

An Investigation of the Relationship between Government Spending and Private Consumption in Kenya

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Abstract: Over the past years, the relationship between government spending and private consumption remains one of the contentious issues in macroeconomics literature. The question of whether public expenditure is neutral or crowds in or out private consumption has dominated theoretical and empirical debate. Three major schools of thought on the issue are observed in the literature, these are the Ricardian equivalence theorem, the Keynesian framework and the Substitutability hypothesis each with a distinct set of explanations. These contrasting schools of thought have triggered several empirical studies attempting to investigate the relationship between government spending and private consumption. However, conclusions from the empirical studies are inconclusive. Most of the empirical studies, on the subject have mainly focused on the high-income countries which have different structural properties in their economic structure and government spending patterns. There is scanty literature on the relationship between private consumption and government spending in the less developed economies. In Kenya, most of the studies focus on the relationship between government expenditure and economic growth. The government expenditure in Kenya has been increasing gradually over the years. The average value of government expenditure was 9.96 billion U.S. dollars with a minimum of 0.56 billion U.S. dollars in 1961 and a maximum of 50.29 billion U.S. dollars in 2015. On the other hand, the private consumption, average increment was 2.06 billion U.S. dollars with a minimum of 0.09 billion U.S. dollars in 1960 and a maximum of 9.19 billion U.S. dollars in 2015. Though there is upward trend of both private consumption and public spending in Kenya, the relationship between the variables is not clear. This study sought to investigate the relationship between government spending and private consumption in Kenya. The specific objectives of this study were to; determine the correlation between government spending and private consumption, establish the long run equilibrium linkage between government spending and private consumption and determine the causality link between government spending and private consumption in Kenya. This study was based on correlational research design and used the Autoregressive Distributed Lag (ARDL) estimation technique. The model was subjected to several diagnostic tests, Breusch-Godfrey serial correlation LM test, CUSUM test and Bound test to ensure validity and reliability. The results of the study revealed that government spending has a significant positive effect on private consumption both in short run (= 0.376,) and long-run (= 0.888,). The results also indicated that the variables had a positive trend with a strong, statistically significant positive association (0.998,). The Granger causality test results indicate that there is long run unidirectional causal relationship running from government consumption to private consumption. Based on the results, this study recommends the enhanced use of public spending to stimulate the private consumption.

Keywords: Private Consumption, Government Spending, Autoregressive Distributed Lag, Kenya

INTRODUCTION

Central to the study of macroeconomics is an understanding of how government spending on goods and services impact on aggregate economic activity. The relationship between government spending and private consumption continues to attract the attention of fiscal policy analysts and other economists. The question is whether government

spending is neutral or crowds in or crowds out private consumption. Over the past years, the relationship between government spending and private consumption remains a controversial subject in both public policy making and economics academic circles[1]. There are three schools of thought found within literature regarding the relationship between government consumption and private consumption. These are the Ricardian equivalence theorem, the Keynesian framework and the substitutability hypothesis. Each school has come up with a distinct set of explanations regarding the relationship between government consumption and private consumption.

The Ricardian equivalence proposition states that for a given a sequence of government expenditures or spending, it is irrelevant for households if such expenditures are financed by imposing current taxes, or by raising current debt and imposing higher taxes in the future. Consequently, the choice of fiscal policy in a certain economy, whether public debt or taxes, to finance expenditures is neutral on household's consumption allocations i.e. it does not affect private consumption. An increase in government expenditure results in an identical increase in private savings and consequently has no first-order effect on private consumption i.e. neutrality proposition. In other words, there is no causality of the link between public spending and private consumption [2].

The Keynesian hypothesis stipulates that government spending (expansionary fiscal policy) triggers a positive effect (crowding-in effect) on private consumption. The crowding-in effect is also known as complementary effect. The Keynesian view postulates that a given change in government spending will produce a multiplier effect on the aggregate demand. The Keynesian multiplier effect postulates that every dollar spent on investment creates a multiplier effect and leads to an increased expenditure of more than one dollar. This multiplier effect is set in motion when households start to spend out of their additional income from work opportunities funded by government spending. To Keynes, public expenditure is an exogenous factor and a policy instrument for increasing national income. Consequently, he believes that the causality of the relationship between public spending and private consumption runs from government expenditure to private consumption [4]. The substitutability framework stipulates that an increase in government spending reduces private consumption. According to, this hypothesis private consumption would be substituted one for one for a given change in government consumption regardless of the way it is financed. This view reiterates that an increase in government spending crowds-out private consumption. In other words, the causality of the link between public spending and private consumption runs from government expenditure to private consumption [3].

