, *Review of development Finance* 4(2): 73-82
- Wolde-Rufael, Y. (2009), “Re-examining the financial development and economic growth nexus in Kenya”, *Economic Modelling* 26: 1140 — 1146.
- Wood, A. (1993), “Financial Development and Economic Growth in Barbados, Causal Evidence” *Savings and Development* 17(4): 379-389.
- Woolard, I. and Leibbrandt, M. (1999), “Measuring Poverty in South Africa”, DPRU Working Papers No. 99/3, Development Policy Research Unit, University of Cape Town
- World Bank (2016), *Global Economic Prospect: Divergences and Risks*. Washington D.C: World Bank
- World Bank (2014a), *Kenya Economic Update: Anchoring High Growth: Can Manufacturing Contribute More?* No. 11, December 2014. Washington D.C: World Bank

- World Bank (2014b), World Development Indicators. Washington D.C: World Bank.
- World Bank (2013a), Kenya Economic Update: Time to shift gears: Accelerating growth and poverty reduction in the New Kenya. No. 8, June 2013
- World Bank (2013b), Developing Kenya's Mortgage Market. Washington DC, WorldBank
- World Bank (2013c), "Global Financial Development", Washington DC, World Bank
- World Bank (2006), "Measuring Banking Sector developments", Washington DC: World Bank
- World Bank (2002), "Capital Market Integration in the East African Community", Washington, DC, World Bank. No. 14.
- World Bank (1990), World Development Report 1990: Poverty. Newyork: Oxford University Press.
- Xu, Z. (2000), "Financial Development, Investment and Economic Growth", *Economic Inquiry* 331 - 344.
- Yang, B. (2011), "Does Democracy Foster Financial Development? An Empirical Analysis". *Economics Letters* 112(3): 262- 265.
- Yartey, C. A. (2007), "Well-developed Financial Intermediary Sector Promotes Stock Development: Evidence from Africa", *Journal of Emerging Market Finance* 6(3): 269–8
- Yu, H. and Gan, P. T. (2010), "The Determinants of Banking Sector Development: Malaysian Experience". *International Research Journal of Finance and Economics* 35: 29-35.
- Zivot, E. and Andrews, W. K. (1992), "Further Evidence on the Great Crash, the Oil Price Shock and the Unit Root Hypothesis", *Journal of Business and Economics Statistics* 10: 251-270
- Zoli, E. (2007), "Financial Development in Emerging Europe: The Unfinished Agenda". IMF Working Paper No. WP/07/245

APPENDIX

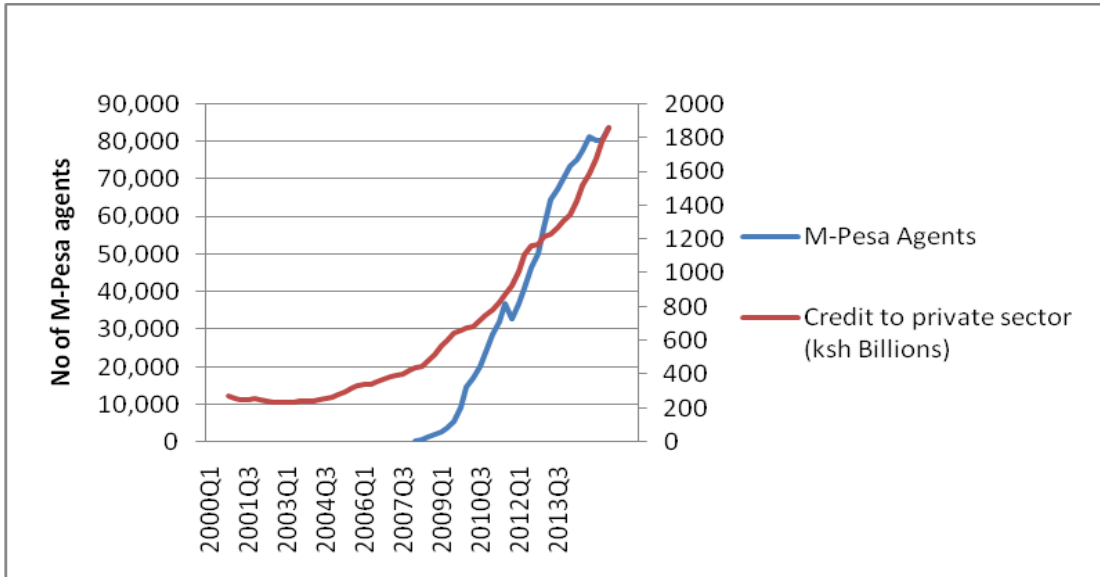


Figure A.1: Relationship between M-Pesa Agents and Credit to Private Sector

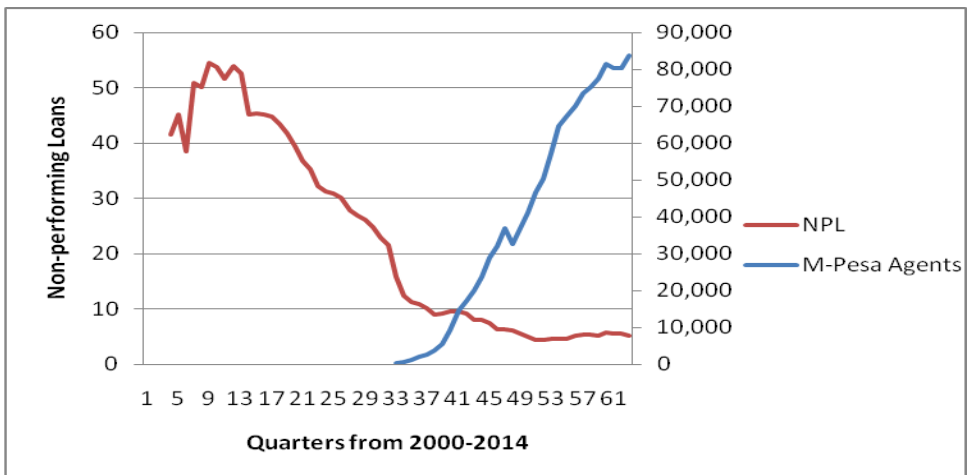


Figure A.2: Relationship between M-Pesa Agents and Non-Performing Loans (NPL)

