

The **KENYA INSTITUTE** for **PUBLIC**
POLICY RESEARCH and **ANALYSIS**

Responsiveness of Gross National Savings Rate to Changes in Fiscal and Monetary Policy in Kenya

Omanyo Daniel Odhiambo

DP/206/2019

THE KENYA INSTITUTE FOR PUBLIC POLICY
RESEARCH AND ANALYSIS (KIPPRA)

Responsiveness of Gross National Savings Rate to Changes in Fiscal and Monetary Policy in Kenya

Omanyo Daniel Odhiambo

*Kenya Institute for Public Policy
Research and Analysis*

KIPPRA Discussion Paper No. 206

KIPPRA in Brief

The Kenya Institute for Public Policy Research and Analysis (KIPPRA) is an autonomous institute whose primary mission is to conduct public policy research leading to policy advice. KIPPRA's mission is to produce consistently high-quality analysis of key issues of public policy and to contribute to the achievement of national long-term development objectives by positively influencing the decision-making process. These goals are met through effective dissemination of recommendations resulting from analysis and by training policy analysts in the public sector. KIPPRA therefore produces a body of well-researched and documented information on public policy, and in the process assists in formulating long-term strategic perspectives. KIPPRA serves as a centralized source from which the Government and the private sector may obtain information and advice on public policy issues.

Published 2019

© Kenya Institute for Public Policy Research and Analysis

Bishops Garden Towers, Bishops Road

PO Box 56445-00200 Nairobi, Kenya

tel: +254 20 2719933/4; fax: +254 20 2719951

email: admin@kippra.or.ke

website: <http://www.kippra.org>

ISBN xxxx xxx xx x

The Discussion Paper Series disseminates results and reflections from ongoing research activities of the Institute's programmes. The papers are internally refereed and are disseminated to inform and invoke debate on policy issues. Opinions expressed in the papers are entirely those of the authors and do not necessarily reflect the views of the Institute.

Abstract

National savings rate is an important indicator of economic health. It indicates the country's ability to finance a greater share of its development needs using domestic sources. As such, boosting national savings is an important ingredient for growth. National savings rate has been fairly lower in Kenya compared to its peers in the East African Community and the greater Sub-Saharan Africa. This study examines the impact of monetary policy and fiscal policy on explaining the national savings behaviour in Kenya by estimating the Kenyan savings function with GDP growth, government budget deficit, inflation, tax revenue, money supply and interest rate on bank deposits as its determinants. The analysis covers the period 1980-2018 using dynamic Autoregressive Distributed Lag (ARDL) approach. The study finds that GDP growth, growth in Government tax revenue and real interest rate on deposits positively and significantly affect national savings rate both in the short and long-run. Fiscal deficit and broad money supply (M2) negatively and significantly affect national savings rate in long-run whereas inflation exerts a positive effect suggesting increasing precautionary motive to hold money during periods of inflationary pressures. In the short-run, however, it is established that broad money supply positively affects national savings rate while inflation slows savings rate. The study recommends increased efficiency and effectiveness in tax administration and tax policy, increased investment in activities that increase productivity and economic growth to improve incomes and peoples' savings ability. Monetary policy measures to ensure absence of negative real interest rates on bank deposits by maintaining inflation within tolerable limits should be adopted. The Government should also limit its spending within sustainable levels and invest appropriately to curtail the negative effects of increased budget deficit on national saving.

Abbreviations and Acronyms

ADF	Augmented Dickey-Fuller
AfDB	African Development Bank
APS	Average Propensity to Save
CBK	Central Bank of Kenya
EAC	East African Community
GBP	Government Budget Position
GDP	Gross Domestic Product
GDS	Gross Domestic Saving
GoK	Government of Kenya
GTR	Government Tax Revenue
IMF	International Monetary Fund
KES	Kenya Shillings
LCH	Life-Cycle Hypothesis
MPS	Marginal Propensity to Save
PIH	Permanent Income Hypothesis
RIH	Relative Income Hypothesis
WB	World Bank
WDI	World Development Indicators
FDI	Foreign Direct Investment
ODA	Overseas Development Assistance

Table of Contents

Abstract.....	iii
Abbreviations and Acronyms.....	iv
1. Introduction.....	1
1.1 Background of the Study.....	1
1.2 Statement of the Problem.....	4
1.3 Justification of the Study.....	5
2. Literature Review.....	7
2.1 Theoretical Review.....	7
2.1.1 McKinnon-Shaw Hypothesis.....	7
2.1.2 The Keynesian Theory of Absolute Income Hypothesis.....	7
2.1.3 Relative Income Hypothesis (Duesenberry).....	8
2.1.4 Milton Friedman's Permanent Income Hypothesis (PIH).....	8
2.1.5 Ando and Modigliani Life-Cycle Hypothesis (LCH).....	9
2.2 Empirical Literature Review.....	10
2.3 Overview of Literature.....	12
3. Methodology.....	13
3.1 Analytical Framework.....	13
3.2 Empirical Model.....	14
3.3 Estimation Method.....	15
3.4 Test Properties of the Data.....	16
3.4.1 Unit Root Test.....	16
3.4.1 Co-integration.....	16
4. Results and Discussion.....	18
4.1 Descriptive Statistics.....	18
4.2 Estimation Results.....	19
4.2.1 Discussion of Long Run Results.....	19
4.2.2 Error Correction Model Results.....	21
5. Conclusion and Policy Recommendations.....	24
5.1 Conclusion.....	24
5.2 Policy Recommendations.....	25
References.....	27
Appendices.....	29

List of Tables

Table 3.1: Description of variables and data sources.....	15
Table 3.2: Unit Root Test Results	16
Table 3.3: Engle-Granger Test Results for Co-integration.....	17
Table 4.1: Descriptive Statistics	18
Table 4.2: Correlation Matrix.....	19
Table 4.3: Estimated Long-run Model.....	20
Table 4.4: Regression results for Error Correction Model	22

List of Figures

Figure 1.1: Average gross national saving in selected SSA countries (1980-2018).....	2
Figure 1.2: Trend of National Saving as a percentage of GDP.....	3

1. Introduction

1.1 Background of the Study

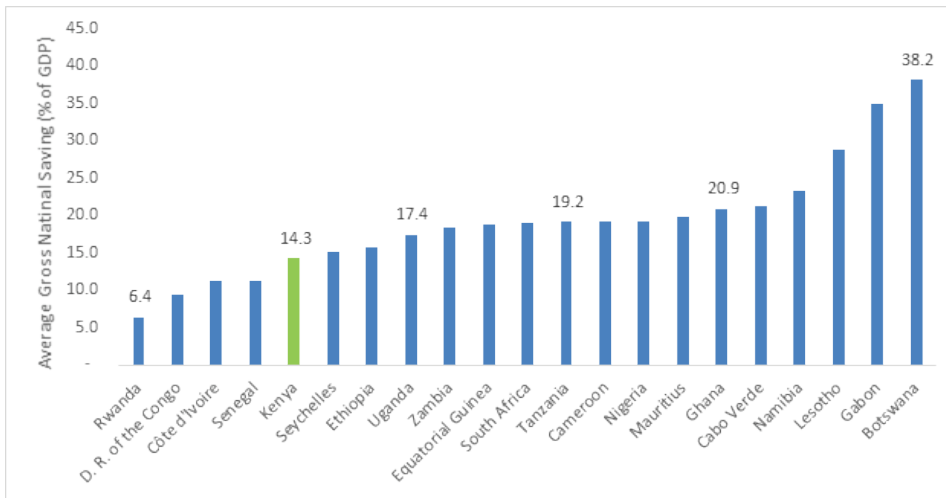
In macroeconomic theory, national savings refers to total public savings plus total private savings of a nation. National savings occupy a central role in an economy since the variations in its size and composition largely determine investment and performance of the economy. Romer (2006) argues that economic performance of a country heavily depends on how the country's economic resources are divided between consumption and the various types of investments such as in human capital, physical capital, and in research and development. This allocation is central to the living standards of a country's population in the long-run and is actively determined by how households allocate their incomes between consumption and savings given the rate of return and other constraints they face. In this regard, understanding the risk that low savings pose to a country's future economic growth and what factors actually drive savings in an economy is crucial.

Noticeable divergence of savings rates exist across the world. Economic literature argues that the varying growth rates across countries is explained by the varying savings rates, which determine the level of investment in human capital, productive capacity and socio-economic infrastructure. According to the 2019 World Economic Outlook (WEO) report by International monetary Fund (IMF), Sub-Saharan Africa (SSA) has a savings rate at 17.8 per cent of its GDP, slightly above Latin America and Caribbean's 17.6 per cent. In comparison, Emerging and Developing Asia saves 40.1 per cent of its GDP while Emerging Markets and Developing Economies and Middle East and North Africa save 32.7 per cent and 29.3 per cent of their GDP, respectively.

