FACTORS DETERMINING GROSS DOMESTIC SAVINGS IN KENYA

BY

MONICAH MWENDE KIVINDU

X50 /68905/2013

SUPERVISOR

DR. URBANUS KIOKO

Research paper submitted to the school of Economics, University of Nairobi, in partial fulfillment of the requirements for the award of the degree of Masters of Arts in Economics.

November 2015

DECLARATION

This research paper is my original work and to the best of my knowledge, it has never been presented for the award of a degree in any other university.

Sign: ....   Date: ....

Monicah Mwende Kivindu

X50 /68905/2013

APPROVAL

This research paper has been submitted for examination with my approval as university

Supervisor

Sign: ....   Date: ....

Dr. Urbanus Kioko

DEDICATION

I dedicate this project to my family: Dad, Mum, Florence, Jeremy, Doreen and Brenda, without whose love and support it would not be possible. Thank you Dad and Mum for emphasizing to us the importance and value of education in any form.

ACKNOWLEDGEMENT

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABSTRACT

The rate of growth of gross domestic savings in Kenya has been declining over the years. This is in line with the low economic growth rate and high rate of inflation facing the country. The aim of the study was to establish the factors determining gross domestic savings in Kenya by extending the analysis to include technology as a potential determinant of savings in Kenya. Co-integration and Vector Error Correlation Model were used to explore the effect of the factors determining Gross Domestic Savings in Kenya using annual time series data covering the period 1980-2014.

The results show that coefficient on technological advancement in terms of internet users, domestic savings provided by financial institutions and GDP growth rate is positive and statistically significant at 5% level of significance. This implies that an increase in 1% of the number of internet users, amount of domestic credit provided by financial institutions and the GDP growth rate leads to a 0.1289%, 0.3207 % and 0.3124 % increase in domestic savings respectively. However, coefficient on inflation rate was negative and statistically significant at 5% level of significance implying an increase in 1% of the inflation rate leads to a 0.1223% decrease in domestic savings. Finally, the dependency ratio, rate of interest and technological advancement in terms of mobile cellular subscriptions were found not to be significant factors.

The research concluded that the rate of growth of gross domestic savings determines the extent of investment in an economy and this plays a key role in driving the economic growth agenda. Recommendations were made to boost and encourage adoption of technology in terms of internet access, promote economic growth, ensure growth in the financial sector and to reduce the level of inflation.

CHAPTER ONE: INTRODUCTION

1.1 Background

Prinsloo (2000) defines savings as that part of disposable income that is not immediately consumed in the process of purchasing a good or a service by an economic agent. According to Nwachukwu and Odigie, (2009), savings is a vital economic growth variable of any economy because it enhances capital formation, increases public and private investments as well as speeding up the rate of economic growth. Saving is considered critical for investment and macroeconomic stabilization. Differences in the rates of saving and investment bring about disparity in the growth performance between countries. For a country to achieve price and financial stability, economic growth, reduced poverty, sustained development, and macroeconomic balance a strong saving performance has to be attained (Adewuyi and Arawomo, 2007). However, despite the flow of foreign capital from other countries, a country's economic growth and investment is determined by its own domestic saving.

The savings rate in Africa has been low compared to the other continents. This is attributed to the fact that Africa is faced with credit constraints and low income which negatively affect the existing incentives to save (Kibet *et al*., 2009). Developing Countries have low savings and experience difficulties in developing productive investments. Sub-Saharan Africa's average savings rate has increased from 10 percent of Gross Domestic Product (GDP) in the 1990s to 14 percent of GDP during the 2000s, and by 2011 it reached 17 percent of GDP.

However, despite the increase in savings in SSA, gross domestic savings rates in Kenya have remained generally very low (Kahangi and Muturi, 2013). According to the World Bank indicators, GDS as a percentage of GDP has been declining over the last 3 years. It averaged 12.82% between 1980-2014 with the highest ratio of 22.56% recorded in 1993 and the lowest

ratio of 3.90% in 2014. This is due to the fact that, in 1993, the Government of Kenya launched a major program of economic reform and liberalization where price and foreign exchange controls were eliminated and publicly held companies privatized leading to increased level of domestic savings (Arok, 2014). The low rate in 2014 was attributed to the reduced level of income earned at the domestic level as a result of reduced tourism. In addition, there was minimal agricultural production which led to low income and necessitated expenditure on consumption (either from imports or even at the household level) reducing the level of Gross domestic savings.

Figure 1.1: Kenya's gross domestic savings (%), 1980-2014
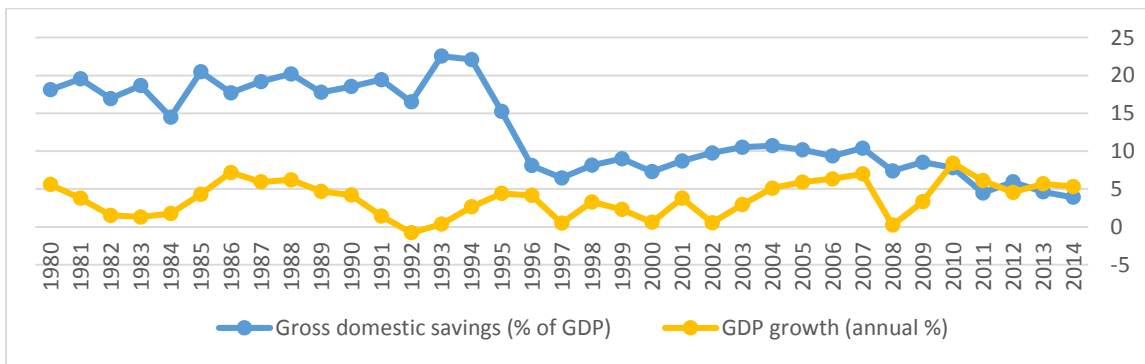
Source: World Bank

1.1.1 Trends in macroeconomic variables

The economic growth rate trend for Kenya has been volatile as shown in figure 1 with the least growth rate of -0.80 % reported in 1992. This was as a result of the high inflation rate as a result of excess liquidity arising from printing of money used to fund the general elections. The highest growth rate in Kenya between the periods 1980 to 2014 was 8.4% achieved in the year 2010. This is linked to the introduction of the new constitution leading to improvement in the performance of majority of the sectors in the economy.

The economic growth rate was however at an average of only 3.73% through the period 1980 to 2014. The GDP annual growth rate amounted to 4.5%, 5.7% and 5.3% in 2012, 2013 and 2014 respectfully. Kenya's economy is projected to increase by 6% in 2015, 6.6% in 2016 and 6.5% thereafter in 2017 (World Bank, year). However, GDP per capita has been slowly increasing due to the high rate of growth in the total population.

These positive projections of the country's growth assume there will be plenty of rainfall which is likely going to improve production in the agricultural sector coupled with macroeconomic stability, reduced oil prices at the international level, stable exchange rate, improved security level in order to attract more tourists, a reformed government and justice for all (African Economic outlook, (AEO 2015) . The trend in Kenya's inflation rate and real interest rate over the period 1980-2014 is shown in Figure 2. The country has also experienced price fluctuations over the period 1980 to 2014 with an average inflation rate of 12.61%, the highest inflation rate of 45.98% in the year 1993 and the lowest rate of 1.55% in the year 1995. In 2013 and 2014, the Kenyan economy experienced relatively stable macroeconomic conditions with very low (single-digit) level of inflation. In 2014, the inflation rate was 6.9%; further estimated to fall to 6.4% in 2015 by the Kenya National Bureau of Statistics.