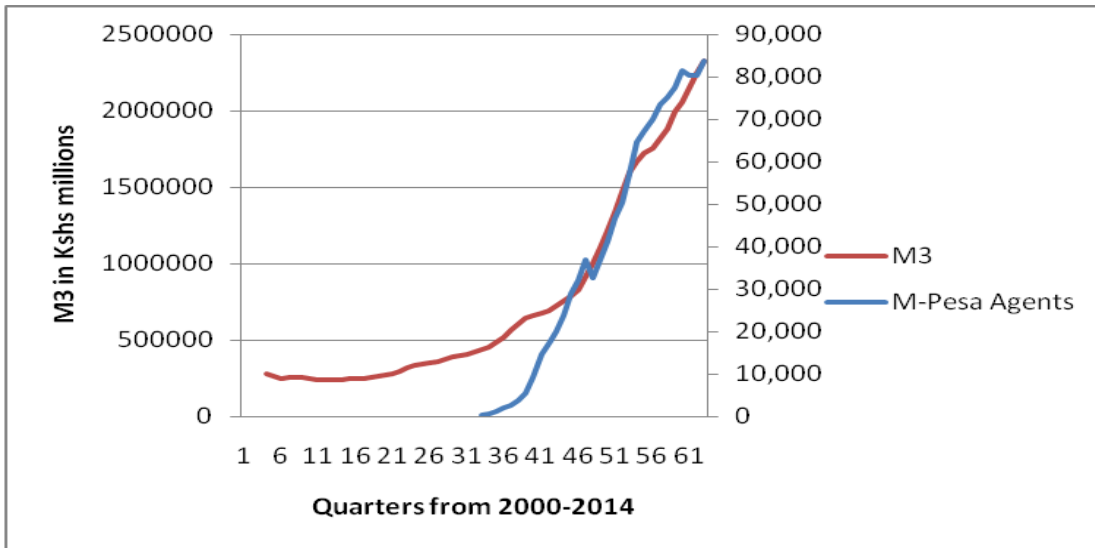


Figure A.3: Relationship between M-Pesa Agents and M3

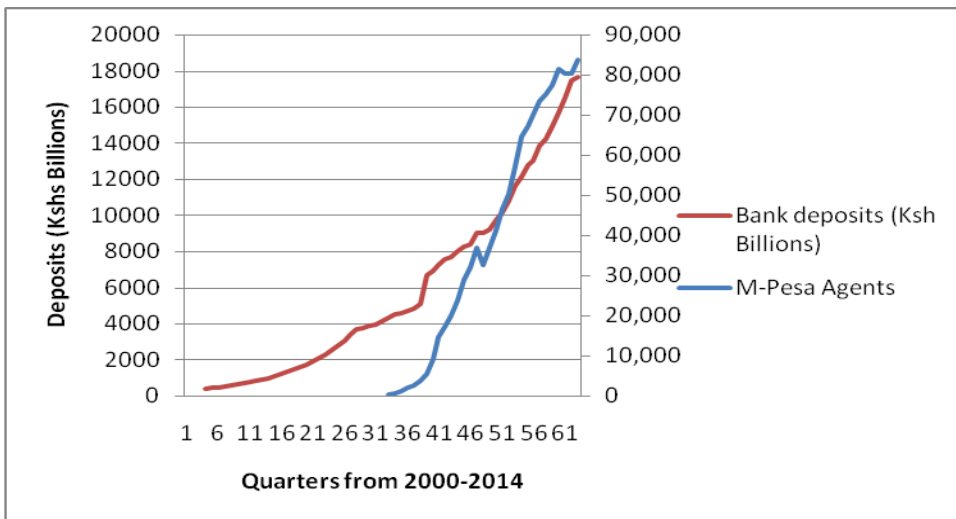


Figure A.4: Relationship between M-Pesa Agents and Bank Deposits

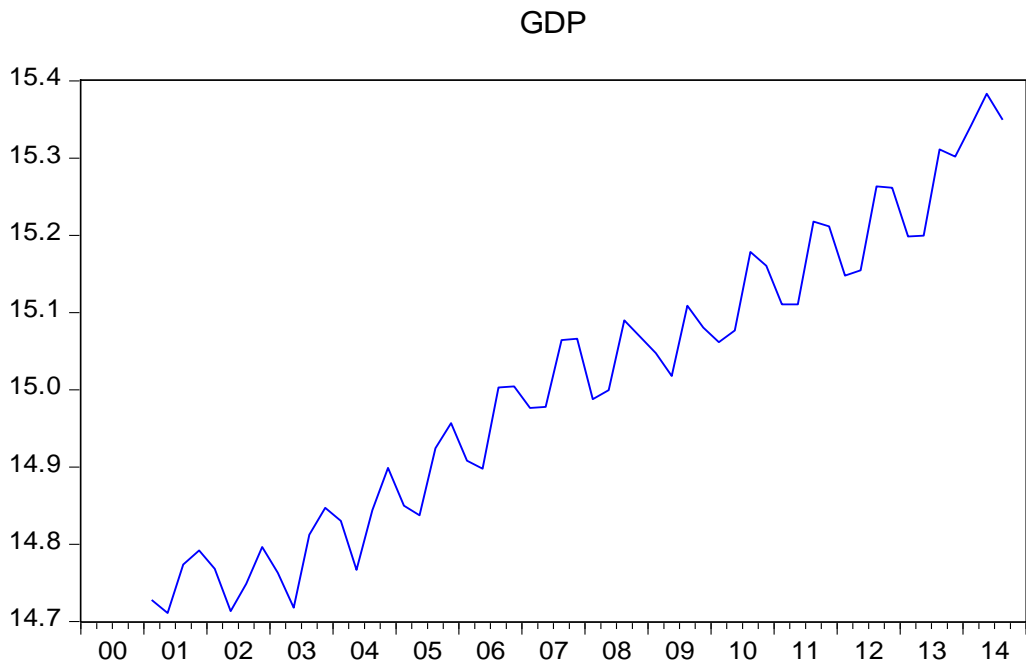


Figure A.5: Trend in Real GDP

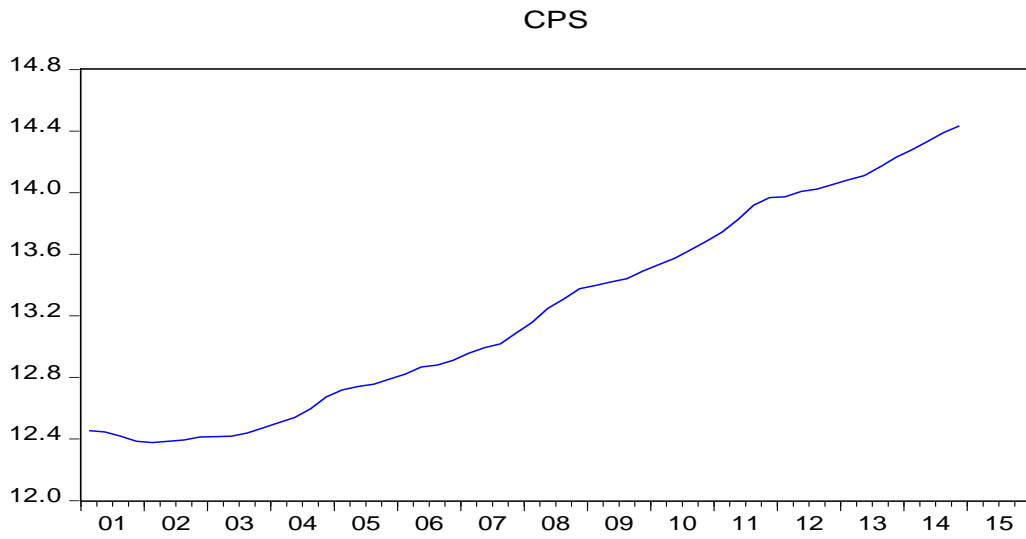


Figure A.6: Trend in Credit to Private Sector

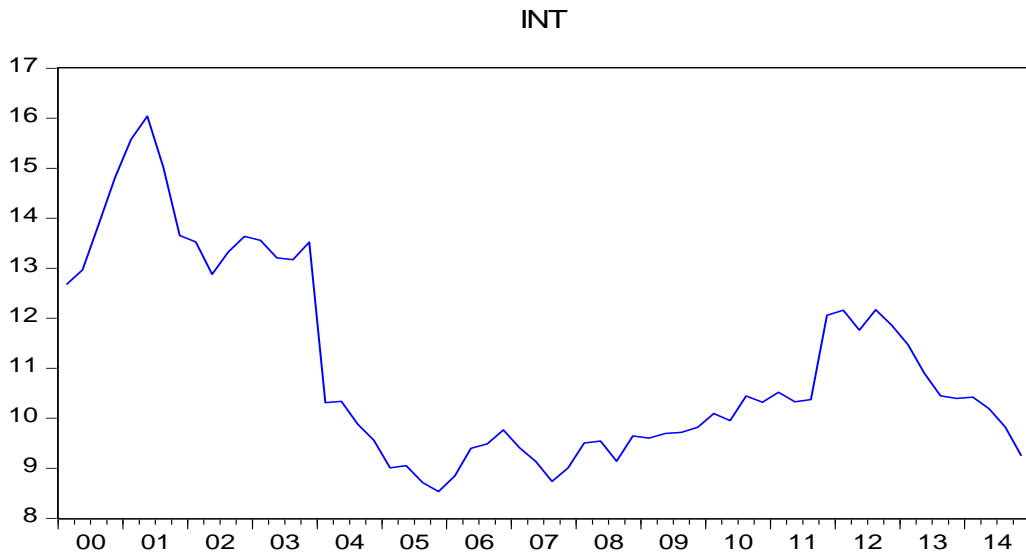


Figure A.7: Trend in Interest Rate Spread

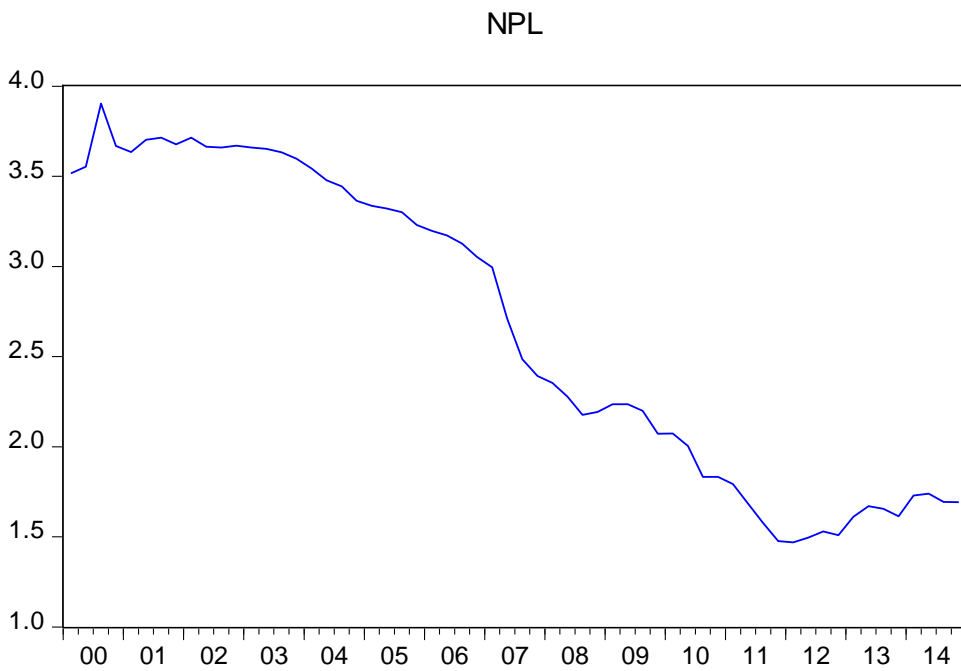


Figure A.8: Trend in Non-performing Loans

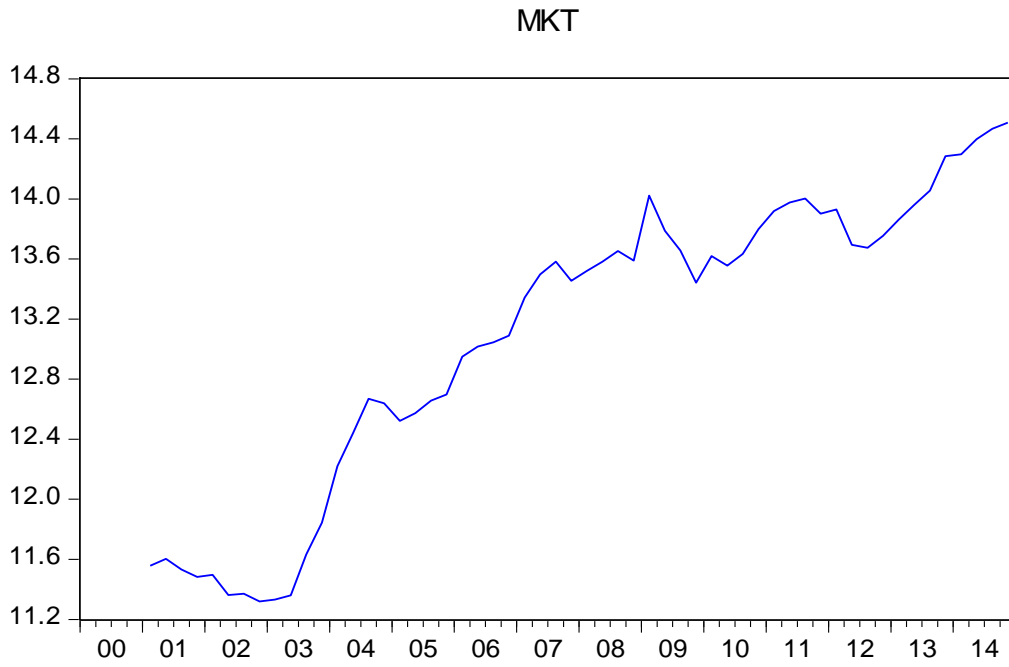