A comparative analysis of selected SSA countries using data from the WEO database reveals that in the past three and a half decades Botswana has never saved below 20 per cent of its GDP. The average savings rate for Gabon, Lesotho, Namibia and Ghana over the period 1980-2018 was 34.8 per cent, 28.7 per cent, 23.3 per cent and 20.9 per cent, respectively. Over the same period, Tanzania and Uganda report 19.2 per cent and 17.4 per cent, respectively. The case for Kenya has, however, been disappointing. The average savings rate for Kenya for the same period is 14.3 per cent, well below its East African Community (EAC) partner states (see Figure 1.1).

An overview of the evolution of the Kenyan economy with regard to macroeconomic policy reveals that for the past three decades, Kenya has instituted various macroeconomic policy reforms that are vital in explaining the complex national

Figure 1.1: Average gross national savings in selected SSA countries (1980-2018)



Source: Author's calculations using data from IMF World Economic Outlook database, 2019

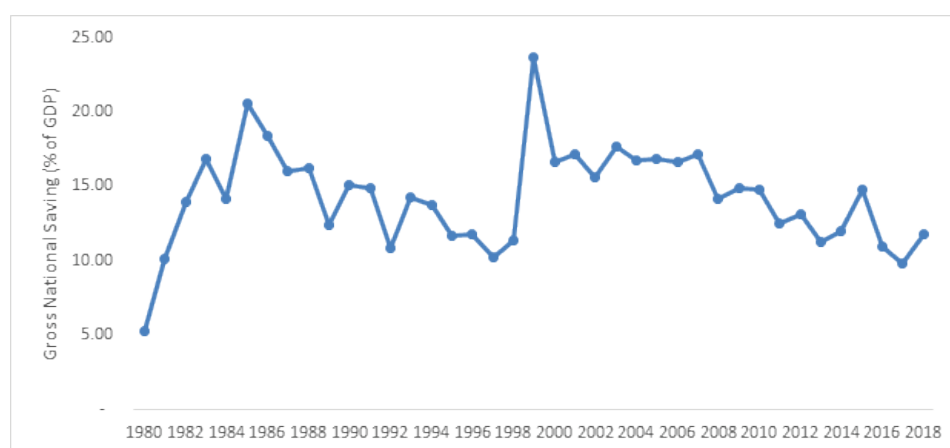
savings behaviour. Ngugi and Kabubo (1998) report that in early 1980s Kenya began to implement structural adjustment programmes to revitalize the growth of the economy. The number of commercial banks and non-bank financial institutions expanded rapidly during the 1980-1986 period, leading to increased financial intermediation and monetization of the economy. In 1991, the county fully liberalized interest rates to encourage financial inclusion and promote mobilization of savings. Also in the early 1990s, the Government followed tight fiscal policy and relied heavily on domestic borrowing with reduced external financing. In the post 2000 era, the Government rapidly expanded its financing through external sources to support infrastructural development across the country. Other noticeable reforms over the decades include adoption of a floating exchange rate system, and development of money and capital markets.

There has been an increase in the number of Forex bureaus, adoption of flexible monetary policy tools and licensing of Deposit Taking Micro-finance (DTMs) institutions which has been instrumental in facilitating financial inclusion. Introduction of agency banking model for commercial banks, e.g. Coop kwa jirani, KCB Mtaani, among others, coupled with adoption of mobile phone financial services have greatly supported financial deepening by bringing financial services closer to the population. Introduction of Shariah-compliant banking products has also ensured increased financial inclusion. Further reforms include enactment of Kenya Deposit Insurance Act of 2012 establishing the Kenya Deposit Insurance

Corporation to provide safety-net for the savings, banking and payments systems in the economy, and the reintroduction of interest rate controls through the 2016 Amendment of the Banking Act that set maximum domestic lending interest rates at 4.0 per cent above the Central Bank Rate (CBR) and minimum domestic deposit rates at 70 per cent of the CBR.

Figure 1.2 shows trends in Kenya's gross national savings as a percentage of Gross Domestic Product (GDP) from the year 1980 to 2018. It is evident that over the study period, national savings as a percentage of GDP has been episodic and disappointingly lower than the Kenya Vision 2030 target of 30 per cent of GDP. The trend analysis indicates that for the past decade, national savings have been on a decline.

Figure 1.2: Trend of national saving as a percentage of GDP



Source: Author's calculations using data from IMF World Economic Outlook database, 2019

Considered as an essential driver of economic growth by development economists, adequate national savings have advantages that set it apart from other sources of investment finance. A country can finance its investment through sufficient national savings, Foreign Direct Investment (FDI) and Overseas Development Assistance (ODA). What then makes national savings a distinct source of investment financing? Kidane (2010) postulates that FDI in most instances is attracted to countries endowed with mega natural resources and is usually susceptible to economic and political uncertainty. On the other hand, ODA are usually tied with conditions that usually force recipient governments to execute political and economic reforms that may not necessarily impact directly on propelling growth of output. In addition, excessive external borrowing can unconstructively affect domestic interest rates, balance of payment and weaken

the local currency relative to major currencies in the long-run. As a consequence, it may be prudent for a developing country such as Kenya to enhance the levels of national savings to engineer higher economic growth.

Of importance to note is that a country can generate sufficient national savings through cumulative savings of income irrespective of its natural resource endowment, which in most instances determines FDI inflows into the country. National savings have performed relatively poorly in Kenya over the years. The implication of this is an increase in foreign capital to fill the existing resource gap. Where savings levels are low, levels of investment are equally low.

Kenya being an open economy transacting at the international market has seen a continued flow of capital into the country, particularly from exports, diaspora remittances and inward foreign investment. Given the low levels of national savings, as the Government continues to grapple with the persistent fiscal deficit and debt repayment responsibility, it is forced to finance the deficit through foreign borrowing or additional foreign financing. This has the downside risk of exposing the economy to external shocks, leading to worsening of balance payment position, depreciation of the Kenya shilling, inflation and high interest rates thereby discouraging economic activities.

Moreover, low national savings implies widening of the net saving - investment gap, which would result into low private sector investment. Specifically, the growth of Micro and Small Enterprises' (MSEs') sector is likely to be sluggish given that low savings affect investment activities of the enterprises that cannot access external funding, thereby leading to increased unemployment and poverty incidences.

1.2 Statement of the Problem

Constrained savings is usually considered a barrier to economic growth because savings determine how much of a country's economic resources are available and investible in the key sectors of the economy. Kenya is cognizant of this and as part of its macroeconomic goals, through its economic blueprint the Kenya Vision 2030 sets to achieve a national savings rate of 30 per cent of GDP by the year 2030 to help finance the investment needs of the country.

Billions of dollars in domestic resources are leaked out of the economy through tax evasions and exemptions, capital flight, debt repayment burden and profits repatriation by multinational companies. This situation is worsened by the country's large informal sector, which seldom pass their cash holdings through formal financial channels. A review of the gross national savings performance indicates that the country has not been able to meet the targets set within the

Medium-Term Plan (MTP) framework. For instance, MTP II targeted to achieve national savings rate of 16.4 per cent (2014), 19.7 per cent (2015), 22.7 per cent (2016), 24.8 per cent (2017) and 25.7 per cent (2018).

Despite the various reforms that have been undertaken within the financial sector to increase financial inclusion, such as increased number of commercial banks, introduction of mobile and agency banking, increasing number of credit and saving societies and microfinance institutions, deepened financial markets and sustained increase in diaspora remittances, statistics indicate that Kenya's national savings rate stood at 11.8 per cent in 2018, way below the MTP targets. By contrast, Tanzania and Uganda national savings rate stood at 30.8 per cent and 17.4 per cent, respectively, in 2018 even though their per capita incomes are significantly lower than that of Kenya.

Motivated by the low national savings rate in Kenya and Government's appetite for infrastructure investments that require huge financial resources, this paper seeks to investigate the responsiveness of gross national savings to changes in various fiscal and monetary policy instruments.

1.3 Justification of the study

The role of savings to an economy cannot be over emphasized. Although studies on savings for individual countries, group of countries and regions are relatively abundant (See for instance Ndirangu and Muturi, 2015; Arok 2014; Arawomo 2007, Athukorala 2004 and Ozcan 2003), they have seldom focused on the influence of fiscal policy on savings. Most of these studies have used monetary policy and demographic variables to explain savings behaviour. This being the case, it is apparent that casting a spotlight on the role of fiscal policy in explaining savings behaviour using Kenyan data would be of considerable assistance in drawing a wider perspective of the complex relationship between savings and its drivers.

In addition, Kenya being a developing country and one among the top African economies projected to grow fastest in the coming decades, gross domestic savings then become an important aspect as its breadth, depth and resilience will act to promote investments and ultimately propel the economy towards the 10 per cent per annum GDP growth as envisaged in the Kenya Vision 2030. Towards this end, it is important for Kenya to improve its gross domestic savings levels whereby, from the very onset, it will be critical to understand how macroeconomic policy, particularly the fiscal and monetary policy variables influence gross national savings behaviour in Kenya.