Figure 1.2: Kenya's inflation rate and Real interest rate, 1980-2014
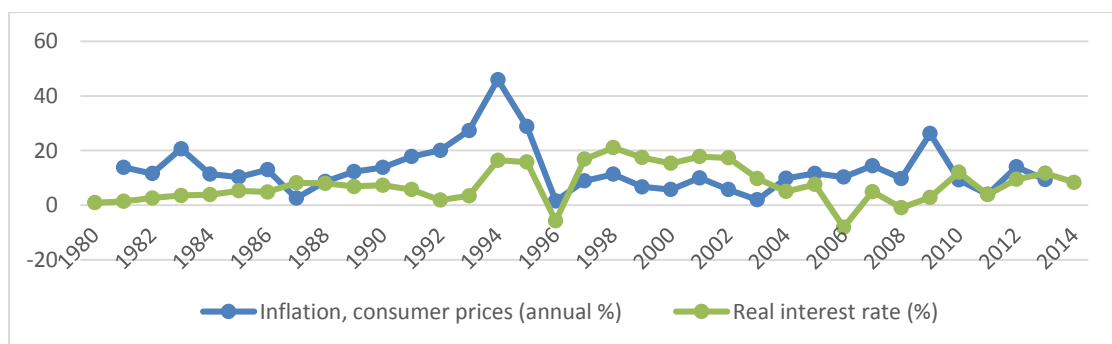
Source: World Bank

The Real Interest Rate (RIR) is the lending interest rate adjusted for inflation as measured by the GDP deflator. Over the period 1980-2014, the trend in RIR has also been erratic with an average rate of 7.5%, a maximum of 21.1% in the year 1998 and a minimum of -8.13% in the year 2006. The domestic credit provided by the financial sector as a percentage of GDP has been increasing over the last 6 years from 35.58% in the year 2009 to 44.58% in the year 2014. The highest domestic credit as a percentage of GDP provided was at 53.25% in 1991 while the lowest was at 31.74% in the year 2007 and the average at 43.48% over the period 1980-2014. The low ration in the year 2007 was as a result of increased credit advanced to the central government to fund the 2007 general elections. The trend in Kenya's population and dependency ratio growth has been indicated on table 1.1.

Table 1.1: Kenya's population growth and dependency ratio

Variable	Measure	Period
Population growth	1.16 million	2010 to 2014
The population(0-14years) average growth	42.38%	2009-2014
Dependency ratio(Young as a % of working-age population)	90.28%	1980-2014
Dependency ratio(Young as a % of working-age population)	77.10%	2009 -2014

Source: Kenya National Bureau of Statistics (2014)

1.1.2 Trends in technology

Kenya has experienced tremendous changes in technology over the past years. Mobile cellular subscriptions were launched from the year 1992 while secure internet servers were introduced in the year 2001. The rate of internet users has growth at 9.6% from the year 1995-2014. The Kenyan mobile company Safaricom and one of the Local Banks in Kenya, Commercial Bank of Africa (CBA), launched the Mshwari mobile product service which gives mobile users access to banking services such savings and loans without walking in to the bank or filling forms. This product mainly targets people who run informal businesses and helps them save as little as 1 Kenya shilling and later on borrow based on the amount of savings. The Kenya Commercial Bank (KCB) in October 2015 launched a new service on a mobile platform, with the KCB M-Benki that allows non-KCB customers to open bank accounts straight from their mobile phones. Majority of the local banks in Kenya have also adopted mobile banking where account holders are able to deposit and transfer money from their mobiles to the various bank accounts and vice versa.

1.1.3 Policies in place to alleviate the level of savings

The Government of Kenya through the Microfinance Act enabled deposit taking Micro Finance Institutions to mobilize general public savings as part of financial liberalization. This micro finance industry is expected to play an important role in deepening financial markets and enhancing access to financial services and products by majority of the Kenyans. On the other hand financial institutions mainly banks have widened their network to cover the rural parts in the country (Kibet *et al*., 2009).

Policy measures are in place currently to enhance the level of savings. The Government of Kenya has adopted both monetary and fiscal policies such as increasing the interest rates and increasing the direct taxes aimed at reducing the level of disposable income. These policies are meant to control inflation. In order to reduce the population growth and hence reduce the dependency ratio, the government has encouraged families to adopt family planning methods. Lastly, the government has ensured availability and access to credit especially to the youth to promote innovations and investment.

1.2 The Statement of the Problem

High investment is important towards achieving rapid economic growth. Moreover, countries that experienced high economic growth had relatively high saving rates. (World Growth Report 2009). Bankole & Fatai (2013) noted that economic growth in Nigeria was caused by the growth on the rate of domestic savings where else Arok (2014) found a unidirectional causality which runs from economic growth (GGDP) to gross domestic savings (GDS). Kenya is faced with low rate of savings and economic growth is mainly funded by inflows of foreign savings. This was evident in the year 2013 where the country achieved a 17% of GDP investment rate despite the low rate of savings (Kenya Economic Update, 2013).

Previous Studies in Kenya on savings such as by Arok (2014) and Nwachukwu and Egwaikhide (2007) have majorly focused on macro-economic variables such as interest rates, Inflation, Per Capita GDP and these have showed mixed results. The studies have also not taken into accounts the technological advancement and the current savings mobilization by

both financial and micro financial institutions. In order to ensure that the current changes and dynamics in the economy are incorporated in establishing the factors determining savings and the impact of these factors on savings, variables such as technological advancement, growth in financial and micro finance institutions, shall be added and the impact on savings determined.

Moreover, these studies provide recommendations on policies to implement in order to improve the level of savings in Kenya, but on the contrast, the rate of savings in Kenya has still remained low with an average of 20% of GDP over the past 5 years. These changes in technology and the persistent low level of gross domestic savings indicate the need to relook at the factors determining savings in Kenya in order to be able to address the lack of domestic resources which in turn would be used to finance investment thus help sustain the growth agenda.

In 2014, Kenya's economy growth rate was 5.4% and is projected to grow to 6% in 2015, 6.6% in 2016 and this will reduce slightly to 6.5% thereafter in 2017. The Kenyan Government aims to achieve economic transformation from a low income country to a newly industrialized middle income country by the year 2030 (Ndirangu and Muturi, 2015). In order to achieve the projected growth in the economy, there is need to establish the factors determining the level of gross domestic savings in order to reduce the reliance on foreign direct investment in financing the country's growth agenda as a supplement to the low domestic savings.

1.3   The aim of the Study

This study aim is to establish the factors determining gross domestic savings in Kenya.

1.3.1   Specific Objectives

The specific objectives of the study are:

1. To identify factors that influence savings in Kenya.

2. To investigate the effect of technological change on domestic savings

3. To estimate the effects of the factors on gross domestic savings.

4. To draw policy recommendations based on the findings of the study.

1.4   Justification of the study

With the current technological advancement and the average expected growth rate of 6% of the Kenya's economy by 2017, there is need to increase the rate of investment which in turn requires an improvement in the savings rate. The current savings ratio of 4 percent of GDP in Kenya indicates the need for appropriate policies that will raise the saving rate in the country.