This contrasting school of thought gave rise to several empirical studies attempting to assess the relationship between government spending and private consumption. Aschauer [5] and Kormendi [6] applied the permanent-income approach and their study established a significant degree of substitutability between private consumption and government spending in the United States. Ahmed [7] estimated the effects of UK government consumption in an intertemporal substitution model and found that government expenditures tend to crowd out private consumption.

Berben and Brosens [8], conducted a study in 17 OECD countries, the findings from their study established that an increase in government spending lead to a decline in private consumption. Nieh and Ho [9], in their study found out that private consumption and government spending in 23 OECD countries are complementary to each other. D'Alessandro [10], examined how government spending would affect private consumption among the 20 selected areas of Italy. The results of this study showed that there was a positive significant effect of government spending on private consumption.

Luis and Jose [11], conducted the study on whether Latin-American Households Neutral to increases in Government Spending. The Results indicated that the Ricardian equivalence proposition was accepted in Brazil, Argentina and Chile but is strongly rejected for Mexico. Kraipornsak [12], studied the impact of government spending on private consumption in Thailand. The study found that there was no effect of government capital spending on either the private consumption or the growth of GDP. Davide and Sousa [13], using a panel data of 145 countries from 1960 to 2007 analyzed the impact of government spending on the private sector. They assessed the existence of crowding-out versus crowding-in effects. The results indicated that government spending crowds-out private consumption.

Ismail [14], studied the relationship between government spending and private consumption in Malaysia. The empirical findings of the study established that in Malaysia, government spending and private consumption are best described as complementary rather than as substitutes. Mahumd and Ahmed [7], examined the relationship between government spending and private consumption in Bangladesh. The study findings validated the Barro[2]-Ricardian[23] equivalence hypothesis of government spending that household consumption is unrelated to government consumption decision in the long-run. Hamid and Ali [15], investigated the relationship of government spending and private sector consumption in G7 Countries. The results of this study indicated that government spending has a positive effect on private consumption.

Recently [16], investigated the Effect of Government Expenditure on Private Consumption in china. The results of this study indicated that an increase in the aggregate level of government spending has a positive effect on private consumption. Though many data based macroeconomic models predict that expansionary fiscal policy increases output in the long run, there is no clear empirical or theoretical consensus as to how changes in fiscal policy affect private consumption [1]. Most of the empirical studies done, on the subject so far are on the high-income countries like China and OECD countries which feature different structural properties in comparison to the less developed countries like Kenya. This necessitates more empirical studies to be established in less developed countries to establish whether the results, reconcile with existing findings or have different results.

The most popular approaches in previous studies on the relationship between government spending and private consumption are based on the specification of structural consumption function, based on the Ordinary Least Squares (OLS) estimation technique. This methodology was employed by Feldstein[17], Kormendi [6], Aschauer [5], Seater [18], Blinder [19], Evans[20], Haug [21] and Stanley[22].The Ordinary Least Squares (OLS) estimation technique has its weakness which could lead to spurious results. This study adopted Autoregressive Distributed Lag (ARDL) estimation and Granger causality analysis which is more superior to OLS. This methodology ensured that there were stable, long run equilibrium relationships between the variables hence achieved more reliable results.

The relationship between government spending and private consumption is crucial for the design, implementation and effectiveness of fiscal policy. The Private consumption expenditure is typically the largest constituent of the gross domestic product (GDP), representing in general around 75% of Kenya's GDP. It is, therefore, an essential variable for economic analysis of aggregate demand. In addition to its direct effect on the macro economy, government spending can indirectly affect economic activity through two other components of the GDP, namely private consumption spending and private investment spending. In countries where government is a major player in the macroeconomic activity, understanding these effects becomes even more important. However, studies to establish the relationship between government spending and private consumption in Kenya are unexplored. This study sought to establish the correlation between the two variables; to establish the empirical long run equilibrium linkage and to establish the effect of government spending on private consumption in Kenya.

Literature Review and Theoretical Framework

Literature Review

There are three major schools of thought observed in literature regarding the relationship between private consumption and government spending. These are Keynesian views of government consumption, substitutability hypothesis and Ricardian equivalence. Each school has come up with a distinct set of explanations regarding the relationship between government consumption and private consumption.