This study will therefore contribute to the policy arena by availing to policy makers evidence-based information on the key fiscal and monetary policy variables that require radical manipulation to trigger sustainable domestic gross savings that will generate long-term benefits to the economy. Moreover, by casting a spotlight on the role of fiscal policy management on domestic savings, this study will extend existing knowledge on drivers of domestic savings in Kenya and provide useful information to the National Treasury and the Central Bank as they come up with fiscal and monetary policy initiatives to boost saving behaviour in the country.

2. Literature Review

2.1 Theoretical Review

There are several theories in economic literature that explain savings behaviour of economic agents; these are: McKinnon-Shaw Hypothesis, Absolute Income Hypothesis, Relative Income Hypothesis, Permanent income Hypothesis and the Life Cycle Hypothesis. The following excerpt presents a brief discussion of these theories.

2.1.1 McKinnon-Shaw Hypothesis

McKinnon (1973) and Shaw (1973) analyzed the impact of financial liberalization on domestic financial system in developing countries. The underlying assumption of this analysis was that savings are responsive to interest rates. Their analysis concluded that alleviating financial restrictions in developing countries and allowing real interest rates to be determined by market forces is critical for supporting savings and investment. The thrust of the argument of this hypothesis is that liberalization associated with high interest rates would stimulate savings, which will in turn finance higher investments leading to higher growth. The hypothesis states that real interest rates positively impact savings, such that economic agents would reduce present consumption in favour of high future interest income from savings.

The hypothesis also argues that disciplined fiscal policy can end high inflationary expectations. High nominal interest rates will yield an increase in the willingness to hold assets in the form of bank deposits, leading to growth in the real size and competitiveness of the financial sector. This in turn will yield increased propensity to save. Accordingly, the hypothesis argues against interest rates capping especially in developing economies with high inflation rates, citing that such regulations hinder savings mobilization and capital formation, which in turn hinders economic growth.

2.1.2 The Keynesian Theory of Absolute Income Hypothesis

The key argument put forward by Keynes (1937) is that savings and consumption are an increasing function of absolute or disposable income. In other words, all else equal, consumption increases with increments in disposable income albeit at a decreasing rate. The implication is that more will be saved as income increases while consumption increases at a declining rate.

The linear functional form of the Keynesian saving function showing constant marginal propensity to save (MPS) is presented in equation (2.1) below:

$$S_t = C_o + \beta Y_t \dots\dots\dots (2.1)$$

Where t is time, S is the value of savings at time t , and Y is the total disposable income at time t . $\beta = \Delta S/\Delta Y$ denotes the marginal propensity to save assumed to be constant and positive, with values less than one. This implies that the relationship between income and savings is positive and direct. The theory also argues that income and the average propensity to save (APS) have a positive direct relationship. APS is usually given as $= S/Y$. C_o in equation (2.1) denotes the constant term with a value less than zero. It therefore follows that when $Y_t = 0$ at time t , then savings will be less than zero or even negative. *Ceteris paribus*, this theory argues that savings-income relationship is not proportional and that the rich save more than the poor segments of a population.

2.1.3 Relative Income Hypothesis (Duesenberry)

Duesenberry (1949) argues that the consumption function of a household depends on its income in relation to the income of other households with which it competes. The consumption level of a given household will depend not only on its income but also on the income of the other competing households surrounding; that is, its position in the income distribution. This hypothesis is a deviation from Keynes (1937) argument that consumption and savings, for that matter, depend entirely on absolute income.

Consumption of a household thus depends on the relative income of the group or class that the household has placed itself in. It is in this regard that rich households will have higher level of consumption compared to their incomes and this is mainly to keep up with their peers in a income group or class. The relative income hypothesis (RIH) assumes that the per cent of income that is saved does not depend on the income level but the position or class in which the economic agent relates to. As a result, the MPS of an individual would be higher if he/she relates to higher position in the income distribution. The RIH further postulates that an increase in a household income would not inspire a similar increase in consumption over and above the already achieved position in the income distribution. This implies that savings will increase with increase in income.

2.1.4 Milton Friedman’s Permanent Income Hypothesis (PIH)

Friedman (1957) argues that economic agents are rational and often seek to maximize their lifetime utility subject to spending all their constrained lifetime resources.

According to Friedman, individuals' total income is made up of transitory income and permanent income. Transitory income is income that is unexpected while permanent income is income that the consumer expects with certainty. It is argued that economic agents plan their consumption on the basis of current and expected future income in their lifetime. It therefore follows that consumption is determined by permanent income rather than the absolute income as argued in the Keynesians absolute income theory. Functionally this can be presented as:

$$S_t = C_t + \theta Y^p + \partial Y^T \dots\dots\dots (2.2)$$

Where, $Y = \text{total income} = Y^p + Y^T$, θ and ∂ denotes the MPS with regard to permanent income (Y^p) and transitory income (Y^T), respectively. According to equation (2.2), permanent changes to income affects consumption while temporary changes in income do not affect the level of consumption. Consumption expenditure of an individual is virtually determined by past behaviour. This model also suggests that changes in transitory income directly and positively affect savings.

2.1.5 Ando and Modigliani Life-Cycle Hypothesis (LCH)

This model of analyzing consumption and savings was put forward by Ando and Modigliani in 1963. According to LCH, individuals' lifetime is made up of three cycles; that is, childhood, middle age and old age. Childhood and old age periods are characterized with low streams of income as the individual has low productivity while middle age period is characterized with high streams of income. At the early ages of life, economic agents are considered as net borrowers since they are not involved in any economic activity, yet they consume goods and services. In the middle years of life, consumers are able to actively participate in income generating economic activities and are thus able to save, pay off their debts and provide for their retirement. The final years of life is referred to as the dis-savings period where the consumers are old and cannot actively participate in income generating economic activities. As a result, their level of income reduces, and their saving levels.

Ando and Modigliani postulate that when interest rates are high, current prices increase vis-à-vis the future prices. This discourages consumption in the current period while promoting savings in the current period. Similarly, increased GDP growth rates promote aggregate savings as the lifetime incomes of the youth increase at a higher rate compared to that of the elderly. In this way, countries with higher GDP are expected to save more than those with lower GDP. This model also considers inflation as a positive driver of savings. When inflation rates are higher, risk-averse consumers consume less and save more as a precaution to cater for unfavourable and unpredictable future income changes.

2.2 Empirical Literature Review

The theoretical literature discussed in the preceding section has identified interest rates, financial liberalization, income and life-cycle variables such as age and life expectancy as drivers of savings. Overall, drivers of savings can be grouped into fiscal/government policies, financial, uncertainty, demographic, external an income and growth variables. There exists an extensive literature applying a range of empirical methods focusing on a myriad of policy variables.

Government policies such as fiscal deficit and government tax revenue have been identified by researchers as influencing the level of savings. Empirical results of Gallina (2006) reveal that chronic fiscal deficit depresses domestic savings in Pakistan as government has to use its savings to finance the deficit. This has the overall effect of depressing national savings. Jilani et al. (2013), Larbi (2013) and Arawomo (2012) found that the relationship between fiscal deficit and savings is positive, citing that deficit financing by government results in an increase in private savings since individuals and firms increase their savings in anticipation for future increases in taxation to service the bonds. In a similar measure, this perspective supports the Keynesian view that budget deficits will raise income through multiplier effects and consequently savings. Kidane (2010) in another study of determinants of gross domestic savings in Ethiopia using error correction model found a positive and significant relationship between gross domestic savings and government taxation, refuting the Ricardian equivalence argument that an increase in government taxation would result into an increase in public savings, which would offset the decline in private savings, thus having a zero net effect on savings.

It has also been found that macroeconomic uncertainty as measured by inflation greatly impacts on domestic savings, though findings have been ambiguous and varied from country to country. For instance, Aryeetey (1995) adopted Mackinnon-Shaw hypothesis to evaluate the savings behaviour in Ghana and found that inflationary pressures create unconducive environment for investment though increased uncertainty, thereby positively increasing motive to save to cushion against risks. Similar results were found by Ozcan(2003), Athukorala and Sen (2004) and Ndirangu and Muturi (2015) confirming the precautionary motive of savings. On the contrary, Kidane (2010), Jilani et al. (2013) and Kivindu (2015) reported a negative relationship.

Interest rates also have an effect on savings. Athukorala and Sen (2004) established that in India, real rate of return on bank deposits has a statistically significant positive effect on saving behaviour. These results confirmed the McKinnon-Shaw hypothesis, which provides that in an economy where economic agents intensively save part of their incomes on money and near money assets, high savings deposits interest rates

will have a direct effect of luring economic agents to save more (income effect), which usually erodes the substitution effect of savings in other financial assets - Gallina (2006) and Arawomo obtained similar results. Another strand of literature provides contrary findings , for example Arok (2014), Larbi (2013), Kidane (2010) whose results indicate a negative relationship between interest rates and domestic savings.