Figure A.9: Trend in Market Capitalization

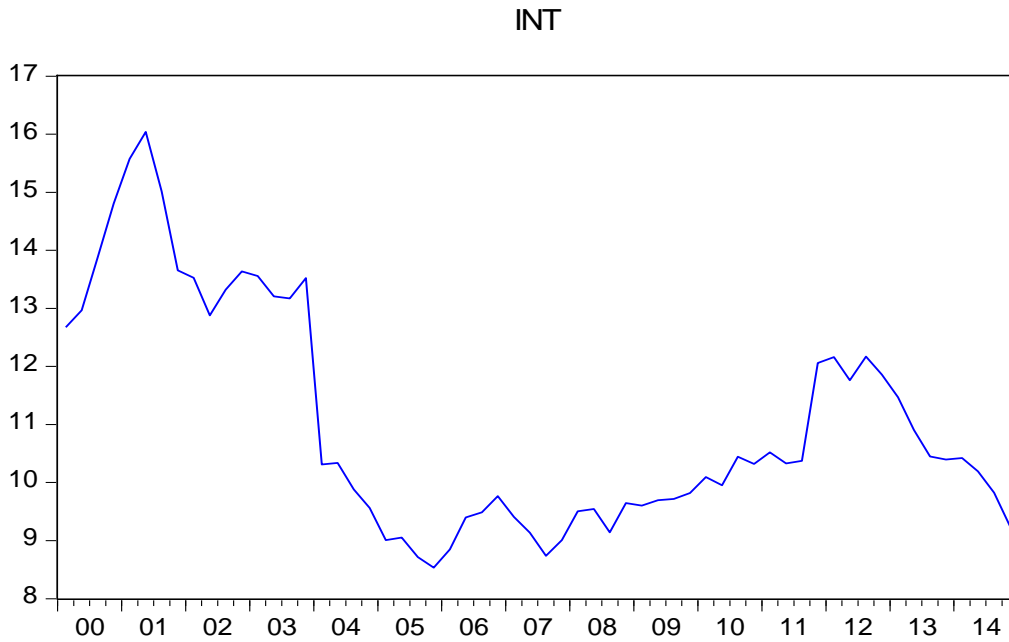


Figure A.10: Trend in Interest Rate Spread

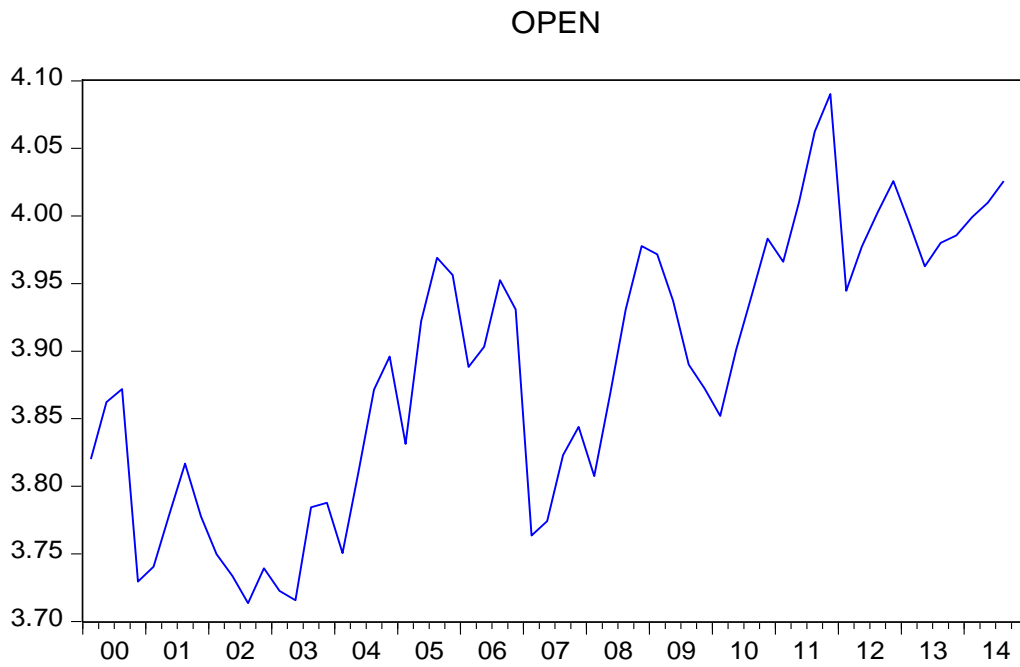


Figure A.11: Trend in Trade Openness

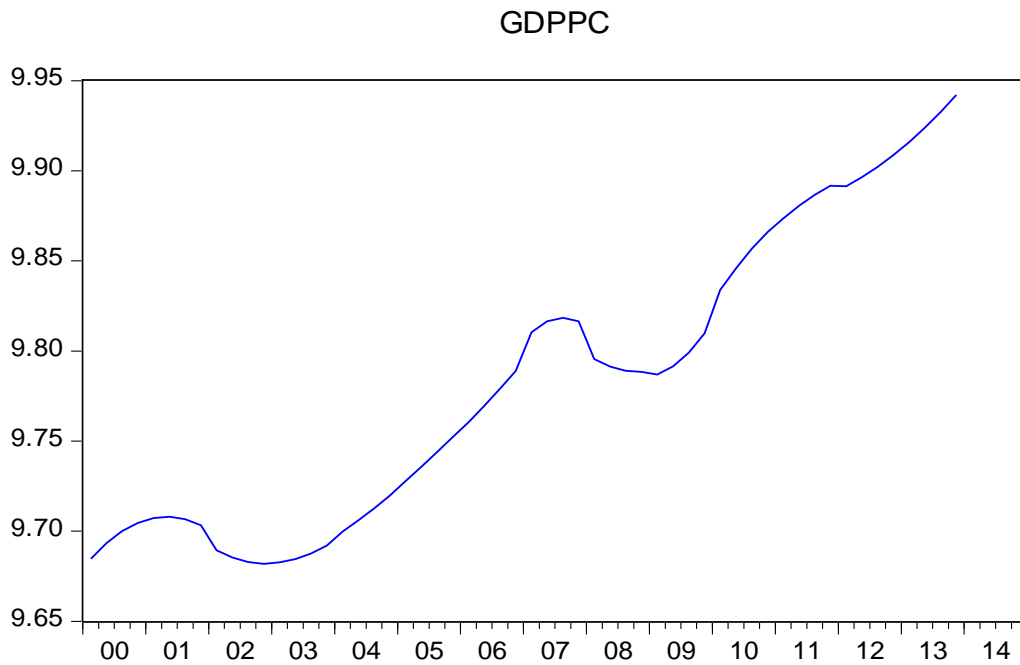


Figure A.12: Trend in GDP Per Capita

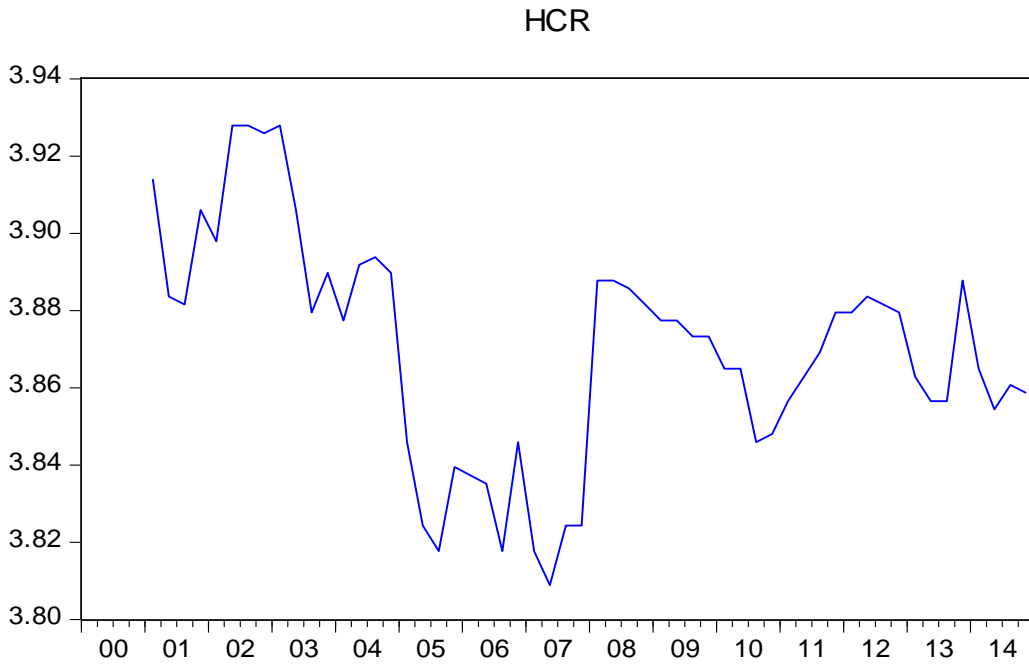


Figure A.13: Trend in Head Count Ratio

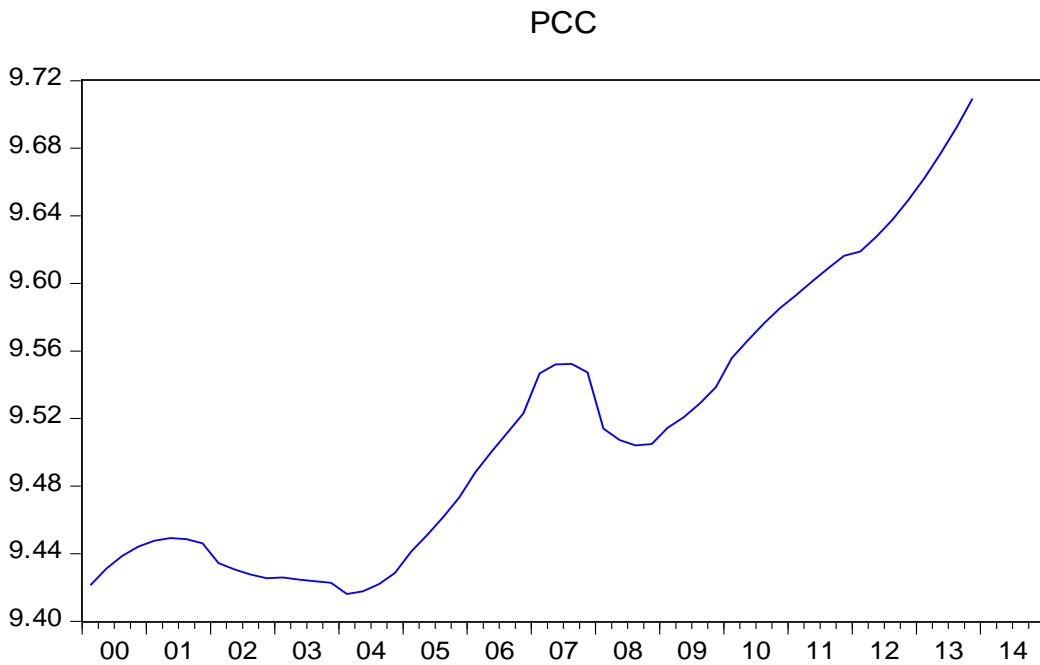


Figure A.14: Trend in Per Capita Consumption

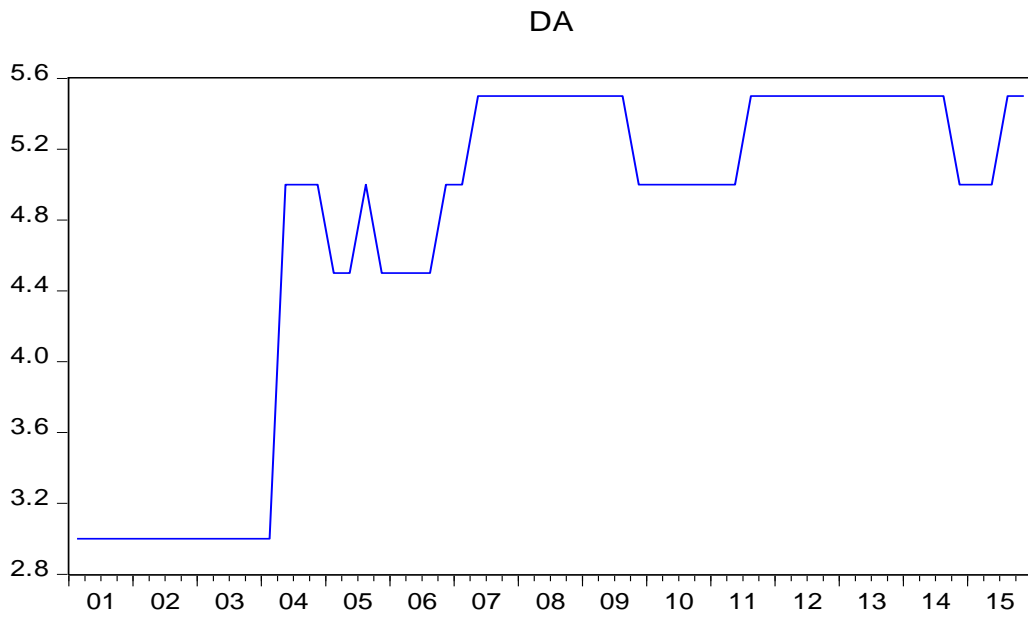


Figure A.15: Trend in Democratic Accountability

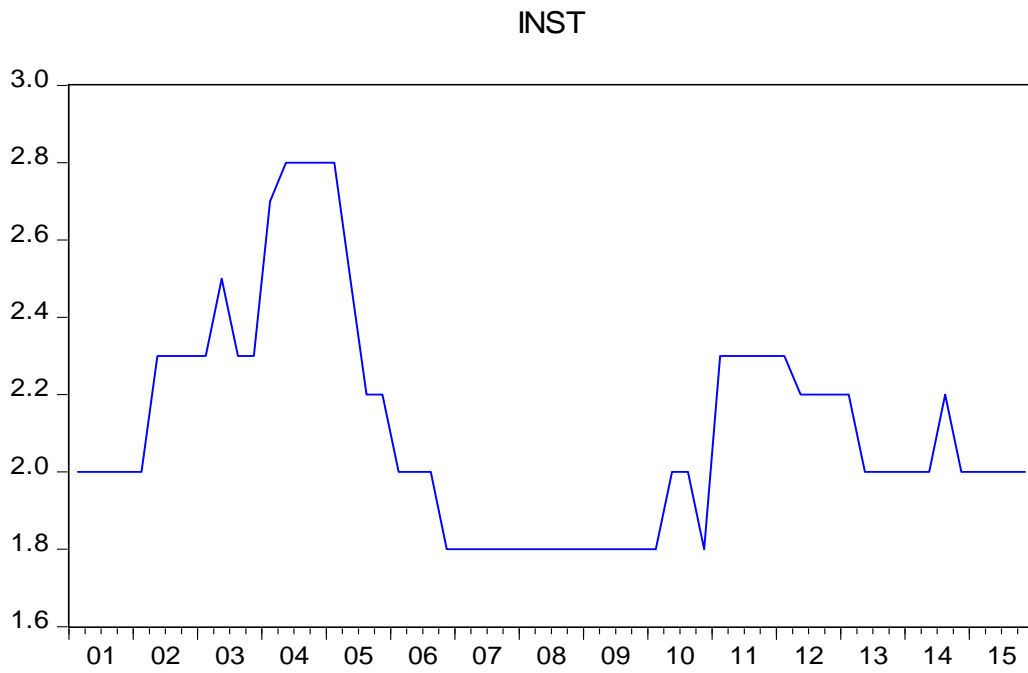