Ricardian Equivalence Theorem

In 1974 Robert Barro in his seminal paper "Are Government Bonds Net Wealth" developed the Ricardian equivalence theory. This theorem is an extension of [23] neutrality proposition, which stipulated that the choice of fiscal policy in a certain economy, i.e. debt or taxes to finance expenditures is neutral on households' consumption allocations. According to[2], an increase in government expenditure results in an identical increase in private savings and consequently has no first-order effect on private consumption i.e. neutrality proposition.

He further argued that, the government can either finance their expenditure by taxing current taxpayers, or alternatively it can borrow money by issuing bonds. In the scenario where the government issues bonds, it will eventually repay this borrowing by raising taxes above what it would otherwise have been in future. The choice is therefore being taxed now or later. This theorem states that, rational consumers are mindful of the present value of the future taxes implied by current deficits, and they increase their savings accordingly to fully offset the new government borrowing [2]. In this study, the theory helps in establishing the relationship between private consumption and government spending.

Keynesian Theorem

In the general theory of employment, interest and money Keynes provided a scientific basis for evolution of the theory of public Expenditure. Unlike the classical economists, Keynes noted that public spending is the remedy against unemployment. He observed that the government played a critical role in the determination on the Aggregate expenditure in an economy. According to Keynes, in times of a recession, the government must undertake the expenditure to compensate for the lack in the components of Household expenditure (C) and private investment (I) to ensure that the demand is maintained in the markets. These government interventions are done through fiscal policy which involves changes in government spending and taxes [4].

The Keynes's theory of Absolute income hypothesis postulated that household's current consumption is responsive to current disposable income, thus the increase in government spending leads to increase output and employment, which further influence household's aggregate consumption. The Keynesian multiplier effect postulates that every dollar spent on investment creates a multiplier effect and leads to an increased expenditure of more than one dollar. This multiplier effect is set in motion when households start to spend out of their additional income from work opportunities funded by government spending. Keynes further established that the non-income determinants of consumption are: wealth, credit, expectations, and aggregate price levels [4].

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Substitutability Theorem

The substitutability view was first advanced by Bailey [3]. This theorem stipulates that an increase in government spending crowds-out private consumption. He noted that the substitution is inevitable regardless of the way the government finances its expenditure. He observed that government expenditure on goods and services reduces total resources currently available for household's private consumption. Thus, one-unit increase in government expenditure would reduce private expenditure by an equal amount. The private consumption is crowded out by either the consumers being induced to postpone consumption in response to deficit-financed government spending or feeling poorer because of a negative wealth effect or they may be induced to postpone consumption in response to deficit-financed government spending. This phenomenon is known as substitutability hypothesis between public and private consumption [24].

Both Keynesian models and the standard Real Business Cycle (RBC) are of the view that government spending have a multiplier effect and increase aggregate output, however, the debate of the effectiveness of government expenditure is based on the size of the multiplier, and the size of the multiplier based on the response of aggregate private consumption to government spending. The RBC model predicts a negative wealth effect while the Keynesian model forecasts a positive effect of government spending on private consumption.

Empirical Literature on Government Spending and Private Consumption

Nieh and Ho [9], investigated whether the expansionary government spending crowds out the private consumption. In this study, they employed cointegrating relationships using the Fully Modified OLS (FMOLS) and Dynamic OLS (DOLS) techniques to estimate the relationship between government spending and private consumption. The results of this study indicate that private consumption and government spending in 23 OECD countries are complementary to each other. Berben and Brosens [8], investigated whether government debt levels could explain observed consumer reactions to fiscal policy by sampling a panel data of 17 OECD countries. In this study, they estimated a nonlinear consumption function using the ARDL approach to co-integration. The results indicated that in long run consumption is positively related to disposable household income, equity wealth and housing wealth. In addition, it showed that an increase in government spending leads to a decline in private consumption in OECD countries.