Money supply as a measure of financial development in an economy has also been cited as a determinant of domestic savings. Just like other determinants of savings, supply of money in the economy showed mixed impacts on savings. Some studies revealed that broad money supply growth had negative effect on savings since in most developing countries, financial and capital markets were not developed enough to stimulate informal and agricultural sectors to prefer savings through the financial sector channel (Kidane, 2010; Arok, 2014). However, Aryeetey (1995), Ozcan (2003) and Larbi (2013) demonstrated that savings respond positively to growth in financial development, indicating that financial liberalization impacts positively on savings. Liberalization removes the market distortion factors in the financial sector, thereby increasing the flow of funds to the formal financial channel, which ensures that these financial resources are allocated to the most productive activities leading to increased savings.

Economic growth and growth in income have also showed a positive relationship with savings. Virtually most of the literature reviewed indicates a positive and significant relationship between savings and economic growth, and increase in per capita income. Athukorala and Sen (2004) confirm the Keynesian absolute income hypothesis in India. Similar findings have been revealed by a Kenyan study conducted by Ndirangu and Muturi (2015). Bankole and Fatai (2013) examined the causality between the level of savings and the rate of economic growth in Nigeria. 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 growth on the rate of domestic savings. The researchers accepted Solow's hypothesis that savings precede economic growth.

Nwachukwu and Egwaikhide (2007) examine long-run and short-run determinants of private savings in Nigeria for the 1970-2005 period. The effect of the inflation rate, the rate of public savings, rate of private savings, terms of trade, the degree of financial depth, the rate of real per capita gross national disposable income (GNDI), rate of growth of real per capita GNDI, the real interest rates and ratio of external debt on private savings rate of Nigeria were estimated. The results showed that there is a positive correlation between savings 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 on the rate of private savings. 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 investments. 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 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 in 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 rates significantly determined the rate of domestic savings while in the long-run, its effect on domestic savings was insignificant. 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.

2.3 Overview of Literature

The literature reviewed has provided evidence that the impact of fiscal policy on savings behaviour has not received much of the attention it needs from both researchers and policy makers. Such a discussion seldom appears in mainstream institutions, journals and conference publications. Most studies have analyzed savings behaviour in the light of monetary policy, financial development and demographic factors. For Kenya in particular, little is known on how gross national savings respond to fiscal policy changes while on the monetary policy front, existing studies have provided conflicting results. This paper therefore makes an attempt to fill this gap by focusing the spotlight on the fiscal policy side in addition to monetary policy effects.

3. Methodology

3.1 Analytical Framework

The analytical framework for this paper is derived from the McKinnon (1973) and Shaw (1973) complementarity hypothesis. The hypothesis is founded on the assumption that return on savings as measured by interest rates positively influences savings. The model includes various macroeconomic variables such as investment, and demand for money.

The McKinnon-Shaw complementarity hypothesis can be presented by the following set of equations as used by Bouzid (2012).

$$M/P = f\{Y, I/Y, (d - \pi^a)\} \dots\dots\dots (3.1)$$

Equation (3.1) gives the long-run demand for money balances with Y defined as real income, I/Y is the ratio of investment to real income, d is nominal interest rate, π^a is the anticipated inflation rate and r is the real interest rate. It is also given that; $(\partial M/P)/\partial Y > 0$, represents the money demand for transactions implying that an increase in income generates strong desire to hold money; $(\partial M/P)/(\partial I/Y) > 0$, represents the money demand for investment indicating that increase in investment to real income ratio increases demand to hold money; that is, investment increases results into monetary savings. In addition, it is also given that $(\partial M/P)/\partial(d - \pi^a) > 0$ indicating that positive real interest rates generate greater money demand.

It is critical that investment transmit to savings if the stipulation of McKinnon-Shaw has to hold, such that under an equilibrium condition, investment to real income ration equals savings to real income ratio i.e. $I/Y = S/Y$. In the McKinnon-Shaw framework I/Y is defined as:

$$I/Y = S/Y = f\{r, (d - \pi^a)\} \dots\dots\dots (3.2)$$

Equation (3.2) represents the investment function where r is the rate of return to capital. In a financially repressed economy, real interest rates are usually below equilibrium rate or even negative, such that increase in interest rate triggers economic agents to save more.

To obtain the complementarity hypothesis, equation 3.1 and 3.2 are differentiated and then the differentials are divided to obtain;

$$\{[d(M/P)]/[d S/Y]\} = \{d(M/P)/[d(.)]\} / \{d(S/Y)/[d(.)]\} = \{g(.) / f(.)\} > 0 \dots\dots (3.3)$$

Equation (3.3) suggests that there demand for money positively influences savings. Thus equation (3.1) can be rewritten as:

$$M/P = f\{ Y, S/Y, I/Y (d - \pi^a) \} \dots\dots\dots (3.4)$$

Savings will thus increase with increase in real interest rates and increase in demand for real money balances will result into growth of savings. A savings function that includes interest rate and real money balances will thus be written as:

$$S/Y = f\{ Y, r, M/P, (d - \pi^a), U \} \dots\dots\dots (3.5)$$

3.2 Empirical Model

In addition to the fundamental variable captured in the McKinnon-Shaw framework, this study will include other variables suggested by literature, which may be crucial in explaining the savings behaviour in Kenya. These additional variables capture the peculiar features of the Kenyan economy. From the foregoing discussion, therefore, the savings function will take the following functional form;

$$GNS = f(GGDP, GBP, GTRG, M2G, INF, RDR, U) \dots\dots\dots (3.6)$$

The specific econometric model to be estimated is:

$$GNS_t = \beta_0 + \beta_1 GDPG_t + \beta_2 GBP_t + \beta_3 GTRG_t + \beta_4 M2G_t + \beta_5 INF_t + \beta_6 RDR_t + \varepsilon_t \dots\dots\dots (3.7)$$

Where *GNS* is the gross national saving rate (measured as a percentage of GDP), *GDPG* is the growth rate of real GDP, *GBP* is the government budget position (fiscal deficit or surplus as a percentage of GDP), *GTRG* is the growth in government tax revenue, *M2G* is growth of the Broad Money used as a measure of degree of financial depth in the economy, *INF* is the annual average inflation rate and *RDR* is the real interest rates on savings and deposits. The subscript *t* in each explanatory variable represents the time period under analysis, ε is the error term and it captures all (unobservable) factors affecting the gross national savings that the model has not captured or accounted for. It is assumed that the error term has zero mean and constant variance and does not exhibit serial correlation.

Variable description and source

The study used time series data for the period 1980-2018 obtained from the Kenya National Bureau of Statistics various economic surveys.

Table 3.1: Description of variables and data sources

Variable	Description	Expected Sign	Source
GNS	Gross National Savings is the dependent variable calculated by deducting final consumption expenditure from the Gross National Disposable Income divided by GDP		IMF
GDPG	Growth Rate of Real GDP	+	KNBS
GBP	Government Budget Position gives government budget deficit or surplus as a percentage of GDP. It is measured as net lending/borrowing as percentage of GDP	+/-	KNBS
GTRG	Represents the growth in government tax revenue	+/-	KNBS
INF	Inflation rate is defined as growth in Consumer Price Index	+/-	KNBS
M2	Represents growth in broad money supply defined as currency outside banks plus all demand deposits except those of National Government, Commercial Banks, Non-Residents deposits plus quasi money as percentage of GDP	+/-	KNBS
RDR	Real deposit rate calculated as nominal interest rate on savings minus inflation rate	+/-	KNBS

3.3 Estimation Method

Regressing non-stationary time series variable on another non-stationary time series variable may cause spurious or meaningless regression. Spurious regression arises when non-stationary series that are known to be unrelated indicate they are correlated. Augmented Dickey Fuller (ADF) and Phillips Perron (PP) tests were employed to check for unit roots for all variables to determine their order of integration. Furthermore, to test for the presence of co-integration, the Engle-Granger approach to co-integration was used. The model was then estimated using co-integration and error correction models with the help of E-views 11 software package.

3.4 Test Properties of the Data

3.4.1 Unit Root Test

The fundamental assumption of Classical Linear Regression model is that the variables in question should have a constant mean and variance and that the covariance of two time periods should be zero. If this assumption is violated, then regressing the variables without testing for stationarity leads to spurious regression. To avoid the problem of spurious regression unit root test was conducted using the Augmented Dickey-Fuller (ADF) test and Phillips-Perron (PP) test to test whether the variables were stationary or non-stationary.

The ADF and PP tests, which make the assumption of presence of unit root in the null hypothesis, were conducted with trend and without trend and the unit root results are presented in Table 3.2 below. The test results indicate that the null hypothesis that GNS, GTRG, M2G, INF and RDR individually had unit roots at level was rejected and thus GNS, GTRG, M2G, INF and RDR are individually integrated of order zero $I(0)$. The null hypothesis that GDPG and GBP individually had unit roots was rejected after first differencing, indicating that these variables are integrated of order one $I(1)$.