Figure A.16: Trend in Institutional Quality

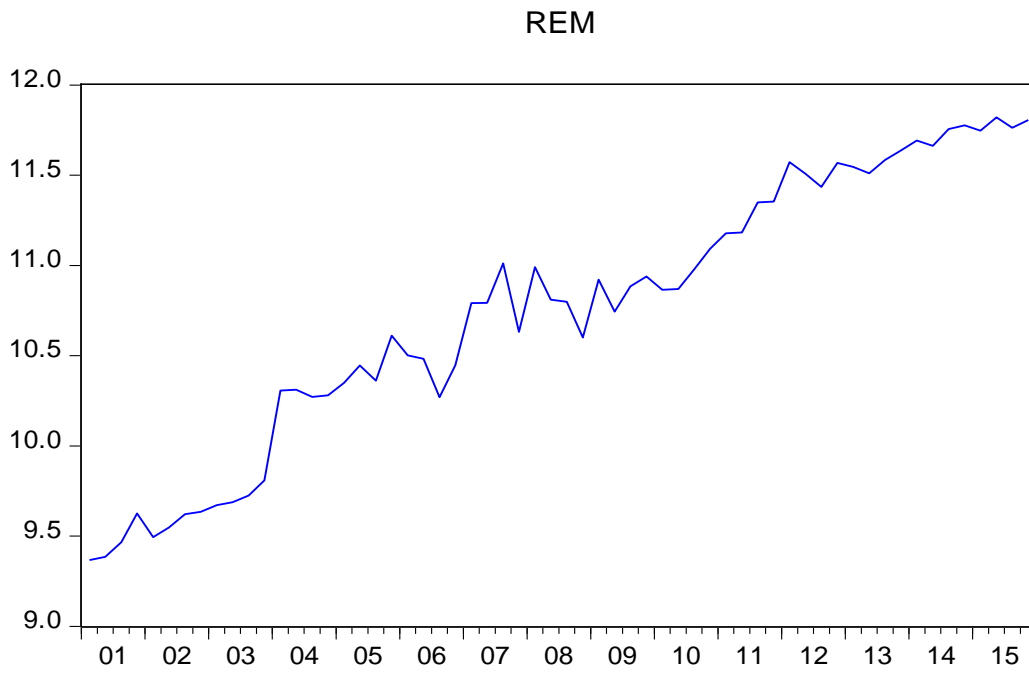


Figure A.17: Trend in Remittances

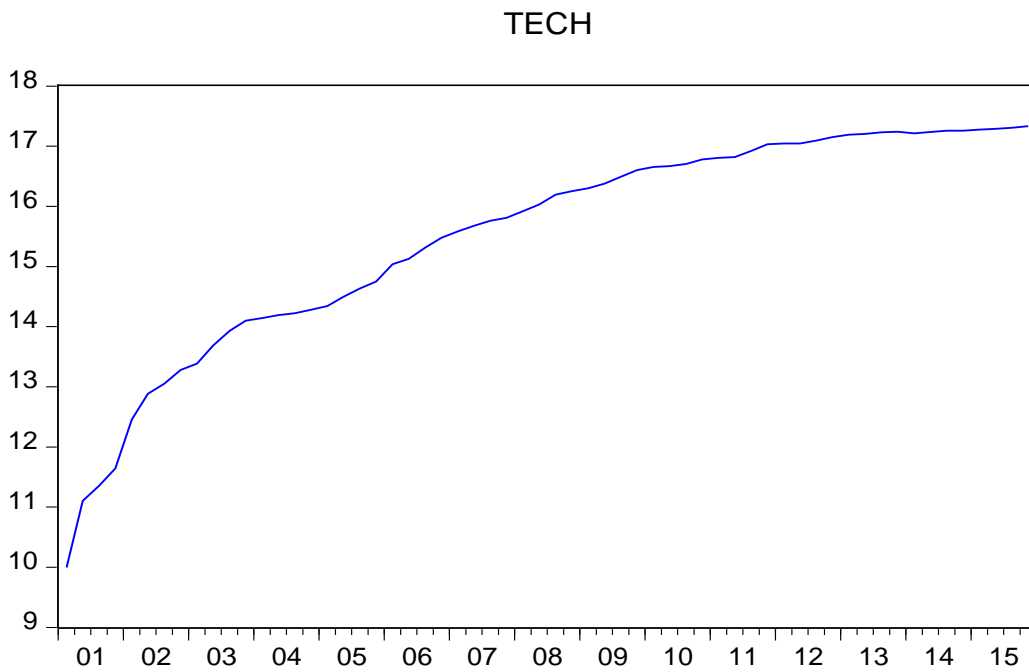


Figure A.18: Trend in Technology

Table A.1: Optimal Lag Length Results

Variable	Lags	FPE	AIC	HQIC	SBIC
LNCredit to Private Sector	3	0.0028*	3.0280*	2.9716*	2.8821*
LNMarket Capitalization	1	0.0227*	0.9473*	0.9191*	0.8743*
LNNon-performing Loans	3	0.0049*	2.4678*	2.4257*	2.3592*
LNGDP per Capita	2	0.000049*	-7.09293*	-7.04977*	-6.98035*
LNReal GDP	1	0.0029*	3.0072*	2.9792*	2.9349*
LNInflation	4	0.1234*	0.7447*	0.8149*	0.9256*