Currently, existing literature has focused on various macro-economic variables such as interest rates, inflation and Per Capita GDP but ignored the effect of the current technological advancement on savings and on the macro-economic variables as well. The results of these studies do not reflect the current state of savings in Kenya as a country and may not be applicable in addressing the decline in gross domestic savings. This study shall focus on the factors determining gross domestic savings in Kenya by taking into consideration the effects of the current innovations in technology on gross domestic savings.

Finally, the results of this study complement existing literature on the savings behaviour in Kenya and will be of importance to policy makers in Kenya and other developing countries in identifying the relevant and appropriate policy measures improve technology in order to mobilize savings. The results will also be utilized by the emerging micro finance institutions to develop strategies towards ensuring that they reach out and mobilize more people to save.

1.5   Structure or Organization of the research

The rest of this research was organized as follows. Chapter two reviews the theoretical and existing empirical literature on gross domestic savings. Chapter three presents the research methodology, while chapter four presents the results of the study. Lastly, chapter five presents the conclusion and policy recommendations.

CHAPTER TWO: LITERATURE REVIEW

2.1   Introduction

This chapter provides a critical review of the existing theoretical and empirical literature on the factors determining gross domestic savings in rural areas according to the study variables.

2.2   Theoretical literature review

Developing countries are concentrating on economic growth and exploiting the strategic variables that improve the growth of the economy. Savings plays a key role and determines investment in a country. Economic theories consider both savings and consumption together since a decision by a consumer to consume implies a consequent decision not to save the amount (Mbuthia, 2011).

In economic literature, there are several theories of savings and factors which determine savings. These theories include among others: the McKinnon-Shaw Hypothesis, the life-cycle hypothesis (Modigliani and Brumberg, 1954; Modigliani and Ando, 1957; Ando and Modigliani, 1963); the permanent income hypothesis (Friedman, 1957); and the relative income hypothesis (Duesenberry, 1949). All four theories have their conceptual roots in the microeconomic theory of consumer choice.

2.2.1   The McKinnon-Shaw Hypothesis

This theory was developed independently by McKinnon (1973) and Shaw (1973). The McKinnon and Shaw hypothesis also referred as the financial liberalization hypothesis focused on financial repression and pointed out that the financial markets in developing economies

need to be liberalized in order to allow market forces to determine real money balance demand, real interest and rates of investment.

From the hypothesis the rate of return on savings, as measured by interest rates positively affect the rate of saving. Policies that lead to financial repression reduce the incentives to save (McKinnon and Shaw, 1973). The McKinnon-Shaw Hypothesis originally focused on interest rates, but later on focused on the adverse effects of high reserve ratios and credit programmes aimed at funding the government activities, which together contributed to low savings, credit rationing and low investment.

Ang and McKibbin (2007) further notes that financial deepening is hindered by interventions such as restriction maintained on financial system operations e.g. laws and regulations, imposing a ceiling on the interest rates, setting high reserves to be maintained by financial institutions and direct credit programs that are initiated by the government. This disrupts the functioning financial systems and consequently have an effect on both the quality and quantity of investments thus a significant negative impact on economic growth.

The hypothesis further notes that high interest rates play a crucial role in attracting savings and thus maintaining a high level of the supply of credit, increasing the number of financial institutions and maintaining intermediaries in the financial sector which lead to high levels of investment and growth in the overall level of output. Bencivenga and Smith, 1991 in their study found out that development in the financial sector positively impact the growth of the economy in line with the McKinnon-Shaw hypothesis.

2.2.2   Theories based on the level of income

2.2.2.1 Life Cycle Hypothesis

This was formulated by Modigliani and Brumberg (1954) and Ando and Modigliani (1963-1964). According to the theory, economic agents spread consumption in their life time over their lives and this is done by gathering or accumulating savings during the period when they are earning and maintaining their levels of consumption when they retire.

The age of consumers and the demographic structure of a community or society rather than the income of given families are factors that drive the level of savings and consumption. The theory observes that the income earned by an individual during their lifetime determines their level of consumption. During the early stages of life of an individual, he/she is a net borrower because the income is usually lower than the levels of consumption. In this stage, the individual consumes from what they have not earned. It is assumed that the consumer at this stage of life has no wealth inheritance from neither their guardians nor their parents. As life progresses and the individual is involved in economic activities he/she is expected to accumulate and maintain a more or less constant or increasing consumption level.

The middle years of life provides an opportunity for most consumers to work and the income grows and exceeds their level of consumption. This point in life according to Ando and Modigliani is the saving period in life. The consumers at this point meets the debt accumulated from the early stages of life and keeps or saves the reminder of their income for consumption

in the future assuming that he/she retires. The last year of life is the dis-saving period according to the hypothesis and the level of income generation reduces as well as the savings.

The prediction made by Ando and Modigliani's life cycle hypothesis is that the age structure of a society's population influences the rate of saving and that the ratios of dependency will negatively impact and affect the rate of savings. The main factor and parameter that controls the ratio of wealth to income and the rate of saving for a given level of growth is the length of retirement.

2.2.2.2 Permanent Income Hypothesis

Friedman's (1957) permanent income hypothesis gives a description of the manner in which economic agents spread consumption over their lifetimes by assuming that a consumer's level of consumption is affected by the income they earn currently and the income that they expect to earn in the future i.e. the permanent income. The theory distinguishes between permanent consumption, that is, planned or constant consumption which depends on permanent income, from transitory consumption which is the unexpected consumption completely independent of income. The hypothesis postulates that changes in permanent income, rather than changes in temporary income, drive the changes in a consumer's consumption patterns.

Thus, households determine their future consumption levels by dividing their current disposable income between consumption depending on the current disposable income and expected lifetime wealth and income. Households therefore determine the present value of assets that are available for consumption in the future and divide it evenly to permanent income so that they can maintain a constant level of consumption.

In the model, permanent income changes lead to large changes in consumption whereas temporary changes in income do not affect the level consumption. According to the hypothesis, savings is termed as future consumption and the ratio of observed savings to observed income increases as observed income increases. This explains the reason why different classes of people have different saving patterns.

2.2.2.3 Relative Income Hypothesis

This was formulated by James Duesenberry (1949). The relative income hypothesis stipulates that a consumption pattern of a consumer is determined by two main factors. First, their current income which mainly depends on the income standard set by the household in the past depending on the income earned in the past. Secondly the consumption pattern is dependent on the income earned by the households around the consumer. This is based on the argument that the status one holds in a society matters and that as one's fellow society members consume quality goods, he or she will not be satisfied with the lower quality goods he or she may be purchasing and hence would want to keep up with the standards of the community.

The hypothesis argues that families earning similar level of income have different consumption patterns. In this case, the consumption level of each family depends on the relative income of group that the family has placed itself in. Families with high levels of income tend to have high consumption levels when compared with the level of income they earn and this is meant to ensure that such families remain in the same class or standard with the families in the same group. A family's savings depend on its income.

2.3   Empirical literature review

Empirical studies have been carried out regarding the factors determining savings in both developed and developing countries. These studies used techniques such as the error correction model to minimize the possibility of estimating spurious relations while ensuring that long-run information is maintained while other studies used the co-integration model in their analysis.