3.4.1 Co-integration

To test for co-integration, this study applied the Engle-Granger two-step procedure, which involves generating the residuals of the estimated long-run relationship by using the ADF test. If the residuals are stationary, it means that the variables are co-integrated. Table 3.3 presents the co-integration results. Results indicate presence of long-run relationship.

Table 3.2: Unit root test results

Variables	ADF test				
	Levels		First difference		Decision
	Intercept	Trend + intercept	Intercept	Trend + intercept	
GNS	-4.418097***	-4.511232***			$I(0)$
GDPG	-2.802049*	-2.964908	-6.725980***	-6.674996***	$I(1)$
GBP	-3.213164**	-3.272632	-5.225856***	-5.125197***	$I(1)$
GTRG	-4.713033***	-4.640677***			$I(0)$
M2G	-4.664793***	-4.693459***			$I(0)$
INF	-3.111998**	-3.902967**			$I(0)$
RDR	-4.185725***	-4.205213**			$I(0)$

Variables	Philips Perron Test				
	Levels		First difference		Decision
	Intercept	Trend + intercept	Intercept	Trend + intercept	
GNS	-4.446345***	-4.506703***			I(o)
GDPG	-2.883940	-3.032888	-8.078421***	-8.702949***	I(1)
GBP	-1.955666	-1.951353	-3.779448***	-4.711391***	I(1)
GTRG	-4.703041***	-4.630241***			I(o)
M2G	-4.723832***	-4.740042***			I(o)
INF	-3.111998**	-3.567363**			I(o)
RDR	-4.162574***	-4.126707**			I(o)

***, ** and * imply rejection of the null hypothesis at 1%, 5% and 10% levels of significance, respectively

Source: Author's calculations using E-views 11

Table 3.3: Engle-Granger test results for co-integration

ADF						
Variable	Trend	Test Statistics	1% Critical Value	5% Critical Value	10% Critical Value	Prob.
Residuals	intercept	-6.334505	-3.626784	-2.945842	-2.611531	0.00000
Residuals	Trend and Intercept	-6.376635	-4.234972	-3.540328	-3.202445	0.00000
Residuals	None	-6.427393	-2.630762	-1.950394	-1.611202	0.00000
Philips Perron						
Variable	Trend	Test Statistics	1% Critical Value	5% Critical Value	10% Critical Value	Prob.
Residuals	intercept	-6.340152	-3.626784	-2.945842	-2.611531	0.00000
Residuals	Trend and Intercept	-6.376635	-4.234972	-3.540328	-3.202445	0.00000
Residuals	None	-6.434181	-2.630762	-1.950394	-1.611202	0.00000

Source: Author's calculations using E-views 11

4. Results and Discussion

4.1 Descriptive Statistics

The study conducted descriptive analysis to establish the statistical properties of the data and ensure that the estimable model had an appropriate functional and mathematical form. Table 4.1 below gives the mean, standard deviation, skewness, kurtosis, Jarque-Bera statistics and the probabilities of all the variables in the model.

Table 4.1: Descriptive statistics

	GNS	GDPG	GBP	GTRG	M2G	INF	RDR
Mean	14.27	3.92	-4.06	14.13	14.62	11.43	-4.33
Median	14.31	4.64	-3.97	13.15	12.86	9.80	-3.06
Maximum	23.69	6.99	0.64	53.20	77.72	46.00	7.90
Minimum	5.28	-0.24	-11.42	0.93	-1.20	1.60	-28.60
Std. Dev.	3.33	2.00	3.02	8.44	12.74	8.32	6.92
Skewness	0.13	-0.53	-0.61	2.43	3.17	2.24	-1.32
Kurtosis	4.01	2.03	2.80	12.92	16.60	9.23	5.49
Jarque-Bera	1.78	3.36	2.49	198.60	365.92	95.59	21.48
Probability	0.41	0.19	0.29	0.00	0.00	0.00	0.00
N	39	39	39	39	39	39	39

Source: Author's calculations using E-views 11

It is evident that the variables used in this study are not dispersed significantly from their mean values as indicated by the relatively low standard deviations values. The Jarque-Bera test statistics, which tests whether a series has a normal distribution by measuring the difference of the series skewness and kurtosis with those of a normal distribution, was used to test the null hypothesis that the distribution of the variables is not significantly different from normal. The Jarque-Bera statistic explicitly rejected the null hypothesis of normal distribution for GTRG, M2G, INF and RDR. However, the null hypothesis of normal distribution was accepted for GNS, GDPG and GBP at the 1%, 5% and 10% levels of significance.

Table 4.2 reveals the correlation matrix of dependent and independent variables for the period from 1980 to 2018. Gross domestic savings have positive correlation with growth of real GDP and real interest rates on deposits and savings, but have negative correlation with government tax revenue growth, fiscal deficit, money supply growth and inflation.

Table 4.2: Correlation matrix

	GNS	GDPG	GBP	GTRG	M2G	INF	RDR
GNS	1.00						
GDPG	0.07	1.00					
GBP	-0.39	-0.03	1.00				
GTRG	-0.07	0.03	-0.52	1.00			
M2G	-0.10	-0.11	-0.50	0.35	1.00		
INF	-0.11	-0.45	-0.50	0.59	0.43	1.00	
RDR	0.11	0.29	0.44	-0.54	-0.28	-0.77	1.00

Source: Author's calculations using E-views 11

4.2 Estimation Results

The study estimated the relationship between GNS and its potential determinants, that is GDPG, GBP, GTR INF RDR and M2 in the context of the Autoregressive Distributed Lag (ARDL) model following the general to specific procedure. The ARDL model was chosen given that some of the variables in the model were integrated of order zero $I(0)$, while others were integrated of order (1). However, before estimating the model, the optimal lag length of each variable in the model was determined to ensure that the model was well specified. The Akaike Information Criterion (AIC) and the Schwartz Bayesian Information Criterion (SBIC) were used to determine the optimal lag length. It was established that the optimal lag length was 2. The long-run model estimates are as shown in Table 4.3.

4.2.1 Discussion of Long Run Results

The fitted long-run ARDL model estimates show that growth rate of domestic product in Kenya have a positive and significant impact on gross national savings. This is in line with economic theory, particularly the Life-Cycle hypothesis (Modigliani, 1970). The estimated coefficient indicates that in the long-run, a unit increase in GDP raises the national savings rate by 1.05 units. These results suggest that with growth in economic activities, the earnings of the individual's business and the government increases and thus they are able to save more. These results are consistent with the works of Ndirangu and Muturi (2015), Arawomo (2012), Gallina (2006) and Touny(2008).

The results regarding government budget position, which is defined as fiscal deficit or surplus, clearly shows that in the long-run, fiscal deficit negatively and

significantly impact on national savings rate. This implies that as government consumes more than it produces, it cuts down on public savings thereby lowering the gross national savings. For precautionary reasons, it would be expected that individuals and firms save more when government relies on deficit financing. However, results show that there is a negative association between fiscal deficit and saving rates. These results are consistent with those of Tedla (2016) and Gallina (2006) but inconsistent with Larbi (2013), Jialani et al (2013) and Arawamo (2012).

Table 4.3: Estimated long-run model

Dependent Variable: GNS Method: Least Squares Date: 08/21/19 Time: 16:12 Sample (adjusted): 1982 2018 Included observations: 37 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	5.7938	1.9238	3.0116	0.0064
GNS(-1)	0.4248	0.0957	4.4386	0.0002
GDPG	1.0538	0.2072	5.0870	0.0000
GDPG(-1)	-0.7608	0.1728	-4.4023	0.0002
GBP	-0.2715	0.1557	-1.7438	0.0951
GBP(-2)	0.6088	0.1732	3.5154	0.0020
GTRG(-1)	0.1461	0.0581	2.5152	0.0197
GTRG(-2)	0.1342	0.0507	2.6445	0.0148
INF	0.3374	0.0735	4.5873	0.0001
M2G	-0.0898	0.0287	-3.1288	0.0049
M2G(-1)	-0.0811	0.0369	-2.2008	0.0385
M2G(-2)	-0.1242	0.0375	-3.3151	0.0031
RDR	0.1574	0.0585	2.6909	0.0133
D1999	10.5795	1.6374	6.4610	0.0000
D1989	-5.8913	1.5991	-3.6841	0.0013
R-squared	0.8603	Mean dependent var		14.6272
Adjusted R-squared	0.7715	S.D. dependent var		2.9712
S.E. of regression	1.4204	Akaike info criterion		3.8307
Sum squared resid	44.3860	Schwarz criterion		4.4838
Log likelihood	-55.8678	Hannan-Quinn criter.		4.0609
F-statistic	9.6799	Durbin-Watson stat		2.1893
Prob(F-statistic)	0.0000			

Source: Author's computations using time-series data for 1980-2018 using E-views 11

Analysis of government tax revenue shows that there is a positive and significant relationship between government tax revenue and gross national savings. The estimated coefficient indicates that increasing government tax revenue would significantly result into an increase in gross national savings. These results are consistent with those of Kidane (2010). The implication of these results is that increases in government savings following a tax increase more than offset the decline in private savings due to tax imposition. This implies that Ricardian equivalence does not apply in the Kenyan context.