LNInterest Rate Spread	1	0.0029*	3.0072*	2.9792*	2.9349*
LNTrade Openness	3	0.0022*	3.2786*	3.2222*	Significant at lag 1
LNInstitutional Quality	1	0.0040*	-2.6837*	-2.6556*	-2.6114*
LNDemocratic Quality	1	0.1959*	-1.0945*	-1.0524*	-0.9859*
LNRemittances	3	0.0061*	-2.2611*	-2.2330*	-2.1887*
LNTechnology	4	0.0057*	-2.3281*	-2.2579*	-2.1472*
LNPer Capita Consumption	2	0.000049*	-7.09293*	-7.04977*	-6.98035*
LNHead Count Ratio	1	0.000612*	-4.56098*	-4.53221*	-4.48593*

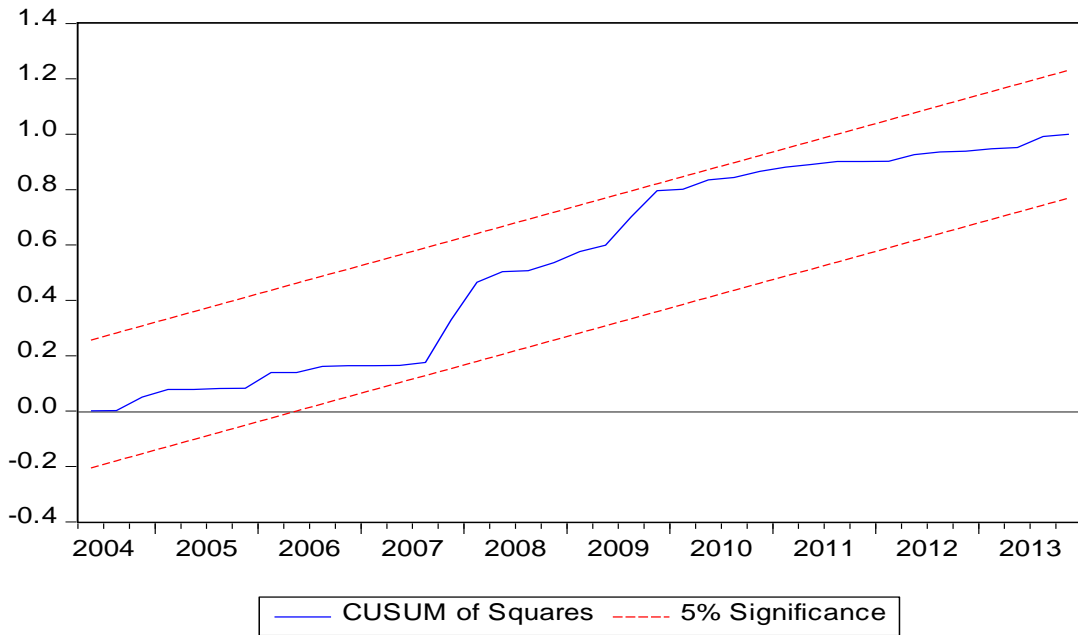


Figure A.19: Cusum of Squares Parameter Stability of Credit to Private Sector Model