In India, Athukorala and Sen (2004) used the Error-Correction model to examine the determinants of private saving covering 1954-1998. The study included variables such as rate of growth of real per capita Gross National Disposable Income (GNDI), rate of growth of the population, real wealth, Real per capita GNDI, nominal interest rate minus inflation rate, population per bank branch, terms of trade, the total lending to household sector by domestic financial institutions, share of agriculture in total GDP, remittances by Indian expatriates relative to GNDI and public saving as a ratio of GNDI. The results showed that Gross Domestic savings is significantly influenced by Gross Domestic Product in India for the period observed. Besides, nominal interest rate on bank deposits minus the inflation rate, the rate of growth of real per capita GNDI, the real per capita GNDI and the rate of inflation positively influenced the rate of private saving while Population per bank branch, terms of trade and Public saving as a ratio of GNDI negatively influenced the level of private savings. The rate of growth of the population, real wealth, total lending to household sector by domestic financial institutions as a ratio of GNDI and share of agriculture in total GDP did not statistically have a significant effect on the rate of private savings.

Using the Granger-causality and Engle-Granger co-integration techniques, Bankole and Fatai (2013) examined the relation between the level of savings and the rate of economic growth in Nigeria during the period 1980-2010. The study used GDP and percentage changes in consumer prices as the independent variables. The findings of the study showed that the rate of economic growth in Nigeria is caused by the growth on the rate of domestic savings. The researchers accepted the Solow's hypothesis that savings precedes economic growth but reject the Keynesian theory that it is economic growth that leads increases the level of savings.

In Kenya, Ndirangu and Muturi (2015) studied the determinants of gross domestic savings for the period 1970-2013. In the study Gross Domestic product (GDP), inflation rate, real interest rate and age-dependency ratio were included as independent variables and their effect on the gross domestic savings in Kenya estimated using the error correlation model. The results of the study showed that GDP significantly explained the changes in the GDS at 10% level of significance. Inflation rate and age-dependency ratio were also found to have a positive effect on gross domestic savings while the real rate of interest was inversely correlated to the gross domestic savings.

In an attempt to investigate the determinants of private savings in Nigeria during the period covering 1970-2005, Nwachukwu, and Egwaikhide (2007) used the Error-Correction modelling procedure. The effect of the inflation rate, the rate of public saving, rate of private saving, terms of trade, the degree of financial depth, the rate of real per capita GNDI, rate of growth of real per capita GNDI, the real interest rate and ratio of external debt on the private saving rate of Nigeria was estimated. The results showed that there is a positive correlation between the saving rate and the level of disposable income. The real interest rate on bank

deposits has a significant negative impact on the savings behaviour in Nigeria as this increases the cost of borrowing funds which then reduces the amount of available credit for investments and in turn the level of income. In addition, the rate of inflation, ratio of external debt service and terms of external trade had a positive impact the rate of private saving. High inflation leads to an increase in prices which in turn increases the level of income among middle income earners. This improves the level of savings and boosts investment. Low ratio of external debts implies a reduction in the amount of foreign debt accumulated by a country and the burden of servicing the debt. Consequently, internally generated funds can be used to fund projects that improve the level of economic growth and hence lead to high income. This then increases the level of savings. The researcher recommended that the government of Nigeria needs to focus on increasing the level of production in the economy which in turn would lead to the growth in the level of real income and creation of employment opportunities.

Touny (2008) studied the determinants of domestic savings performance in Egypt during the period 1975-2006. The model included independent variables such as the rate of inflation, rate of growth fixed per capita income, ratio of current account deficit relative to the economy's GDP, real interest rate, ratio of the budget deficit and broad money supply (M2) relative to the GDP. From the study, the inflation rate and growth rate of per capita income in Egypt positively and significantly affect the rate of domestic savings both in the short run and in the long run. The budget deficit ratio negatively affected the savings ratio which meant that increased savings by the government tend to crowd out private savings. Further, the study showed that the current account deficit had a negative effect on the rate of domestic savings both the short run and the long run and thus Egypt may have to rely on external savings to substitute the low level of domestic savings.

From the Study it was found that in the Short run, real interest rate significantly determined the rate of domestic savings while in the long run, its effect on domestic savings was insignificant determinant. On the Contrary, in the short run, the ratio of broad money supply was an insignificant determinant but in the long run, this was a significant determinant.

In Ghana, Larbi (2013) used the co-integration approach in examining the long run factors determining the level of private domestic savings. The findings of the study identified the rate of inflation, the degree to which the financial sector is liberalized and the level of per capita income as significant factors that influence the level private savings. The researcher recommended that the government needed to deepen the extent of financial liberalization in order to ensure that financial institutions offer improved financial packages for increased savings.

Arok (2014) examined the major determinants of gross domestic savings rate (GDS) in Kenya using secondary annual data for the period 1971-2012. Economic growth, public savings, real per capita income, M2, current account balance and deposit interest rate were used as the variables in the model and the model estimated using the co-integration and error correction models. The findings pointed out that in the long run, real per capita income significantly affect the rate of domestic savings in Kenya. On the other hand, rate of interest on deposits, public savings and current account deficit have a negative impact on domestic savings in the long run.

Using a micro economic approach, Kibet *et al.,* (2009) studied the determinants of household savings in rural Kenya. The Study focussed on smallholder farmers, entrepreneurs and teachers in Nakuru. Through application of least squares method the results of the study showed that

the level of household savings is determined by the level of income and education of a household, dependency ratio, the gender and age of the head of the household, type of occupation, the amount of service charge, the amount spent on transport costs and the accessibility of credit. On the other hand, the results showed that the rate of interest has a slight negative effect in determining the level of household savings.

In Ethiopia, Teshome *et al*, (2013) also adopted a micro economic approach to establish the Determinants of Rural Household Savings. The study examined the saving behaviours among rural household in East Hararghe Zone, Oromia Regional State, Ethiopia using survey data which was generated from 700 sample households using the Tobit model for analysis. The results of the study showed that household head education level, livestock holdings, access to credit service, income, investment, training participation, forms of savings and saving motives significantly determined the level of rural household savings.

2.4   Overview of empirical literature

From the empirical literature, various macroeconomic factors determining the rate of domestic savings were identified. GDP and the rate of growth of GDP were identified as the significant factors influencing domestic savings in the study by Athukorala and Sen (2004), and Bankole and Fatai (2013). Nwachukwu and Egwaikhide (2007) and Touny (2008) on the other hand revealed real interest rate as the main factor determining savings in their studies. Other macro-economic variables such as the budget deficit ratio to GDP, ratio of broad money supply (M2) to GDP, current account deficit ratio to GDP, external debt service ratio, the rate of inflation, per capita income and terms of have also been showed to affect the rate of domestic savings

from previous empirical literature. Demographic factors were also noted as factors determining savings.

The results of these studies may not reflect the current changes in the economy resulting from the advancement in technology such as the introduction of the mobile phones platform and online banking which has also led to growth in the financial sector. This study extends the analysis to include technology as a potential determinant of savings in Kenya. None of the previous studies in Kenya and outside Kenya has made an attempt to assess the contribution to increasing savings rate in the country. Technological advancement measured in terms of the number of mobile phone subscriptions and the number of secure internet users as well the banking sector depth and financial sector development in terms of size will be considered as some of the determinants affecting the rate of gross domestic savings in Kenya and their effect estimated.

The use of mobile phones ensures that customers are able to access the various products availed by financial institutions such as loans and customer deposits. The use of mobile phones leads to reduced queues in financial institutions and makes it easier for customers to deposit any amount of deposits in the bank accounts. On the other hand, the use of online banking technology also eases the banking process which enables customers to access financial institutions products without having to visit the branches. This improves the level of savings as customers are able to easily deposit funds in their various accounts.