The financial development in the economy was measured by money supply M2 and the results indicate a negative and significant impact of M2 on gross national savings. These results imply that increased money supply enables households and firms to finance higher consumption at a given income level and thereby reduce on their savings. These results suggest that an increase in money supply reduces the propensity to save and are consistent with Arawomo (2012) and Kidane (2010) but inconsistent with Ozcan (2003).

Real deposit rate exhibited a positive and significant coefficient for the long-run relationship, indicating that a unit increase in real savings deposit rate would result into 0.16 units increment in gross national savings. This implies that when deposit rates are higher, future incomes and wealth stream will be higher and economic agents will consequently forgo current consumption and save more. These results conform to the findings of Mckinnon (1973) and Shaw (1973), Athukorala and Sen (2004), Gallina (2006), Arawamo (2012) but inconsistent with Ndirangu and Muturi (2015), Larbi (2013) and Epaphra (2014).

4.2.2 Error Correction Model Results

Table 4.4 shows the results for the error correction model. The overall goodness of fit of the model is adequate as indicated by an R-squared of 0.7923. Estimation was based on the general to specific approach to ensure an agreeable fit. Dummies were also included to capture short-run structural breaks. The error correction term has the expected negative sign, and it is statistically significant. The magnitude of the error correction term is -0.7604, which indicates that the speed of adjustment to the equilibrium gross national savings in Kenya is 76.04 per cent in each time period. This implies that instabilities in gross national savings would be corrected within a period of one and a quarter years thereabout.

The coefficient of growth of domestic product is positive and significant in explaining gross national savings in the short-run. This suggests that when the economy is bustling with activities, incomes increase for households, firms and the government and thus their propensities to save increase.

Changes in short-run gross national savings respond to changes in government tax revenue positively and significantly. These indicate that government savings respond positively and significantly to changes in tax revenue compared to private savings, such that the increasing government tax revenue results into an increase in government savings that more than offsets the negative impact of tax imposition on private savings.

Table 4.4: Regression results for Error Correction Model

Dependent Variable: D(GNS) Method: Least Squares Date: 08/21/19 Time: 16:39 Sample (adjusted): 1983 2018 Included observations: 36 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.4417	0.3076	-1.4361	0.1634
D(GDPG)	0.6001	0.2037	2.9454	0.0069
D(GTRG(-2))	0.0740	0.0388	1.9081	0.0679
D(INF(-2))	-0.1567	0.0480	-3.2663	0.0032
D(M2G(-1))	0.1508	0.0340	4.4385	0.0002
D(M2G(-2))	0.1295	0.0359	3.6108	0.0013
D(RDR)	0.1808	0.0631	2.8669	0.0083
D(RDR(-1))	0.1266	0.0556	2.2765	0.0316
ECT2(-1)	-0.7604	0.2728	-2.7873	0.0100
D1999	13.3923	1.9063	7.0254	0.0000
D1987	-4.4551	2.0596	-2.1631	0.0403
R-squared	0.7923	Mean dependent var		-0.0614
Adjusted R-squared	0.7092	S.D. dependent var		3.2864
S.E. of regression	1.7721	Akaike info criterion		4.2287
Sum squared resid	78.5088	Schwarz criterion		4.7125
Log likelihood	-65.1162	Hannan-Quinn criterion.		4.3976
F-statistic	9.5376	Durbin-Watson stat		2.0002
Prob(F-statistic)	0.0000			

Source: Author's computations using time-series data for 1980-2018 using E-views 11

The coefficient for financial deepening variable M2 indicates a positive and significant relationship with gross national savings. This evidence suggests that financial development in financial and capital markets in Kenya adequately induces as many Kenyans, especially those in agriculture and informal sectors, to participate and thereby increase their money holdings with the financial markets,

at least in the short-run. Years 1987 and 1999 were included as dummy variables and for the short-run model these were significant. D1987 had a negative and significant impact on national savings. This could be explained by the double digit inflation rate that followed the second phase of the implementation of the structural adjustment programmes. D1999 had a positive impact on national savings and this could be attributed to the uncertainties that followed the 1997 elections and the turn of millennium in 2000 that saw increased anticipation leading to increased money holdings.

5. Conclusion and Policy Recommendations

5.1 Conclusion

Regression results of this study have established that fiscal policy is a key factor with direct impact on gross national savings. Previous studies analyzing the determinants of savings, particularly in Kenya, have more often than not focused on monetary and financial sector variables, and demographic variables. However, Gallina (2006), Kidane (2010), Arawamo (2012) and Larbi (2013) established that fiscal policy could influence savings although they had mixed results. It is in recognition of this and the motive to draw a wider picture of the complex relationship between savings and their determinants that this study attempted to understand the nature of national savings behaviour in Kenya in the context of fiscal and monetary policy using data for the period 1980-2018.

The study found that government budget deficit negatively impacted on national savings in the long-run, implying that whenever government runs huge budget deficits, gross national savings would decline. Government tax revenue positively impacted gross national savings, indicating that increasing government tax has a net effect of boosting national savings through public savings since such an increase would net out the decline in private savings following tax imposition.

Real deposit interest rates showed a positive relationship with national savings, providing evidence that absence of negative real deposit interest rates boosts savings in the economy. The results also suggest that financial deepening measured by broad money supply M2 reduces propensity to save as individuals can finance higher levels of consumption in the present and thus are less likely to participate in the financial and capital markets through savings. Inflation showed a positive relationship with savings rate in the long-run, indicating that in Kenya the precautionary motive for money holdings is actually valid.

The error correction model reported the expected negative sign for ECT(-1) with a magnitude of 0.76, indicating that gross national savings will adjust to equilibrium at a speed of 76 per cent in each period wherever instabilities occur. Thus, it takes approximately 1.25 years for gross national savings to return to long run trajectory once it is destabilized.

5.2 Policy Recommendations

Following from the empirical results of this study, we present several policy recommendations for Kenya that would help boost the rate of national savings so as to propel economic growth without over-relying on external financing. These recommendations are presented in three broad groups – fiscal policies, growth and income, and monetary policy and financial development.

Fiscal policies: This study has established that there is a direct negative relationship between budget deficit and savings rate in Kenya. Budget deficit results when government spending is more than its revenue. The results for government tax revenue suggest that improvement in tax collection will boost national savings through public savings channel. It is therefore prudent for the government to step up its efforts in improving tax collection and reduce deficits, including pending bills at the county level. Improving tax revenue can be addressed by not only increasing taxes but also by widening the tax base through effective tax administration and tax policy that will bring to the tax net eligible tax payers and punitively punish tax evaders. Budget deficit would improve domestic savings in the short-run. This could possibly be through the growth channel, particularly when there is effectiveness and efficiency in public spending. Proper management of public expenditure could stimulate savings especially if the government borrowing to finance the deficit invested in projects with the potential to raise productivity and reduce poverty levels. Therefore, the National Government should keep budget deficit within reasonable limits and choose tax policies that are sustainable and do not severely repress private savings. Continued strict adherence to the Public Finance Management (PFM) Act will actively support this course. In addition, there is need for proper check on size of the government, increased government investments on big investments and curbing corruption.

Growth and income: As the results of this study suggest, economic growth is a significant and strong determinant of gross national savings. Therefore, as the country continues to push for higher national savings rate of up to 30 per cent of GDP, there is need to adopt policies that sustain higher growth momentum and ensure that the distribution of that growth across various income groups is more equal. This includes strict adherence to inclusive growth strategies such as supporting manufacturing, trade, tourism, and other services sectors to generate employment and increase productivity in the agricultural sector. Faithful implementation of the “Big Four” agenda will be a plus in this trajectory.

Monetary policy and financial development: Regression results of this study indicate a significant and positive relationship between savings rate and real deposit interest rates, an indication that propensity to save increases with

increases in deposit rate both in the short- and long-run. The monetary authority should therefore ensure absence of negative real interest rates as this is critical to any environment conducive to positive savings. Increasing money supply would result into decline in national savings, implying that such a move would only propel current consumption. It is therefore prudent that the Central Bank of Kenya continuously and judiciously monitors money supply levels such that inflationary pressures are restricted to stimulate savings. Macroeconomic uncertainty due to inflation results into precautionary savings motive in Kenya in the long-run. However, short-run regressions suggest that inflation negatively affects domestic savings. To this end, it is advisable that the Central Bank of Kenya continues with its objective of ensuring stability in prices and sustainable economic growth.