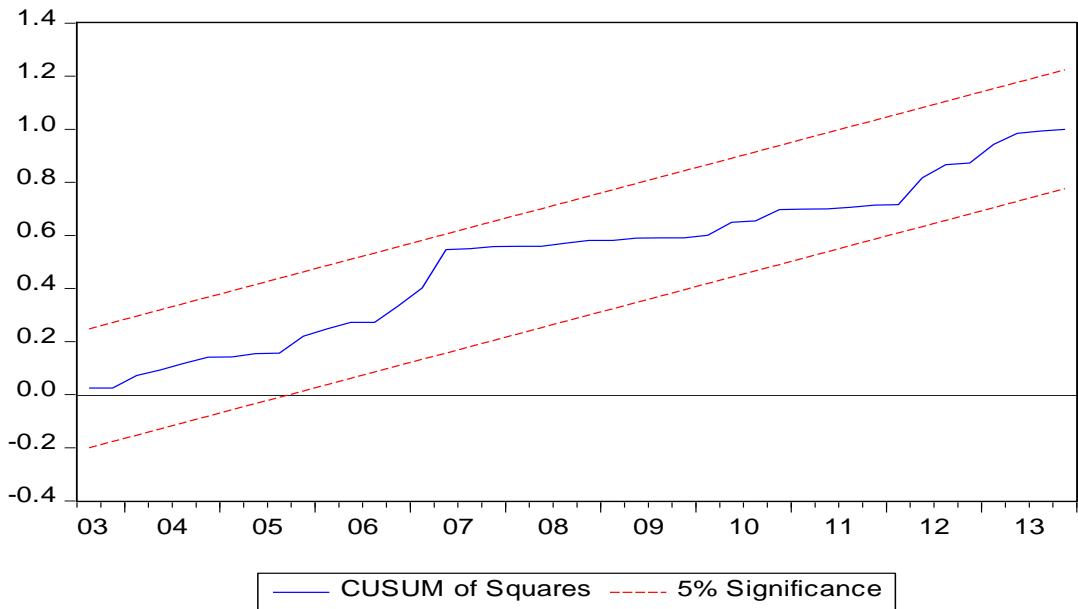


Figure A.20: Cusum of Squares Parameter Stability of Non-performing Loans Model

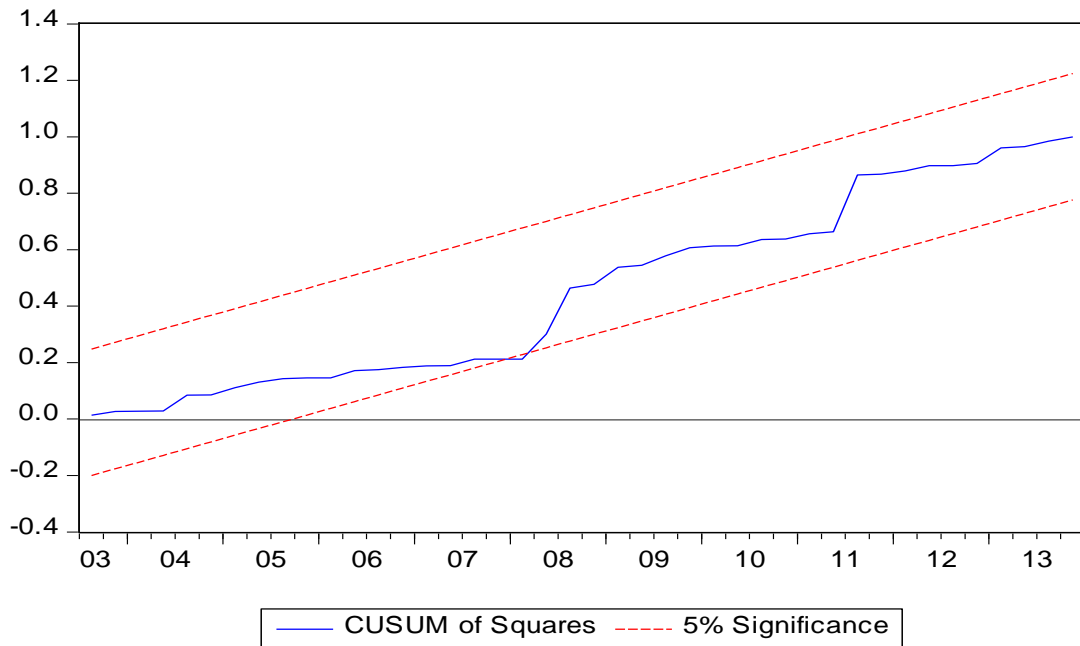


Figure A.21: Cusum of Squares Parameter Stability of Market Capitalization Model

Table A.2: Short-run Regression Results of the Market Capitalization Model

Dependent Variable: LNMarket Capitalization	
Variable	Co-efficients
LNTrade Openness	-0.129 (0.703)
LNInstitutional Quality	0.473** (0.010)
LNGDP Per Capita	2.848** (0.002)
LNInflation	0.056 (0.213)
LNDemocratic Accountability	0.569** (0.000)
LNRemittances	-0.181 (0.179)
LNTechnology	0.151** (0.002)

** Significant at 5 Percent Significance Level

Table A.3: Correlation Matrix between GDP and Independent Variables

	LNReal GDP	LNCredit to Private Sector	LNLiquid Liabilities	LNMarket Capitalization	LNNon- performing Loans	LNInflation	LNInterest Rate Spread	LNTrade Openness
LNReal GDP	1.00							
LNCredit to Private Sector	-0.42	1.00						
LNLiquid Liabilities	0.44	(0.87)	1.00					
LNMarket Capitalization	0.50	0.44	0.57	1.00				
LNNon- performing Loans	-0.32	0.17	0.29	0.19	1.00			
LNInflation	-0.07	-0.28	0.04	-0.02	-0.15	1.00		
LNInterest Rate Spread	-0.16	-0.20	0.18	-0.04	0.36	0.03	1.00	
LNTrade Openness	0.48	0.25	-0.45	-0.23	0.36	0.17	0.04	1.00

Correlations greater than 0.7 are given in parenthesis ()

Table A.4: Clemente – Montanes – Reyes Unit Root Test Results

Variable	One Structural Break				Two Structural Breaks			
	Additive Outlier		Innovations Outlier		Additive Outlier		Innovations Outlier	
	Level	First Difference	Level	First Difference	Level	First Difference	Level	First Difference
Real GDP	-1.617 (-3.560)	-3.825 (-3.560)	1.601 (-4.270)	-4.262 (-4.270)	-2.253 (-5.490)	-9.871 (-5.490)	-0.854 (-5.490)	-4.314 (-5.490)
LNCredit to Private Sector	-1.912 (-3.560)	-2.587 (-3.560)	-1.548 (-4.270)	-2.601 (-4.270)	-3.423 (-5.490)	-9.406 (-5.490)	-1.801 (-5.490)	-2.789 (-5.490)
LNMarket Capitalization	-2.442 (-3.560)	-5.052 (-3.560)	-3.374 (-4.270)	-7.609 (-4.270)	-2.975 (-5.490)	-8.480 (-5.490)	-4.314 (-5.490)	-8.424 (-5.490)
LNNon- performing Loans	-2.053 (-3.560)	-6.662 (-3.560)	-3.332 (-4.270)	-6.955 (-4.270)	-3.618 (-5.490)	-5.613 (-5.490)	-4.889 (-5.490)	-8.063 (-5.490)
LNInterest Rate Spread	-3.129 (-3.560)	-5.756 (-3.560)	-3.607 (-4.270)	-8.287 (-4.270)	-4.460 (-5.490)	-6.683 (-5.490)	-5.163 (-5.490)	-9.724 (-5.490)
LNInflation	-7.390 (-3.560)	-5.882 (-3.560)	-4.049 (-4.270)	-6.356 (-4.270)	-5.952 (-5.490)	-5.787 (-5.490)	-3.424 (-5.490)	-6.363 (-5.490)
LNTrade Openness	-2.263 (-3.560)	-8.243 (-3.560)	-3.265 (-4.270)	-3.905 (-4.270)	-5.676 (-5.490)	-8.469 (-5.490)	-5.557 (-5.490)	-3.824 (-5.490)

Figures in parenthesis () indicate t statistics

Table A.5: Optimal Lag Length Results

Lag	LR	FPE	AIC	SC	HQ
0	NA	4.64e-11	-3.927683	-3.669852	-3.828248
1	723.0487	4.32e-17	-17.83132	-15.76867*	-17.03583
2	112.8681	1.61e-17	-18.91056	-15.04309	-17.41902
3	68.23973	1.49e-17	-19.22823	-13.55595	-17.04065
4	64.46313	1.18e-17	-19.99194	-12.51484	-17.10832
5	76.23017*	3.01e-18*	-22.41214*	-13.13021	-18.83246*

Table A.6: Autocorrelation Test of the Residuals in Lag 1 Model

Lag length	LM-Stat	Prob
1	0.6814	0.409
2	0.7607	0.684
3	0.9118	0.823
4	1.0719	0.899
5	4.9494	0.077
6	11.379	0.422
7	11.700	0.111
8	12.626	0.125
9	13.823	0.129
10	13.857	0.180
11	13.905	0.238
12	14.903	0.247