CHAPTER THREE: RESEARCH METHODOLOGY

3.0   Introduction

In this chapter, the methodology used in the study is presented. The description of variables, the data type and sources and data estimation technique are also presented in this chapter. From the empirical literature, various macroeconomic and demographic factors determining the rate of domestic savings were identified. Econometric analysis was used to establish the estimate the effect of the determinants on gross domestic savings in Kenya over the period 1980-2014.

3.1   Nature and type of data

The study used annual secondary time series data from 1980 to 2014. The data was obtained from sources such the Central Bank of Kenya for the years 2014, the World Development Indicators (2014), World Bank data bank (1980 to 2014), the African Development Indicators database (1980 to 2014). Data was picked from the database in excel format and used for running the regression.

3.2   Theoretical framework

In order to estimate the factors determining domestic savings in Kenya, the seminal work of McKinnon and Shaw in1973 was used to derive the empirical model used in the study. From the hypothesis the rate of return on savings, as measured by interest rate would have a positive effect on saving rates. The variables in McKinnon-Shaw Hypothesis are supported by major theories on savings and have been captured in relevant empirical literature with regards to savings. Furthermore, the model has been adopted by various researchers in previous literature on savings in developing countries and thus is appropriate for Kenya.

The McKinnon and Shaw in1973 complementarity hypothesis is as shown in equation 1:

$$M/P = L(Y, d - \pi^e, I/Y); \quad L_Y > 0, L_{I/Y} > 0, L_{d-\pi^e} > 0 \quad \text{....................…………} \quad (1)$$

Where, M/P is demand for money balances, Y is real income, I/Y is ratio of real investment to real income, d is nominal interest rate on savings and time deposits, π^e is expected rate of inflation, and d- π^e shows the real interest rate..

Equation (1) gives the long-run real money demand function. L_Y represents the impact of income on money demand and thus this implies that an increase in the income generates a strong demand for money. $L_{I/Y}$ represents the response of money demand to investment rate implying that investment increases the monetary saving. $L_{d-\pi^e}$ represents a positive impact of real interest rate on money demand. The ratio of actual investment to income (I/Y) must correspond to existing savings in the economy under an equilibrium condition as shown in equation 2

$$I/Y = S/Y = F(r, d-\pi^e) \quad \text{………………………………………………………} \quad (2)$$

Where, S/Y is the ratio of actual gross domestic savings to income and r is rate of return on capital. Real deposit rates are usually below equilibrium level under a financially repressed economy due to the fact that rise in interest rates towards equilibrium induces economic agents to shift from other assets to savings, thus a positive relationship exists between savings and the real deposit rate (d-π^e). Equations 1 and 2 are then differentiated and the result divided by the

differential in order to derive the relationship between savings and growth in the demand for real money balances as follows:

$$\frac{d(M/p)}{d(S/Y)} = \frac{d(M/P)/d(.)}{d(S/Y)/d(.)} = \frac{i(.)}{f(.)} > 0 \quad \text{... (3)}$$

Equation 3 gives a positive relation between savings rate and the demand for real money balances. Thus savings rate can be incorporated as a factor determining the demand for real money balances as indicated in equation 4;

$$M/P = L(Y, S/Y, d - \pi^e, I_G/Y); \ L_Y > 0; L_{S/Y} > 0; iI_G/Y > 0; \ L_{d-\pi^e} > 0 \text{............. (4)}$$

From equation 4 a rise in real interest rates leads to an increase in savings and also growth in the demand for real money leading to an increase in savings. The conditions of money supply have first-order impact on decision to save and invest, thus a savings function that involves demand for real money is given as follows;

$$S/Y = (Y, r, M/P, S_G/Y, U) \text{... (5)}$$

Where, S/Y is the ratio of actual gross domestic savings to income, r is rate of return on capital, M/P is demand for money balances, S_G/Y is the growth rate of gross domestic savings and U is the error term.

3.3   Empirical Model Specification

In order to estimate the effects of the factors determining gross domestic savings on gross domestic savings this study adopts the model in equation 5. In addition to the variables considered in the model, the model was modified to omit the demand for money balances variable and the growth rate of the real Gross Domestic Product, the inflation rate, the domestic credit provided by the financial sector, the age dependency ratio, and the rate of technological

advancement independent variables are added. These variables were added in order to capture the factors that were used in the research.

Based on the time series data on savings over the period 1980-2014 an econometric analysis was used to determine the factors affecting Gross Domestic savings in Kenya.

The linear model is expressed as follows;

$$GDS= f\,(GGDP,\ INF,\ RIR,\ DCFI,\ DR,\ TA,\ U)\ldots..\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ (6)$$

The econometric model is thus explicitly expressed as follows:

$$(\textbf{GDS})_{t=}\quad \beta 0\quad +\quad \beta 1\textbf{GGDP}_t+\quad \beta 2\quad \textbf{INF}_t+\quad \beta 3\textbf{RIR}_t+\quad \beta 4\textbf{DR}_t\quad +\quad \beta 5\textbf{DCFS}_t$$

$$\beta 6\,\textbf{TA}_t\ +Ut\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ (7)$$

Where, GDS is the gross domestic savings as a proportion of GDP, GGDP is the growth rate of the real Gross Domestic Product (GDP), INF is the rate of inflation, RIR represents the real interest rate, DCFS shows the domestic credit provided by the financial sector as a percentage of GDP, DR is the age dependency ratio, TA is the rate of technological advancement and Ut is the error term. In the econometric model, t represent the time period under analysis while β1 to β7 are the co-efficient of associated independent variables; and β0 is the constant intercept of the equation.

3.4 Variable Definition and Priori Expectations

Table 3.4.1: Variable definition, measurement and priori expectations

Variable	Definition	Measurement	Expected sign and inference
GDS	This is the dependent variable in the study. Arok (2014) defines GDS as the total domestic savings by government, firms and households in a given year where savings could be in terms of bank deposits; loans and invested funds.	GDP less final consumption expenditure (total consumption).	This is dependent variable
GGDP	The World Bank defines GGDP as the annual percentage growth rate of GDP at market prices based on constant local currency and is used as the measure of a country's economic growth.	Weighted average of GDP	A positive relationship is expected between GGDP and GDS. This is consistent with the findings by Athukorala and Sen (2004).

INF	The International Monetary Fund define inflation at consumer prices as the annual percentage change in the cost to the average consumer of acquiring a basket of goods and services that may be fixed or changed at specified intervals, such as yearly.	Consumer price index	A negative sign is expected. Adewuyi, Bankole, & Arawomo (2007) states that high rate of inflation largely erodes People's purchasing Power and hence reduces their capacity to save.
RIR	This is lending interest rate adjusted for inflation as measured by the GDP deflator according to the IMF, International Financial Statistics and data files.	Lending interest-inflation	A negative sign is expected which is consistent with the findings by Touny (2008) and Arok (2014). High interest rates discourages people from savings as it would be more expensive to borrow funds.
DCFI	The IFS refers domestic Credit provided by Financial institutions as any form of credit advanced to the various sectors in an economy on gross basis but does not include credit advanced to the central government.	Total credit advanced-credit to central government for	A positive sign is expected. Development of the financial sector is expected to avail more methods and channels for savings increasing the level of domestic savings.