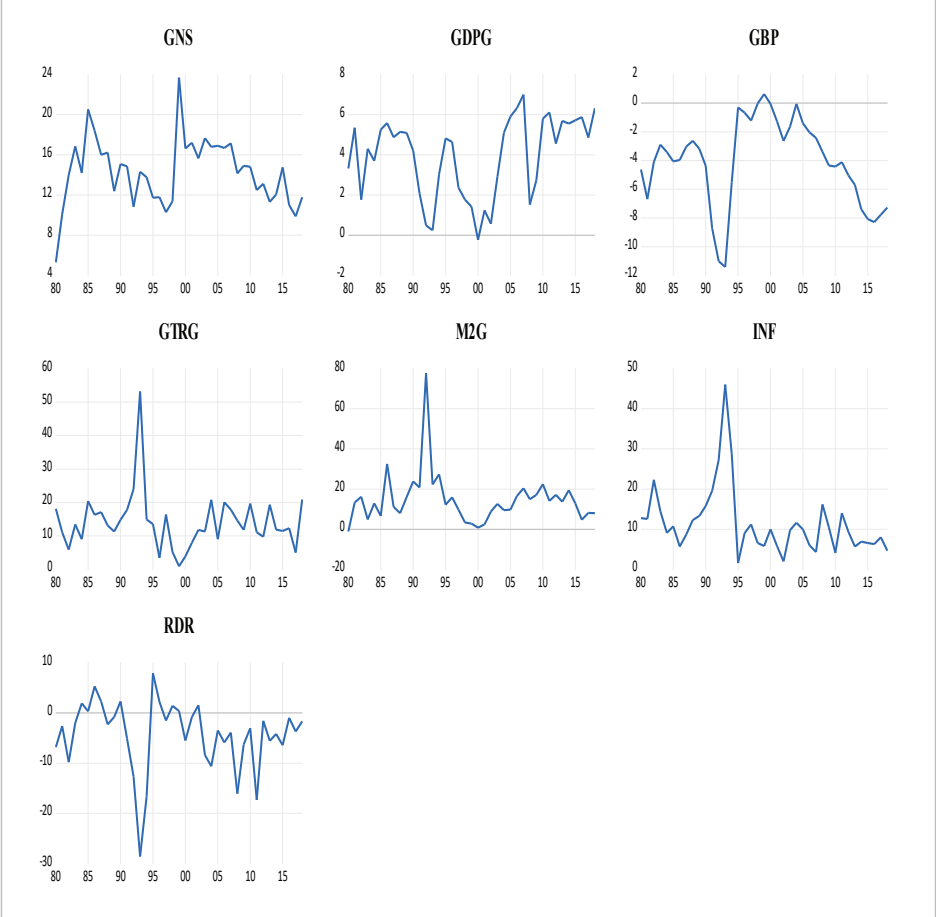
References

- Ando, A. and Modigliani, F. (1963), "The life cycle hypothesis of savings: Aggregate implications and tests". *American Economic Review*, 53(1), 55-84.
- Arawomo, D. F. (2012), Explaining low savings rate among countries in the West African Monetary Zone (WAMZ). Trade Policy Research and Training Programme, University of Ibadan, Nigeria, 1(25), 399-420.
- Arok, B. A. (2014), Determinants of gross domestic savings in Kenya. Thesis for Master of Arts in Economics of the University of Nairobi.
- Aryeetey, E. (1995), "Saving among the rural poor in Ghana". *African Journal of Economic Policy*. Vol. 2, No. 2: 55-69.
- 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.
- Bouزيد, A. (2012), "McKinnon's complementarity hypothesis: Empirical evidence for the Arab Maghrebean countries". *Romanian Economic Journal*, Year XV, No. 44: 23-36.
- Duesenberry, J. S. (1949), *Income, saving, and the theory of consumer behaviour*. London: Harvard University Press.
- Epaphra, M. (2014), "Empirical investigation of the determinants of Tanzania's national savings". *International Journal of Economics and Management Sciences*, Vol. 4, No. 213.
- Friedman, M. (1957), *A theory of the consumption function*. Princeton, New Jersey: National Bureau of Economic Research.
- Gallina, A.V. (2006), Determinants of savings in Pakistan. A World Bank Report No. SASPR-10.
- International Monetary Fund (2016), *Regional economic outlook, Sub-Saharan Africa*. Washington DC: International Monetary Fund.
- Jilani, S., Ahmed, S.S., Cheema, F.A. and Shaik, A.H. (2013), "Determinants of national saving in Pakistan: An explanatory study". *Asian Social Science*, Col. 9. No. 5: 254-262.
- Keynes, J. M. (1937), "The general theory of employment". *The Quarterly Journal of Economics*, 51(2): 209-223.

- Kidane, B.M. (2010), Determinants of gross domestic savings in Ethiopia: A time series analysis (1971-2009). 4th Annual Multidisciplinary Research Conference of Alpha, University College 23-24 July 2010, Addis Ababa.
- Kivindu, M.M. (2015), Factors determining gross domestic savings in Kenya. M.A Economics Thesis, University of Nairobi.
- Larbi, D.A. (2013), "The long run determinants of private domestic savings in Ghana: A co-integration approach". *Journal of Economics and Sustainable Development*, 4(4): 125-136.
- Mckinnon, R.I. (1973), *Money and banking in economic development*. Washington DC: Brookings Institution.
- Ndirangu and Muturi (2015), "Determinants of gross domestic savings in Kenya (1970-2013)". *Journal of Economics, Commerce and Management*, Vol. III, Issue 7: 157-178.
- Ngugi R.W. and Kabubo, J.W. (1998), Financial sector reforms and interest rates liberalization: The Kenya experience. AERC Research Paper No. 72.
- Nwachukwu, T.E. and Egwaikhide, F.O. (2007), An error-correction model of the determinants of private saving in Nigeria. African Economic Society (AES) Conference. Cape Town: Africa Economic Society Press.
- Ozcan, K.M., Gunay, A. and Ertac, S. (2003), "Determinants of private savings behavior in Turkey". *Applied Economics*, 25(12): 1405-1416.
- Republic of Kenya (2007): *Kenya Vision 2030*. Nairobi: Government Printer.
- Romer, D. (2006), *Advanced macroeconomics*, New York: McGraw-Hill, 3rd Edition.
- Shaw, E. S. (1973), Financial deepening in economic development.
- Tedla W.G. (2016), Determinants of gross domestic saving: An empirical evidence from East Africa. M.A. in Economic Modeling and Forecasting Thesis, Addis Ababa University, Ethiopia.
- Touny, M.A. (2008), "Determinants of domestic saving performance in Egypt: An empirical Study". *Journal of Commercial Studies and Researches*, Faculty of Commerce, Benha University, 1-23.
- World Bank (2016), *World Development Report*. New York: Oxford University Press.