Inverse Roots of AR Characteristic Polynomial

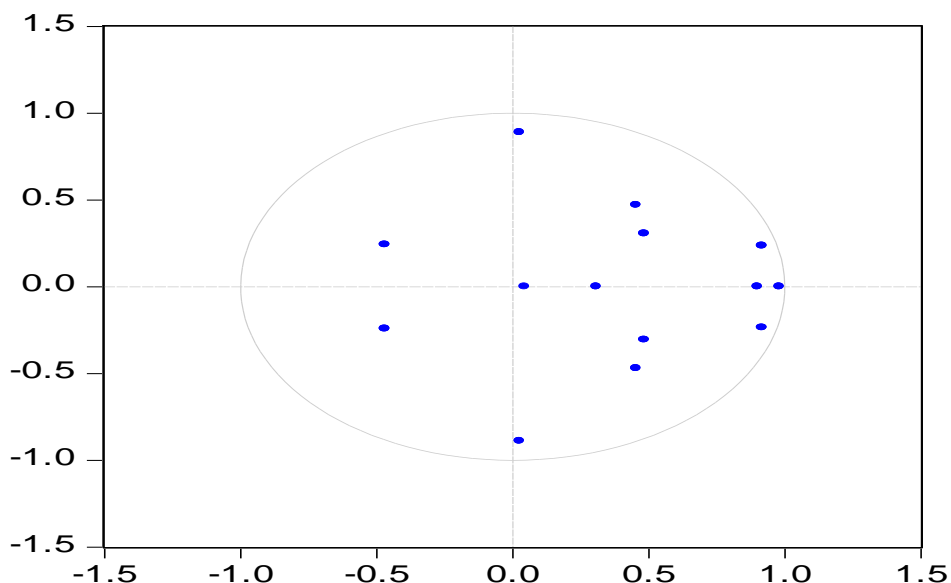


Figure A.22: Stability of the Real GDP VECM model with Two Lags

Table A.7: Granger Causality Results while Controlling for Financial Innovation

Independent Variable (In Natural Logarithm)								
Dependent Variable (In Natural Logarithm)	χ^2 - statistics of lagged first differenced term [p-value]							ECT _{t-1} Co-efficient
	Real GDP	Credit to Private Sector	Inflation	Interest Rate Spread	Market Capitalization	Non-performing Loans	Trade Openness	
Real GDP	–	5.70*** [0.010]	0.11 [0.7350]	7.58*** [0.0059]	7.72** [0.0167]	1.16 [0.2823]	12.23*** [0.0005]	-1.01*** (-10.34)
Credit to Private Sector	6.03** [0.0141]	–	3.11* [0.0780]	7.04*** [0.0080]	0.06 [0.8060]	0.004 [0.9524]	13.26*** [0.0003]	0.92 (7.82)
Inflation	0.28 [0.5956]	0.68 [0.4086]	–	0.66 [0.4164]	0.71 [0.3984]	1.33 [0.2493]	0.33 [0.5628]	-0.97 (-0.656)
Interest Rate Spread	0.09 [0.7633]	0.21 [0.6450]	2.05 [0.1521]	–	5.73** [0.0167]	0.22 [0.6389]	0.001 [0.9655]	-0.11 (-0.606)
Market Capitalization	0.06 [0.8058]	0.03 [0.8657]	0.34 [0.5592]	0.42 [0.5181]	–	0.23 [0.6332]	4.50** [0.0338]	0.41 (0.7833)
Non-performing Loans	4.21** [0.0401]	2.25 [0.1335]	0.02 [0.8892]	0.22 [0.6423]	2.55 [0.1106]	–	1.14 [0.2865]	0.79 (2.8617)
Trade Openness	5.65** [0.0174]	3.16* [0.0755]	1.47 [0.2254]	2.28 [0.1314]	0.41 [0.5213]	0.003 [0.9581]	–	-0.67*** (-4.629)

Note: *, ** and *** denotes significance at 10%, 5% and 1% significance level, respectively. The figures in the squared brackets [...] indicate the p-values while the figures in the parenthesis (...) indicate the t-statistic.

Table A.8: Post Estimation Tests Results of the GDP Model

Residual Normality Test - Null-hypothesis: Residuals are normal	
Jarque-Bera Statistic	17.16773
Probability Value	0.2473
Residual LM Test - Null-hypothesis: No serial Correlation	
LM-Statistic	58.72953
Probability Value	0.1609
Residual Heteroscedasticity Test - Null-hypothesis: No Heteroskedasticity	
Chi-square	859.6359
Probability Value	0.3115

Table A.9: Sensitivity of Rural Poverty to Income Growth and Income Distribution

Dependent variable	Constant	Log income	Log Gini coefficient	R ²
Head count Ratio	5.2175 (14.33)	-0.5028 (-10.75)	0.4792 (7.61)	0.93
Poverty gap ratio	2.5105 (4.6)	-0.7648 (-10.92)	1.3801 (14.63)	0.96
Squared Poverty gap ratio	0.2894 (0.35)	-0.9585 (-9.0)	2.1116 (14.72)	0.96

Source: Ali and Thorbecke (2000) and Mwabu et al. (2003)

Table A.10: Sensitivity of Urban Poverty to Income Growth and Income Distribution

Dependent variable	Constant	Log income	Log Gini coefficient	R ²
Head count Ratio	1.595 (3.563)	-0.2389 (-4.419)	0.8977 (6.048)	0.76
Poverty gap ratio	2.8133 (3.933)	-0.4264 (-4.703)	2.1186 (8.534)	0.85
Squared Poverty gap ratio	4.0465 (3.121)	-0.585 (-3.559)	3.1553 (7.0109)	0.79

Source: Ali and Thorbecke (2000) and Mwabu et al. (2003)

Table A.11: Sensitivity of National Poverty to Income Growth and Income Distribution

Dependent variable	Constant	Log income	Log Gini coefficient
Head count Ratio	3.3685 (8.9464)	-0.37085 (-7.584)	0.68845 (6.829)
Poverty gap ratio	2.6619 (4.267)	-0.5956 (-7.8115)	1.74935 (11.582)
Squared Poverty gap ratio	2.16795 (1.7355)	-0.77175 (6.279)	2.63345 (10.865)

Author's own calculations based on Table A.11 and A.12

Table A.12: Correlation Matrix with Per Capita Consumption

	LNPer Capita Consumption	LNGDP Per Capita	LNCredit to Private Sector	LNNon- Performing Loans	LNInflation	LNInterest Rate Spread	LNTrade Openness
LNPer Capita Consumption	1.00						
LNGDP Per Capita	0.12	1.00					
LNCredit to Private Sector	-0.12	-0.42	1.00				
LNNon- Performing Loans	0.06	-0.22	0.22	1.00			
LNInflation	-0.22	-0.07	-0.18	-0.04	1.00		
LNInterest Rate Spread	-0.24	-0.04	-0.05	0.41	0.06	1.00	
LNTrade Openness	0.10	0.38	0.07	0.04	0.11	0.06	1.00

Table A.13: Correlation Matrix with Head Count Ratio

	LNHead Count Ratio	LNGDP Per Capita	LNCredit to Private Sector	LNNon- Performing Loans	LNInflatio n	LNInterest Rate Spread	LNTrade Openness
LNHead Count Ratio	1.00						
LNGDP Per Capita	-0.08	1.00					
LNCredit to Private Sector	-0.09	-0.42	1.00				
LNNon- Performing Loans	0.09	-0.22	0.26	1.00			
LNInflation	0.28	-0.08	-0.18	-0.02	1.00		
LNInterest Rate Spread	0.16	-0.04	-0.08	0.40	0.06	1.00	
LNTrade Openness	-0.10	0.48	0.06	0.02	0.11	0.13	1.00

Table A.14: Optimal Lag Length of the Model with Per Capita Consumption

Lag	LR	FPE	AIC	SC	HQ
0	NA	4.04e-13	-8.6719	-8.4093	-8.5712
1	661.8832	7.93e-19	-21.830	-19.7288	-21.0245
2	139.1657	1.34e-19	-23.707	-19.7668*	-22.1962
3	63.24045	1.42e-19	-23.9301	-18.1515	-21.7147
4	101.7933*	2.05e-20*	-26.4713*	-18.8539	-23.5510*

* indicates lag order selected by the criterion at 5% significance level

Table A.15: LM Test of Per Capita Consumption Model at Lag Two

Lag length	LM-Stat	Prob
1	74.0818	0.0118**
2	58.5479	0.1649
3	43.3389	0.7010
4	66.5306	0.0484**
5	62.7783	0.0893*
6	31.5123	0.9753
7	45.2500	0.6259
8	66.5130	0.0485**
9	53.8783	0.2932
10	45.2869	0.6244
11	29.4516	0.9879
12	52.2491	0.3489

* and ** indicates significance at 10% and 5% respectively

Inverse Roots of AR Characteristic Polynomial

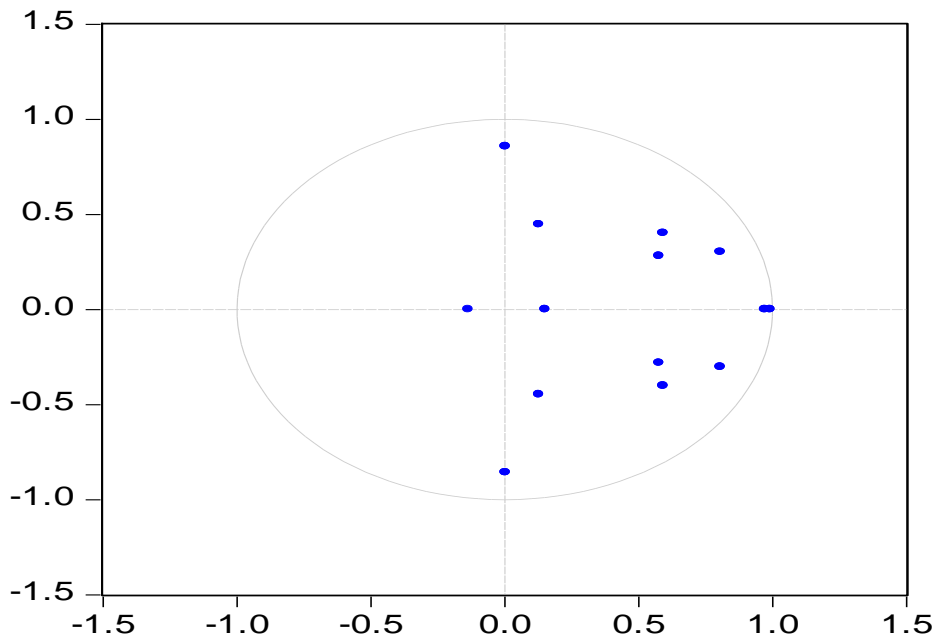


Figure A.23: Stability of the Per Capita Consumption VECM Model with Two Lags

Table A.16: Optimal Lag Length of the Head Count Ratio Model

Lag	LR	FPE	AIC	SC	HQ
0	NA	5.99e-13	-8.278420	-8.013267	-8.177097
1	580.7014	5.69e-18	-19.86153	-16.94334	-19.05095
2	107.3037	2.19e-18	-20.92062	-17.74031*	-19.40079
3	68.51219*	1.90e-18	-21.36155	-15.52819	-19.13245
4	65.87517	1.25e-18*	-22.43430*	-14.74488	-19.49595*