	This variable is a proxy of the banking sector depth and financial sector development in terms of size.	the years 1980-2014.	
DR	In this study the DR means the ratio of young dependents i.e. people who are less than 15 years of age to the total working age population i.e. above 15 below 64 years of age(World bank, 2014)	Total young dependents/total working population	A negative relationship is expected to imply that the rate of domestic savings is expected to decrease with an increase in dependency ratio as found out by (Kibet *et al*., 2009).
TA	This refers to the effects of technology on the modern economy. The number of secure internet users indicates the number of people who are able to access the internet services e.g. internet banking Additionally, mobile subscriptions indicate the number of people who are able to access facilities such as mobile banking and thus providing access to the various financial institutions products.	The number of mobile subscriptions and secure internet users was used as the proxy variables for TA.	A positive sign is expected since the increase in the number of mobile and internet subscriptions is likely going to make savings easier for the technology users. This reduces the queues in the various financial institutions since savings deposits can be made directly through the phone and online.

3.5   Estimation technique

To estimate the effects of the identified factors on gross domestic savings in Kenya, an analysis of time series data for the period 1980-2014 was done. The model was estimated using the co-integration and error correction models in order to be able to estimate the long-run relationship in the variables. Most time series data have unit roots (are non-stationary). Regression of time series data yields spurious results.

According to Engle and Granger (1987), most macroeconomic time series variables have unit roots (are non-stationary) which lead spurious regressions when the model is estimated using OLS. The results of such estimations indicate common time trends but fail to reflect long-run relationships. The stationarity of the explanatory variables was tested followed by a co-integration test in order to establish the effects of the model in the long run.

3.5.1   Unit Root Testing

The first step in analysing the time series data was to perform unit root testing using Augmented Dickey-Fuller (ADF) Test as suggested by Dickey and Fuller (1979). This was used to test for stationarity of the variables thus establish the long run effects of the model. The existence of a unit root in the results implied non stationarity of the times series data while the nonexistence of a unit root implied stationarity of the time series data.

3.5.2   Co-integration Tests and error correction model (ECM)

Co-integration is done in case of existence of a unit root implying non-stationarity of time series data. Co-integration exists if two or more stationary or non-stationary time-series data move together in the same direction.

Co-integration test is used in examining the stationarity of the residuals (u,). If the results of the Co-integration Tests showed the existence of a co-integration vector, and the Vector Error Correction Model (VECM) was used to obtain both the short-run and long-run relationship of the equation.

3.5.3 Diagnostic Tests

Diagnostic Tests were performed to establish whether the Ordinary Least Squares (OLS) estimation technique holds by ensuring that its assumptions are not violated. The study used the multi-collinearity test and residual auto correlation and multicollinearity tests.

CHAPTER FOUR: EMPIRICAL FINDINGS AND DISCUSSIONS

4.1   Stationarity Test

Using Augmented Dickey-Fuller (ADF) Test, unit root testing was carried out on variables used in the research. This test was carried out as time series data in most cases exhibit non-stationarity, hence estimating the model would lead to statistical inference problems.

Table 4.1.1: Augmented Dickey-Fuller (ADF) Test results for stationarity of the time series data

Dfuller MacKinnon approx. Variable	ADF Test Statistic	1% Critical Value	5% Critical Value	10% Critical Value	p-value for Z(t)	Integration Order
Gross Domestic savings	-6.509	-4.306	-3.568	-3.221	0.0000	I (1)
Growth rate of the real GDP	-4.941	-3.702	-2.980	-2.622	0.0250	I (0)
Inflation rate	-3.417	-4.297	-3.564	-3.218	0.0491	I (0)
Real interest rate	-3.927	-4.297	-3.564	-3.218	0.0111	I (0)
Domestic credit provided by the financial sector	-6.029	-4.306	-3.568	-3.221	0.0000	I (1)
Dependency ratio	-4.865	-4.334	-3.580	-3.228	0.0004	I (4)
Mobile cellular subscriptions	-6.251	-4.380	-3.600	-3.240	0.0000	I (0)
Secure Internet users	-3.993	-4.380	-3.600	-3.240	0.0090	I (2)

Table 4.1.1 gives the results of the unit root test. From the analysis, the time series data under review was not stationary since not all the times series related to the variables were integrated of order zero. Where the times series related to the variables were integrated of order zero, the time series was noted to be stationary. The results shows that the data on GDP growth rate, inflation rate, rate of interest and technological advancement in terms of mobile cellular subscriptions were stationary at level i.e. even before any transformation is done on the data implying non non-existence of unit roots. On the other hand, the data on gross domestic savings and domestic credit provided by the financial institutions were stationary at first difference meaning that the data was not stationary but the first difference was found to be stationary.

Data on technological advancement in terms of internet users was stationary after the second difference and finally data on dependency ratio was stationary after the fourth difference. Due to the presence of unit roots as indicated above, a co-integration test was considered necessary to examine the stationarity of the residuals.

4.2 Co-integration Analysis

Two or more variables are said to be co-integrated if they have a long-run equilibrium or relationship between them i.e. move together in the same direction (Gujarati, 2004). Co-integration is a technique used in analyzing data that is not stationary at level. Using standard models to analyze most of the economic variables of recent times ends up producing a spurious regression since the time series is not stationary at level. In this study, co-integration was considered due to the existence of a unit root in the variables used in the model as indicated in section 4.1.1. This research applied Johansen (1995) normalization method to test for co-integration rank and proceeded to apply a vector error correction mechanism to display the

coefficients in the model estimation section. Through Vector Error-Correction, identification

was obtained by placing own constraints on the parameters of the co-integrating vectors. The

co-integration rank results are shown in table 4.2.1

Table 4.2.1 Co-integration test results

Co-integration rank	parms	LL	eigenvalue	trace statistic	5% critical value
0	8	88.97822	.	164.709	156
1	23	110.5183	0.76212	121.6292*	124.24
2	36	130.449	0.73518	81.7677	94.15
3	47	144.4594	0.60703	53.747	68.52
4	56	155.8649	0.53251	30.936	47.21
5	63	164.2932	0.42987	14.0793	29.68
6	68	169.3809	0.28764	3.9039	15.41
7	71	171.3287	0.12177	0.0084	3.76
8	72	171.3329	0.00028		

The results presented in Table 4.2.1 show that the null hypothesis of no co-integration ($e = 0$) is rejected at 5% level of significance. This conclusion is based on the trace values. Trace value statistics indicate that there exist a single long-run equation at the 5% critical value and the p-value 0.0000 is less than the 0.05 level of significance. At lag order 1, the variables were co-integrated which leads to an important conclusion that there is a common trend among the variables, which means than there exists a long-run relationship between the growth rate of the real Gross Domestic Product, the rate of inflation, the real interest rate, the domestic credit provided by the financial sector as a percentage of GDP, the age dependency ratio and the rate of technological advancement and gross domestic savings in Kenya. The equilibrium nature may however be violated during the short-run but this will constantly be corrected by the error terms between the variables. The error correcting terms therefore enjoin the existing long-term behaviors to the short-run ones. The reaction of the dependent variable in relation to the independent variable will be explained in the way the variables will behave in case there exist disequilibria (Gujarati, 2004).