Appendices

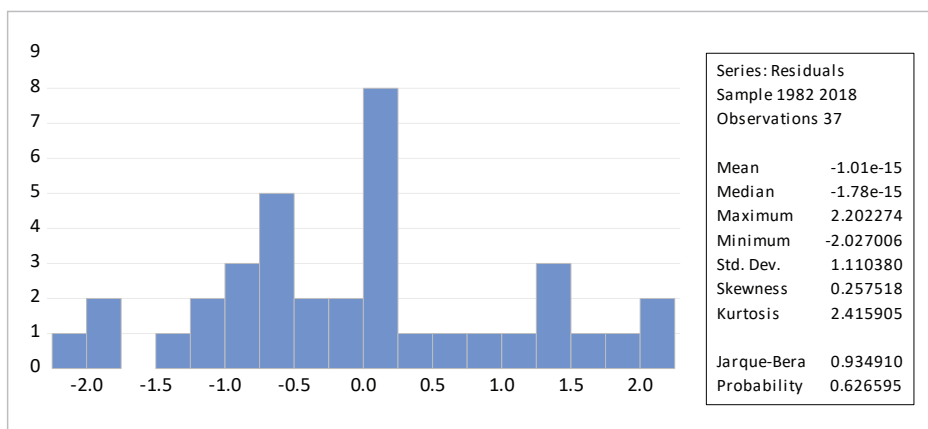
A Trends in model variables



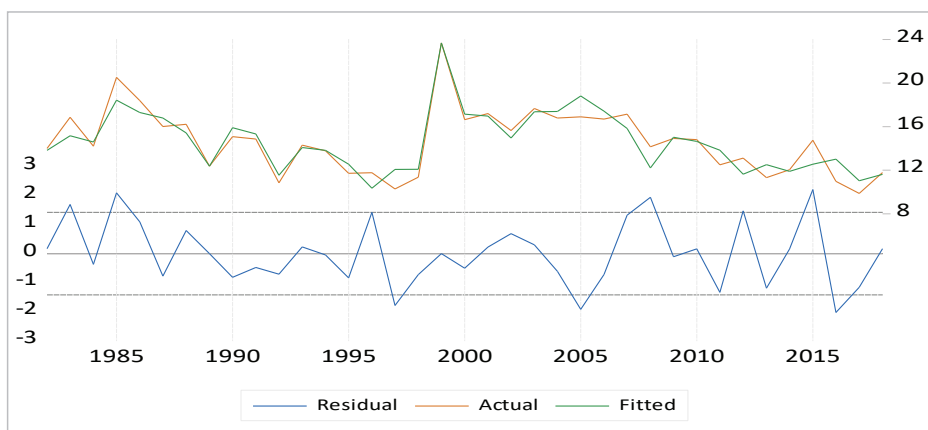
B Long-run best fit

Dependent Variable: GNS Method: Least Squares Date: 08/21/19 Time: 16:12 Sample (adjusted): 1982 2018 Included observations: 37 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	5.7938	1.9238	3.0116	0.0064
GNS(-1)	0.4248	0.0957	4.4386	0.0002
GDPG	1.0538	0.2072	5.0870	0.0000
GDPG(-1)	-0.7608	0.1728	-4.4023	0.0002
GBP	-0.2715	0.1557	-1.7438	0.0951
GBP(-2)	0.6088	0.1732	3.5154	0.0020
GTRG(-1)	0.1461	0.0581	2.5152	0.0197
GTRG(-2)	0.1342	0.0507	2.6445	0.0148
INF	0.3374	0.0735	4.5873	0.0001
M2G	-0.0898	0.0287	-3.1288	0.0049
M2G(-1)	-0.0811	0.0369	-2.2008	0.0385
M2G(-2)	-0.1242	0.0375	-3.3151	0.0031
RDR	0.1574	0.0585	2.6909	0.0133
D1999	10.5795	1.6374	6.4610	0.0000
D1989	-5.8913	1.5991	-3.6841	0.0013
R-squared	0.8603	Mean dependent var		14.6272
Adjusted R-squared	0.7715	S.D. dependent var		2.9712
S.E. of regression	1.4204	Akaike info criterion		3.8307
Sum squared resid	44.3860	Schwarz criterion		4.4838
Log likelihood	-55.8678	Hannan-Quinn criterion.		4.0609
F-statistic	9.6799	Durbin-Watson stat		2.1893
Prob(F-statistic)	0.0000			

C Normality test



D Long-run residuals



E Test for autocorrelation

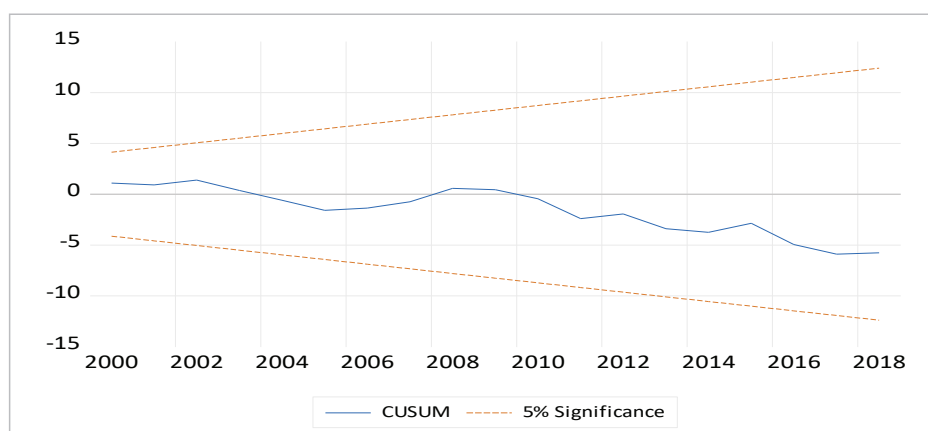
Breusch-Godfrey Serial Correlation LM Test:			
Null hypothesis: No serial correlation at up to 2 lags			
F-statistic	0.3709	Prob. F(2,20)	0.6947
Obs*R-squared	1.3234	Prob. Chi-Square(2)	0.5160

F Test for Structural Stability

i) Ramsey RESET Test

Equation: LONG_RUNFINAL			
Omitted Variables: Squares of fitted values			
Specification: GNS C GNS(-1) GDPG GDPG(-1) GBP GBP(-2) GTRG(-1) GTRG(-2) INF M2G M2G(-1) M2G(-2) RDR D1999 D1989			
	Value	df	Probability
t-statistic	0.0507	21	0.9600
F-statistic	0.0026	(1, 21)	0.9600
Likelihood ratio	0.0045	1	0.9463
F-test summary:			
	Sum of Sq.	df	Mean Squares
Test SSR	0.0054	1	0.0054
Restricted SSR	44.3860	22	2.0175
Unrestricted SSR	44.3805	21	2.1134
LR test summary:			
	Value		
Restricted LogL	-55.8678		
Unrestricted LogL	-55.8656		

ii) CUSUM Test



G Multicollinearity test

Variance Inflation Factors			
Date: 08/21/19 Time: 23:46			
Sample: 1980 2018			
Included observations: 37			
Variable	Coefficient Variance	Uncentered VIF	Centered VIF
C	3.7011	67.8747	N/A
GNS(-1)	0.0092	37.2152	1.4989
GDPG	0.0429	15.1610	3.1912
GDPG(-1)	0.0299	10.3833	2.1649
GBP	0.0242	11.1123	4.0812
GBP(-2)	0.0300	13.0484	4.7839
GTRG(-1)	0.0034	16.2687	4.4175
GTRG(-2)	0.0026	12.7912	3.2867
INF	0.0054	19.8346	7.0401
M2G	0.0008	5.8437	2.4106
M2G(-1)	0.0014	9.7172	3.9444
M2G(-2)	0.0014	10.0056	4.2306
RDR	0.0034	4.2398	3.0733
D1999	2.6812	1.3289	1.2930
D1989	2.5573	1.2675	1.2333

Note: Table shows that the value of all centred VIF is below 10. The conclusion is that the independent variables are not collinear to the dependent variable. The probability of accepting “false” hypothesis is low.

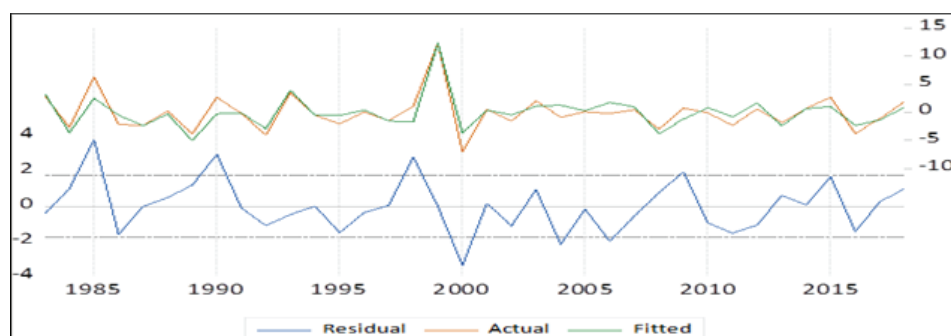
H Heteroskedasticity test

Heteroskedasticity Test: Breusch-Pagan-Godfrey			
Null hypothesis: Homoskedasticity			
F-statistic	0.7310	Prob. F(14,22)	0.7239
Obs*R-squared	11.7475	Prob. Chi-Square(14)	0.6266
Scaled explained SS	2.9403	Prob. Chi-Square(14)	0.9992

I Error-correction model

Dependent Variable: D(GNS) Method: Least Squares Date: 08/21/19 Time: 16:39 Sample (adjusted): 1983 2018 Included observations: 36 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.4417	0.3076	-1.4361	0.1634
D(GDPG)	0.6001	0.2037	2.9454	0.0069
D(GTRG(-2))	0.0740	0.0388	1.9081	0.0679
D(INF(-2))	-0.1567	0.0480	-3.2663	0.0032
D(M2G(-1))	0.1508	0.0340	4.4385	0.0002
D(M2G(-2))	0.1295	0.0359	3.6108	0.0013
D(RDR)	0.1808	0.0631	2.8669	0.0083
D(RDR(-1))	0.1266	0.0556	2.2765	0.0316
ECT(-1)	-0.7604	0.2728	-2.7873	0.0100
D1999	13.3923	1.9063	7.0254	0.0000
D1987	-4.4551	2.0596	-2.1631	0.0403
R-squared	0.7923	Mean dependent var		-0.0614
Adjusted R-squared	0.7092	S.D. dependent var		3.2864
S.E. of regression	1.7721	Akaike info criterion		4.2287
Sum squared resid	78.5088	Schwarz criterion		4.7125
Log likelihood	-65.1162	Hannan-Quinn criterion.		4.3976
F-statistic	9.5376	Durbin-Watson stat		2.0002
Prob(F-statistic)	0.0000			

J Short-run residuals



ISBN 978 9966 058 93 5

**Kenya Institute for Public Policy Research and Analysis
Bishops Garden Towers, Bishops Road
PO Box 56445, Nairobi, Kenya
tel: +254 20 2719933/4, 2714714/5, 2721654, 2721110
fax: +254 20 2719951
email: admin@kippra.or.ke
website: <http://www.kippra.org>**