Table A.17: LM Test of Head Count Ratio Model at Various Lags

Lag length	Model at lag 2		Model at lag 3		Model at lag 4	
	LM-Stat	Prob	LM-Stat	Prob	LM-Stat	Prob
1	61.40685	0.1099	106.7643	0.0000**	42.59559	0.7288
2	48.31430	0.5008	56.32301	0.2199	39.13595	0.8423
3	55.19192	0.2522	79.46646	0.0038**	58.22306	0.1723
4	55.36662	0.2470	89.30649	0.0004**	64.31918	0.0699*
5	60.63419	0.1231	61.57016	0.1073	41.12980	0.7805
6	37.87295	0.8757	81.30631	0.0025**	45.69672	0.6078
7	53.19495	0.3159	65.20342	0.0605*	52.24921	0.3489
8	58.79231	0.1595	80.41507	0.0031**	75.13502	0.0096**
9	48.28450	0.5021	58.25858	0.1714	65.32527	0.0593*
10	54.39581	0.2766	67.76925	0.0390**	47.06637	0.5518
11	36.12776	0.9141	57.29386	0.1946	49.45397	0.4550
12	53.00519	0.3224	58.54731	0.1649	47.78774	0.5223

* and ** indicates significance at 10% and 5% respectively

Inverse Roots of AR Characteristic Polynomial

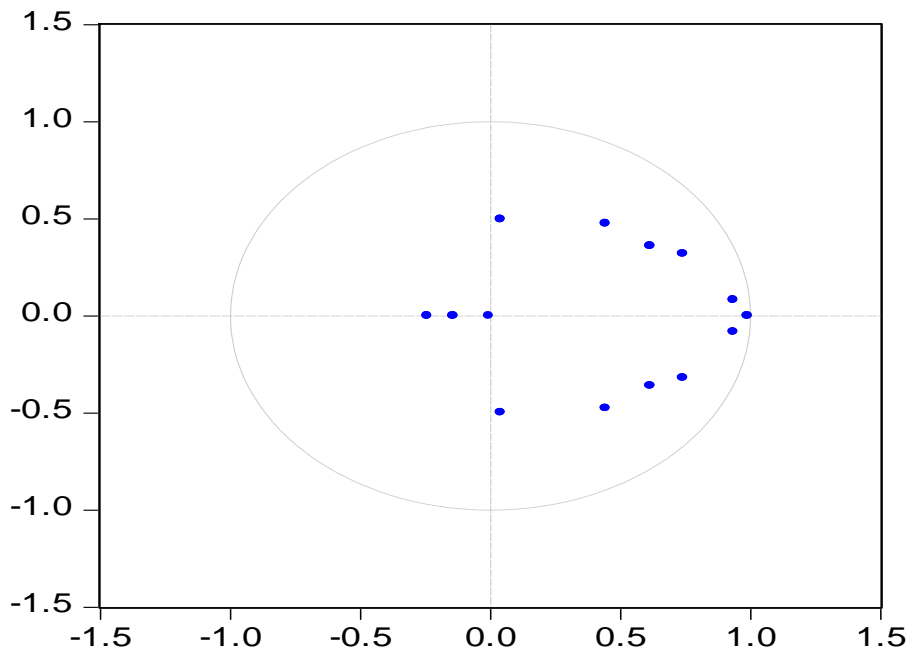


Figure A.24: Stability of the Head Count Ratio VECM Model with Two Lags

Inverse Roots of AR Characteristic Polynomial

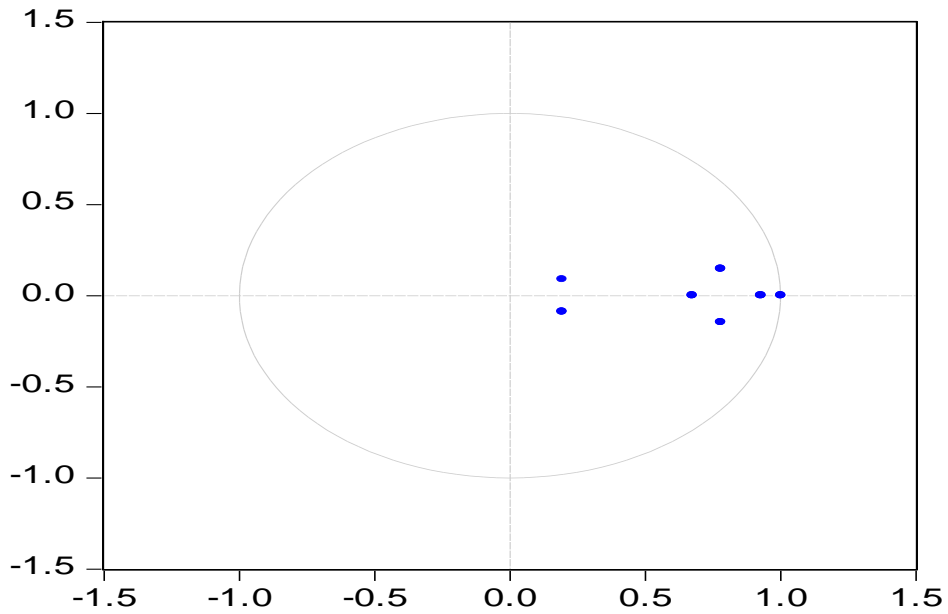


Figure A.25: Stability of the Head Count Ratio VECM Model with Three Lags

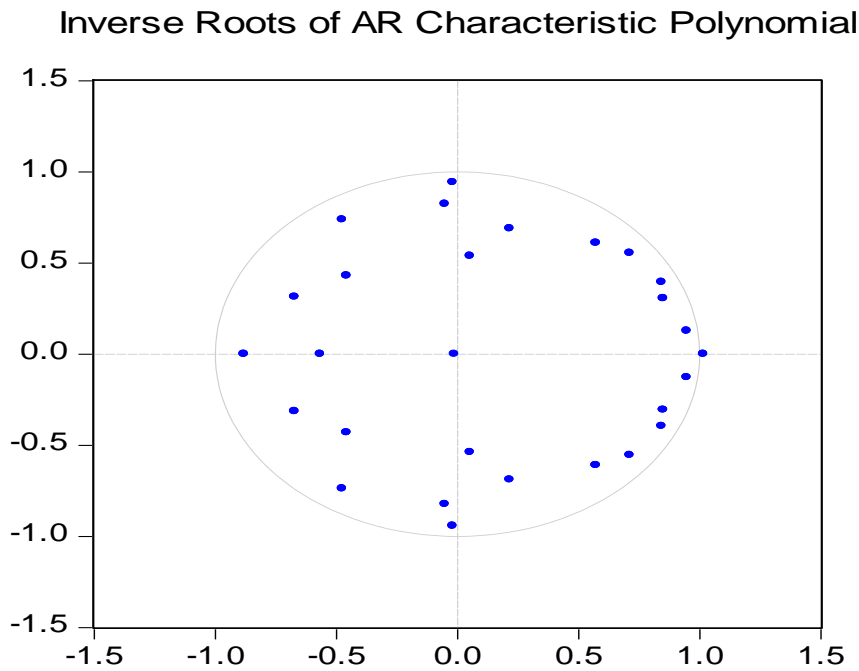


Figure A.26: Stability of the Head Count Ratio VECM Model with Four Lags

Table A.18: Post Estimation Tests Results of the Head Count Ratio Model

Residual normality Test - Null-hypothesis: Residuals are normal	
Jarque-Bera Statistic	10.64
Probability Value	0.1550
Residual Heteroscedasticity Test - Null-hypothesis: No Heteroskedasticity	
Chi-square	809.58
Probability Value	0.7688

Table A.19: Post Estimation Tests Results of the Per Capita Consumption Model

Residual normality Test - Null-hypothesis: Residuals are normal	
Jarque-Bera Statistic	378.49
Probability Value	0.007
Residual Heteroscedasticity Test - Null-hypothesis: No Heteroskedasticity	
Chi-square	808.7185
Probability Value	0.7753

Table A.20: Predicted Quarterly Head Count Ratio for the Period 2001 – 2014

Period	Predicted Poverty (Head Count Ratio)	Period	Predicted Poverty (Head Count Ratio)
2001q1	50.1	2008q1	48.8
2001q2	48.6	2008q2	48.8
2001q3	48.5	2008q3	48.7
2001q4	49.7	2008q4	48.5
2002q1	49.3	2009q1	48.3
2002q2	50.8	2009q2	48.3
2002q3	50.8	2009q3	48.1
2002q4	50.7	2009q4	48.1
2003q1	50.8	2010q1	47.7
2003q2	49.7	2010q2	47.1
2003q3	48.4	2010q3	46.9
2003q4	48.9	2010q4	46.9
2004q1	48.3	2011q1	47.3
2004q2	49.0	2011q2	47.6
2004q3	49.1	2011q3	47.9
2004q4	48.9	2011q4	48.4
2005q1	46.8	2012q1	48.4
2005q2	45.8	2012q2	48.6
2005q3	45.5	2012q3	48.5
2005q4	46.5	2012q4	48.4
2006q1	46.4	2013q1	47.6
2006q2	46.3	2013q2	47.2
2006q3	45.5	2013q3	47.3
2006q4	46.8	2013q4	48.8
2007q1	45.5	2014q1	47.7
2007q2	45.1	2014q2	47.2
2007q3	45.8	2014q3	47.5
2007q4	45.8	2014q4	47.4