4.3   Vector Error-Correction Model (VECM)

From the co-integrations results above, the results show the existence of a co-integration vector. The Vector error correction model (VECM) was used to obtain both the short-run and long-run relationship of the equation. Further, the analysis in the research used Vector Error-Correction Model to model the stationary relationships between multiple time series that contained the unit roots as indicated in the unit testing results. The Vector Error-Correction implemented Johansen's approach for estimating the parameters of the VECM.

Table 4.3.1: Estimation results

Vector Error Correction Model in the Long-run

	Coefficient	Standard Error	Z value	P>|z|	[95% Conf. Interval]	
Gross domestic savings(Dependent variable)		1			.	.
Growth rate of the real GDP	.3124047	1230233	2.54	0.011	.5535259	-.0712834
Rate of inflation	-1.22278	.1501395	8.14	0.000	-1.517048	-.9285118
Real interest rate	-.1330901	.2213024	-0.60	0.548	-.5668347	.300654
Domestic credit provided by the financial institutions	3.20692	1.54095	2.08	0.037	.1867147	6.227126
Age dependency ratio	-557.8597	310.5999	-1.80	0.072	-1166.624	50.90482
Mobile subscriptions	.0426485	.3322978	0.13	0.898	-.6086431	.6939402
Secure internet users	.1288793	.0393361	3.28	0.001	.051782	.2059765
Constant	-10.39715					

The estimation results are indicated in the Vector Error Correction Model output results in the Long-run as shown in table 4.3.1. The P value of secure internet users which measures the degree of technological advancement, P=0.001<0.05 while the coefficient is greater than one indicating that the coefficient on technological advancement in terms of secure internet users is positive and statistically significant at 5% level of significance.

This implies that an increase in 1% of the number of internet users leads to a 0.1289% increase in domestic savings. The advancement in technology in terms of the increase in the number of secure internet users indicate an improvement in the accessibility of various facilities offered by financial institutions. For instance, people are able to withdraw or deposit funds in the various accounts held with financial institutions online. This has reduced the length of queues in the various financial institutions. The ease of access of the various financial products offered had led to an increase in the domestic savings. The increase is in line with the expectation as the introduction of online banking for instance, leads in efficiencies around the financial institutions processes.

The P value of domestic credit provided by financial institutions, P=0.037<0.05 while the coefficient is greater than one indicating that the coefficient on domestic savings provided by financial institutions is positive and statistically significant at 5% level of significance. This implies that an increase in 1% of the amount of domestic credit provided by financial institutions leads to a 0.3207 % increase in domestic savings. An increase in the domestic credit provided by the financial institutions shows the development of the financial sector in terms of size. It also indicates the financial sector depth. Growth in the financial sector leads to the creation of various financial institutions where people are able to deposit their funds as savings such as Micro Finance institutions. The increase in the amount of domestic credit provided by financial institutions would also mean diversification of the various products offered by financial institutions. This leads to growth in the domestic savings due to the increase in the number and type of financial institutions.

Further, the P value of the growth rate of the real Gross Domestic Product, P=0.011<0.05 while the coefficient is greater than one indicating that the coefficient on growth rate of the real Gross Domestic Product is positive and statistically significant at 5% level of significance. This implies that an increase in 1% of the GDP growth rate leads to a 0.3124 % increase in domestic savings. The growth rate of the real Gross Domestic Product measures the country's economic growth and therefore an increase would imply high economic growth rate in a country. An increase in the growth rate of the GDP implies that the rate of investment in the country is high and that the economy is stable. This provides an environment for investment which then leads to the increase in income and in turn an increase in the level of gross domestic savings. The results are similar to the findings by Athukorala and Sen (2004) and Bankole and Fatai (2013) and is in line with economic statistics and theory.

On the contrary, the P value of the inflation rate , P=0.000<0.05 while the coefficient is less than one implying that the coefficient on inflation rate is negative and statistically significant at 5% level of significance. This implies that an increase in 1% of the inflation rate leads to a 0.1223% decrease in domestic savings. A high rate of inflation increases the level of prices and thus increases the amount of income that is spent on consumption. Moreover, the high prices largely erodes people's purchasing power and hence reduces their capacity to save. The results are in line with economic statistics and theory, similar to the results by Larbi (2013) who noted that in Ghana, an increase in the rate of inflation led to a decrease in the level of private domestic savings. However, the results differ from results by Touny (2008) who notes that in Egypt, the inflation rate positively and significantly affected the rate of domestic savings both in the short run and in the long run during the period 1975-2006.

Besides, the P value of real interest rate, the age dependency ratio and technological advancement in terms of mobile cellular subscriptions, P<0.05 implying that the dependency ratio, rate of interest and technological advancement in terms of mobile cellular subscriptions were not found to be statistically significant in explaining changes in domestic savings.in Kenya. This means that a change in 1% in these variables does not significantly impact on the gross domestic savings.

4.4 Post estimation (diagnostic) test results

To check for model adequacy the research adopted the residual autocorrelation test .The p-values of both the lags indicated a value greater than 5% significance level leading to non-rejecting of null hypothesis that the model residual do not suffer from serial correlation. This then implied that output coefficients were a true reflection of the relationship and robustness that existed between the variables. A multicollinearity test was also performed as collinearity amongst variables used in the model causes some parameters to be unidentified numerically. The results indicated that beta was exactly identified hence the absence of multi-collinearity among the variables regressed in the model. The results of the diagnostic tests are indicated in the appendix.

CHAPTER FIVE: SUMMARY, CONCLUSION AND POLICY RECOMMENDATION

5.1   Introduction

Chapter five presents the conclusion and policy recommendations based on the study findings and points out areas for further research.

5.2   Summary of the Study

Using time series data covering the period 1980-2014, the study established the factors determining gross domestic savings in Kenya by extending the analysis to include technology as a potential determinant. The independent variables used included the growth rate of the real Gross Domestic Product, inflation rate, real interest rate, domestic credit provided by the financial sector as a percentage of GDP, age dependency ratio and the rate of technological advancement.

Unit root testing was performed using the Augmented Dickey-Fuller (ADF) Test as suggested by Dickey and Fuller (1979). This was to test for stationarity of the variables thus establish the long run effects of the model. The results of the test indicated the existence of a unit root in the data relating to gross domestic savings, domestic credit provided by the financial sector, age dependency ratio and technological advancement in terms of internet users thus indicating that the times series data was non stationary. These variables were however stationary after first, second and fourth difference.

The statistical findings of the analysis showed that, the growth rate of the real Gross Domestic Product (GDP), the inflation rare, the domestic credit provided by the financial institutions as well as technological advancement in terms of internet users were statistically significant in

explaining the changes in Gross Domestic savings in Kenya. The dependency ratio, rate of interest, and technological advancement in terms of mobile cellular subscriptions were however found to be insignificant factors.

5.3   Conclusions

The rate of growth of gross domestic savings determines the extent of investment in an economy and this plays a key role in driving the economic growth agenda. For Kenya to achieve the economic growth rate as projected in the vision 2030, there is need to understand the factors determining the gross domestic savings. Existing policies only consider macro economic variables and ignore the impact of the current advancement in technology on gross domestic savings. The current savings ratio of 4 percent of GDP in Kenya indicate the need to develop technology sensitive policies that raise the saving rate and thus this study contributed to the economic literature by establishing the factors that determine the Gross domestic savings by extending technology as a potential determinant using the annual time series data from 1980 to 2014.