Luis and Jose [11] conducted the study "Are Latin-American Households Neutral to Increases in Government Spending"; in this study, they empirically tested the validity of Ricardian Equivalence Proposition in Argentina, Brazil, Chile and Mexico, using a generalized method of moments and full information maximum likelihood dynamic optimization models. The results indicated that null hypothesis concerning the Ricardian equivalence proposition cannot be rejected for Argentina, Brazil, and Chile but is strongly rejected for Mexico. Thus, in scenarios where the fiscal authority seeks to stimulate economic activity by means of tax reductions and increases in government spending, the outstanding effect might be only a rise in private savings in the first three countries. D'Alessandro [10], examined how government spending would affect private consumption among the 20 selected areas of Italy. The results of this study showed that there was a positive significant effect of government spending on private consumption. Kraipornsak [12], investigated the impact of government spending on private consumption in Thailand. The study established that there was no effect of government capital spending on either the private consumption or the growth of GDP, while the government consumption spending has a negative effect on the growth of GDP.

Ismail [14], used an intertemporal maximization model to investigate the relationship between government spending and private consumption in Malaysia. The findings of this study established that in Malaysia, private consumption and government spending are best described as complementary rather than as substitutes. The study rejects

the arguments that there is a significant degree of substitutability between government spending and private consumption. In addition, in Malaysia the tax variable is significantly different from zero. So, the rejection of Ricardian equivalence is confirmed statistically.

Mahumd and Ahmed [7], examined the relationship between government spending and private consumption in the Bangladesh economy through the lens of economic theories using the cointegration and error correction modeling. The findings of this study validated the Barro-Neutrality theory that, government spending that household consumption is unrelated to government consumption decision in the long-run.

Hamid and Ali [15], investigated the relationship of government spending and private sector consumption in G7 Countries. The results of the model estimated by using fixed effects method indicate that government spending has a positive effect on private consumption. The research resolved that the estimated coefficient (elasticity) of government expenditure can be considered as an instrument for economic policymakers in G7 countries. Point to note is that G7 countries consist of seven major advanced economies (Canada, France, Germany, Italy, Japan, the United Kingdom, and the United States) which form a significant percentage of the world economy.

Most recently [16], investigated the Effect of Government Expenditure on Private Consumption in china. In this study, they employed the panel unit root tests and dynamic OLS (DOLS) estimator based on 29 provinces of China between 1996 and 2013 to estimate the relationship between government spending and private consumption. The results of this study indicated that an increase in the aggregate level of government spending has a positive effect on private consumption.

Conclusions of the empirical studies on the relationship between private consumption and government consumption are mixed and varies with the regions, countries; as well as time. Though studies on this subject have been carried out at country level and cross-country level, empirical works in less developed African economies like Kenya are unexplored. In this backdrop, this study seeks to empirically investigate the relationship between government spending and private consumption in Kenya.

Theoretical Framework

This study was based on the Framework proposed by of [25] and[26]. The private consumers the utility function (*U*) is expressed as follows:

$$U = \text{Log}(C + \alpha G) - \frac{1}{1 + \nu} L^{1+\nu} + V(G) \dots \dots \dots (1.1)$$

Where:

(*C*) = *Private Consumption*

(*G*) = *Government Spending*

(*L*) = *Labor supplied*

V = *The marginal disutility of work*

V(G) = *The separate impact of government spending*

The marginal utility of private consumption is given by:

$$\frac{dU}{dC} = \frac{1}{C + \alpha G} \dots \dots \dots (1.2)$$

The sign of α (coefficient) may be positive or negative depending on the relationship between government spending and private consumption. A positive α implies that an increase in Government Spending decreases the marginal utility of private consumption implying substitutability. On the other hand, a negative α implies that an increase in Government Spending increases the marginal utility of private consumption implying complementary. The household’s budget constraint is:

$$PC = PwL - P\tau = \int_0^1 D_i \hat{\partial}_i \dots \dots \dots (1.3)$$

Where:

P = *Aggregate price level*

W = *Real wage rate*

$\tau = Lump\text{-}sum\ tax$

$D = Dividends\ of\ firm$

In equation (1.3) we only have lump-sum tax and government spending is fully financed by tax revenue. Thus, the household optimization model is expressed:

$$\lambda = \frac{1}{P(C + \alpha G)} \dots\dots\dots(1.4)$$

$$L^v = \lambda Pw \dots\dots\dots(1.5)$$

Substituting equation (1.4) into (1.5) and we obtain equation (1.6), which represents consumption-leisure trade off;

$$L^v = \frac{w}{(C + \alpha G)} \dots\dots\dots(1.6)$$

The representative firm produces goods using a technology which is a function of labor and government expenditure. The production function of typical firm becomes:

$$Y = L^\eta G^\gamma \dots\dots\dots(1.7)$$

The first order condition of profit maximization is:

$$MC = \left(\frac{w}{\eta L^{\eta-1} G^\gamma} \right) \dots\dots\dots(1.8)$$

Where:

$MC = Marginal\ Cost$

$\gamma = Elasticity$

The production function (1.8) implies that if the elasticity of government expenditure γ is positive, government spending raises current production.

When the government expenditure G increases, the wealth effect makes the representative household poorer because of the increase in taxes. The household reacts by reducing consumption of goods and leisure. This mechanism holds regardless the increase in output due to fiscal policy[27].

RESEARCH METHODOLOGY

Research Design

This study was based on correlational research design. Correlational studies are carried out to identify relationships among variables or to predict likely outcomes. If a relationship of sufficient magnitude exists between two variables, it becomes possible to predict a score on either variable if a score on the other variable is known (Prediction Studies). This research design actualized the study general objective to establish the relationship between government spending and private consumption in Kenya.

Area of Study

Kenya is a sovereign state in East Africa, which lies on the equator. It lies between latitudes 5⁰N and 5⁰S, and longitudes 34⁰E and 42⁰E with the Indian Ocean to the southeast, Uganda to the west, South Sudan to the north-west, Ethiopia to the north, Tanzania to the south, and Somali to the northeast. Kenya covers 581,309 km² (224,445 sq mi) and has a population of approximately 44 million. Kenya became independent in 12th December 1963 and is currently divided into 47 semi-autonomous counties, governed by elected governors. The capital of Kenya is Nairobi, which is a regional commercial hub. Kenya has a GDP of 32 Billion US Dollars and is the largest by GDP in East and Central Africa. The major economic activity in Kenya is the agriculture, which employs majority of the citizens. The country traditionally exports tea and coffee, and more recently fresh flowers to Europe. Kenya's climate condition varies from tropical along the coast to temperate inland to arid in the north and northeast parts of the country.

Population

This study was conducted using time series data and covering the period between 1970 and 2014. The study used annual figures sourced from World Bank Database.

Data Collection Techniques

The study was based purely on secondary data which have already published in the World Bank Database. The World Bank data is reliable and consistent.

DATA ANALYSIS

This study utilized Eviews software in the data analysis. The study also used the descriptive and inferential statistics in data analysis.

Autoregressive Distributed Lag Estimation Technique

This study employed Autoregressive Distributed Lag (ARDL) estimation technique which is applicable irrespective of the order of integration, i.e. test allows a mixture of I (0), I (1), I (0) and I (1) variables as regressors. Therefore, the ARDL technique has the advantage of not requiring a specific identification of the order of the underlying data[30].

ARDL equation takes the following form;

$$\alpha(L, p)y_t = \alpha_0 + \sum_{i=1}^k B_i(L, q)x_{it} + \lambda w_t + \varepsilon_t \dots \dots \dots (3.1)$$

$$t = 1, \dots, n$$

Where;

$$\alpha(L, p) = 1 - \alpha_1 L - \alpha_2 L^2 - \dots - \alpha_p L^p \dots \dots \dots (3.2)$$

$$\beta_i(L, q) = \beta_0 - \beta_{i1} L - \beta_{i2} L^2 - \dots - \beta_{iq} L^q \dots \dots \dots (3.3)$$

$$i = 1, 2, \dots, k$$

Where (y_t) is the endogenous variable, (α_0) is constant, (L) is the lag operator ($Ly_t = y_{t-1}$), (W_t) is $S \times 1$ vector of deterministic trend.

Hence the long run equation of ARDL is;

$$y_t = \alpha_0 + \alpha t + \sum_{i=1}^k B_i x_i + \lambda w_t + \eta_t \dots \dots \dots (3.4)$$

Where: $\alpha = \frac{\alpha_0}{\alpha(1, p)}$

The long run coefficients are;

$$\hat{\varphi}_i = \frac{\beta_i(1, q)}{\alpha(1, p)} = \frac{\beta_i + \beta_{i1} + \dots + \beta_{iq}}{1 - \alpha_1 - \alpha_2 - \dots - \alpha_p} \dots \dots \dots (3.5)$$

$$i = 1, 2, \dots, k$$

Equation (3.5) can be written as

$$\pi = \frac{\lambda(p, q_1, q_2, \dots, q_k)}{1 - \alpha_1 - \alpha_2 - \dots - \alpha_p} \dots \dots \dots (3.6)$$