5.4   Policy Recommendations

With the current trends in technology such as the introduction of the use of the internet in carrying out various transactions, policies e.g. reducing the cost of acquiring internet based gadgets need to be put in place. This will aim at ensuring that majority of the people access the gadgets and are able to log in to the internet and access the various online products produced by various financial institutions. Furthermore, measures need to be in place to reduce the internet access costs transaction costs by regulating the charges by the various internet service providers. Finally, the government needs to introduce education programs aimed at ensuring

that the citizens acquire basic technology knowledge which in turn would help boost the access to internet. With the current trends in technology and the increasing level of innovation, new internet based trading platforms need to be introduced by the various financial institutions as part of diversifying financial products in the market.

In order to ensure growth in the financial sector in terms of size as measured by the domestic credit provided by the financial institutions, the government needs to create an enabling environment for financial institutions by ensuring that the regulations in place do not discourage business operations. Policies including reduction of the reserve ratios for various financial institutions as well as reducing the requirements before set up of a new financial institutions may be adopted.

To ensure growth in the Gross Domestic product, the government needs to create a politically stable environment for investments, ensure transparency in laws and regulations, promote accountability in public management, promote equality and be on the forefront in fighting corruption. The government of Kenya also needs to adopt a contractionary monetary policy to reduce money supply in the economy by increasing the level of real interest rates. This will lead to a decrease in the inflation rate which will then lead to an improvement in the purchasing power of citizens and reduction in the amount spent on consumption thus increasing the amount of funds available for savings.

5.5   Areas for Further Research

This study recommends further research be done incorporating other current trends in the economy and also using cross sectional data in order to be able to capture the effects of technology on the micro economic variables determining gross domestic savings.

REFERENCES

Adewuyi, Bankole, and Arawomo. (2007). What Determines Saving in the Economic Community of West African State (ECOWAS)? *Journal of Monetary and Economic Integration*, 71-72.

African Economic outlook, (AEO) 2015.

Ando, A., and Modigliani, F. (1963). The" life cycle" hypothesis of saving: Aggregate implications and tests. *The American economic review*, 55-84.

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.

Arok, B. A. (2014). Determinants of gross domestic savings in Kenya (Doctoral dissertation, University of Nairobi).

Athukorala, P. C., and Sen, K. (2004). The determinants of private saving in India. *World Development*, 32(3), 491-503.

Bankole, A. S., and Fatai, B. O. (2013). Relationship between Savings and Economic Growth in Nigeria. *The Social Sciences*, 8(3), 224-230.

Bencivenga, V. R., and Smith, B. D. (1991). Financial intermediation and endogenous growth. *The Review of Economic Studies*, *58*(2), 195-209.

Bencivenga, V. R., Smith, B. D., and Starr, R. M. (1995). Transactions costs, technological choice, and endogenous growth. *Journal of economic Theory*, *67*(1), 153-177.

Breusch, T. S., and Pagan, A. R. (1979). A simple test for heteroscedasticity and random coefficient variation. *Econometrica: Journal of the Econometric Society*, 1287-1294.

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*(366a), 427-431.

Duesenberry, J. S. (1949). Income, saving, and the theory of consumer behavior.

Engle, R. F., and Granger, C. W. (1987). Co-integration and error correction: representation, estimation, and testing. *Econometrica: journal of the Econometric Society*, 251-276.

Friedman, M. (1957). A Theory of Consumption Function. New Jersey: Princeton University Press.

Greenwood, J., and Jovanovic, B. (1989). Financial development, growth, and the distribution of income (No. w3189). National Bureau of Economic Research.

Gujarati, D. (2004). *Basic Econometrics*. United States Military Academy, West Point.

International Monetary Fund (IMF), International Financial Statistics (IFS) and data files.

Kahangi, W., and Muturi, W. (2013). Determinants of Low Income Household Savings in Kenya: A survey of Mathare Slum. *International Journal of Current Research*, 2686-2690.

Kibet, L. K., Mutai, B. K., Ouma, D. E., Ouma, S. A., and Owuor, G. (2009). Determinants of household saving: Case study of smallholder farmers, entrepreneurs and teachers in rural areas of Kenya. *Journal of Development and Agricultural Economics*, 1(7), 137-143.

Larbi, D. A. (2013). The long run determinants of private domestic savings in Ghana: a cointegration approach. *Journal of Economics and Sustainable Development*, 4(4), 125-136.

Loayza, N and Shankar. R (2000) 'Private Savings in India', *The World Bank Economic Review*, Vol.14, No.3, pp.: 571-594.

Mbuthia, A. N. (2011). Households'saving Decisions in Kenya (Doctoral dissertation, Kenyatta University).

McKinnon, R. I. (1973). Money and capital in economic development. Brookings Institution Press.

Modigliani, F. (1986). Life cycle, individual thrift, and the wealth of nations. *The American Economic Review*, 297-313.

Modigliani, F., and Ando, A. K. (1957). Tests of the Life Cycle Hypothesis of Savings: Comments and Suggestions1. *Bulletin of the Oxford University Institute of Economics and Statistics*, *19*(2), 99-124.

Modigliani, F., and Brumberg, R. (1954). Utility analysis and the consumption function: An interpretation of cross-section data. Franco Modigliani, 1.

Mugenda, O. M. (1999). *Research methods: Quantitative and qualitative approaches*. African Centre for Technology Studies.

Ndirangu and Muturi (2015), determinants of gross domestic savings In Kenya (1970-2013).

Nwachkwu Tochukwu, E., and Odigie, P. (2009). What Drives Private Savings in Nigeria. In A Paper Presented at the Centre for the Study of African A Paper Presented at the Centre for the Study of African Economies (CSAE) Conference, University of Oxford, March.

Nwachukwu, T. E., and Egwaikhide, F. O. (2007, July). An error-correction model of the determinants of private saving in Nigeria. In *A Paper presented at the African Economic Society (AES) Conference, Cape Town, South Africa*.

Paul D, Allison, Logistic Regression-Theory and application', Statistical Analysis Software (SAS), page no: 8-9.

Prinsloo, J.W., (2000).The Saving Behavior of the South African Economy. Occasional Paper No 14, South African Reserve Bank. South Africa.

Ramsey, J. B., and Schmidt, P. (1976). Some further results on the use of OLS and BLUS residuals in specification error tests. *Journal of the American Statistical Association*, *71*(354), 389-390.

Rockwell, R. C. (1975). Assessment of Multicollinearity the Haitovsky Test of the Determinant. *Sociological Methods and Research*, *3*(3), 308-320.

Shaw, E. S. (1973). Financial deepening in economic development (Vol. 270). New York: Oxford University Press.

Teshome, G., Kassa, B., Emana, B., and Haji, J. (2013). Determinants of Rural Household Savings in Ethiopia: The Case of East Hararghe Zone, Oromia Regional State. *Journal of Economics and Sustainable Development,* 4(3), 66-75.

The Kenya National Bureau of Statistics (2014) Kenya Facts and Figures report.

Touny, M. A. (2008). Determinants of domestic saving performance in Egypt: an empirical study. J. Comm. Stud. Res, 1, 1-22.

World Bank's Global Development Database, 2014

APPENDIX

Table 4.4.1: Residual Autocorrelation results

lag	chi2	df	Prob > chi2
1	69.9687	64	0.28416
2	97.5290	64	0.16440
	H0: no autocorrelation at lag order		

Table 4.4.2 Multicollinearity test results

Equation	Parms	chi2	P>chi2
_ce1	7	185.6204	0.0000