Thus, the ARDL

$$\Delta y_t = f_0 + f_1 t + \pi_c y_{t-1} + \pi_g x_{t-1} + \sum_{i=1}^{p-1} \psi_i \Delta X_t + w' \Delta X_t + \mu_t \dots \dots \dots (3.7)$$

Where hypothesis of co-integration is $H_0 : \pi_c = \pi_g = 0$ and $H_a : \pi_c \neq \pi_g \neq 0$

In this study ARDL model is expressed as follows:

$$\Delta C_t = \beta_0 + \beta_1 C_{t-1} + \beta_2 G_{t-1} + \sum_{i=1}^p \beta_3 \Delta C_{t-i} + \sum_{i=0}^q \beta_4 \Delta G_{t-i} + \varepsilon_t \dots \dots \dots (3.8)$$

Where:

$t = \text{Time}$ $C_t = \text{Private consumption}$ $G = \text{Government spending}$ $\varepsilon_t = \text{Random error term}$

Autoregressive Distributed Lag Model Selection

In economic studies estimating the lag length of the autoregressive process for a time series is a vital econometric procedure. Information criteria are the initial measures that can be adopted when selecting the appropriate lag length in a time series. The frequently used procedures for ARDL order selection are sequential testing procedures and application of model selection criteria.

These criteria aim at minimizing the residual sum of squares (RRS) or increasing the Coefficient of determination value. The standard model selection Information criteria which are used in this context choose the ARDL order which minimizes them over a set of possible orders [28].

This study employed Akaike Information criteria (AIC) to select the optimal lag length (k) for the ARDL model. This takes the form

$$AIC(k) = \text{Log}\Omega(k) + 2\frac{k}{T} \dots\dots\dots(3.9)$$

Where;

$\Omega(k)$ is the estimated residual variance from an ARDL (k)

T is the number of observation and

k the number of lags.

Unit Root Analysis

Before the estimation of the long-run relationship of the variables through co-integration analyses, this study checked for stationarity of the data. A stationarity test in time series data is a crucial econometrics procedure because non-stationarity of a series can strongly influence its behavior and properties which may lead to spurious results[29]. Unit root was used to test for stationarity or order of integration of each series of the variables. The study utilized the Augmented Dickey Fuller (ADF) test to analyze the unit root.

The estimation takes the following form:

$$X_t = \delta X_{t-1} + \varepsilon_t \dots\dots\dots(3.10)$$

$$\Delta X_t = \delta X_{t-1} + \varepsilon_t \dots\dots\dots(3.11)$$

$$\Delta X_t = \alpha_1 + \delta X_{t-1} + \varepsilon_t \dots\dots\dots(3.12)$$

Where:

α_1 is a constant (intercept) which shows the trend, ε_t is the error term; In the scenario where the error term ε_t is auto correlated, equation (3.12) will be modified to be equation (3.13) and estimated, the Augmented Dickey-Fuller test (ADF) test will be used.

$$\Delta X_t = \alpha_1 + \delta X_{t-1} + \beta_i \sum_{i=1}^p \Delta X_{t-i} + v_t \dots\dots\dots(3.13)$$

Where:

t = time, v_t is a white noise error term, X represents Private consumption (C_t) or Government Spending (G_t). The parameter δ should be negative and significantly different from zero for stationary condition, i.e. ($\delta = 0$) that is, unit root exists, thus X is nonstationary or $\delta < 0$, that is a unit root does not exist, thus X is stationary).

Correlation

To determine the correlation between the two-time series variables between private consumption (CT) and government spending (Gt), the study used the correlation coefficient (Pearson correlation) [r] at 5% significance level.

$$r_{xy} = \frac{\sum x_i y_i}{\sqrt{\sum x_i^2} \sqrt{\sum y_i^2}} \dots\dots\dots(3.14)$$

Jargue-Bera (JB) Test for Normality

The initial step is to investigate whether the variables follow the normal distribution. The Jargue-Bera test of normality is an asymptotic or large-sample test based on the OLS residuals. The test computes the skewness and kurtosis measures of the OLS residuals and uses the following test statistic:

$$JB = \left[\frac{s^2}{6} + \frac{(k-3)^2}{24} \right] \dots \dots \dots (3.15)$$

The null hypothesis of normality is tested against the alternative hypothesis of non-normal distribution. For the normal distribution, the JB statistic is expected to be statistically indifferent from zero.

H₀: JB = 0 (normally distributed)

H₁: JB ≠ 0 (not normally distributed)

Acceptance of the alternative hypothesis (Rejection of the null) for any of the variables would imply that the variables are not normally distributed and a logarithmic transformation is necessary. The p-value of the test statistic can also be used to decide whether to accept or reject the null. If a p-value for JB-stats > 0.05 we accept the null that the residuals of the equation are normally distributed.

Granger Causality

The basic principle of Granger causality analysis is to test whether past values of macro variables help to explain current values. If the variables are cointegrated either unidirectional or bidirectional Granger causality must exist. This study used Granger causality test, to check for existence of causality by estimating the following regressions.

$$\Delta CT_t = \alpha_0 + \sum_{i=1}^P \alpha_i \Delta CT_{t-i} + \sum_{t=1}^{\rho} \gamma_1 \Delta GT_{t-i} + v_t \dots \dots \dots (3.14)$$

$$\Delta GT_t = \beta_0 + \sum_{i=1}^P \beta_i \Delta GT_{t-i} + \sum_{t=1}^{\rho} \lambda_1 \Delta CT_{t-i} + \varepsilon_t \dots \dots \dots (3.15)$$

Where; v_t and ε_t are error terms and uncorrelated.

Data Presentation Techniques

The study used tables and line graphs in data presentation.

RESULTS AND DISCUSSIONS

This section entails presentation of the study’s empirical results. The presentation is as follows; descriptive statistics of the variables, Trend of the variables, Unit Root Tests of the variables, Correlation Analysis, Estimation of the Econometric Model and later Diagnostic tests.

Descriptive Statistics of the Variables

Table 4.1 below shows the descriptive statistics for the sample period. The study variables indicate that the medians and mean are almost equal; therefore, the data has the quality of normal distribution. Therefore, it does not have an outlier problem. Additionally, the measures of dispersion, standard deviation, maximum and minimum, (determining the range of data) also indicate that the series are normally spread. The standard deviation is small, indicating a low level of fluctuations of the both private consumption and Government spending annual data. The difference between maxi and minima is small. The skewness value of -0.129212 and -0.047544 for the private consumption and Government spending variables suggest that the two-data series have a weak negative skewness. Both data series are platykurtic (fat or short-tailed), relative to the normal given their small kurtosis values.

Table-4.1: Descriptive statistics for Private Consumption (CT) and Government Spending (GT)

	LOG_CT	LOG_GT
Mean	10.65920	11.27560
Median	10.61779	11.25365
Maximum	11.87529	12.64331
Minimum	9.269980	9.838408
Std. Dev	0.768617	0.839072
Skewness	-0.129212	-0.047544
Kurtosis	1.827620	1.761921
Jarque-Bera	2.702359	2.891026
Probability	0.258935	0.235625
Sum	479.6638	507.4020
Sum Sq. Dev	25.993999	30.97783
Observations	45	45

From the above analysis, the Probability values for the Jacque-Bera (JB) statistics for the variables in Table 4.1 show that the JB statistics is not significantly different from zero at 5% and even 1% significance level. Therefore, the variables (CT) and (GT) are normally distributed.

Trend of the Private Consumption (Ct) and Government Spending(Gt)

From the figure 4.1 and 4.2 respectively, it indicates that the two series the private consumption(Ct) and government spending(Gt) series have both an upward trend as shown below;

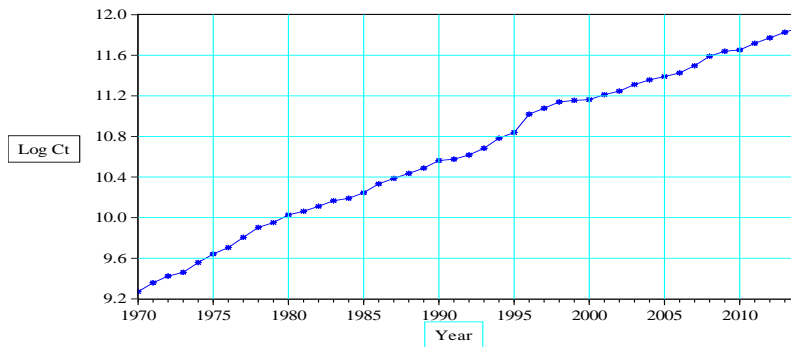


Fig-4.1: Trend analysis for Private Consumption (Ct)

The implication for the upward trend in the private consumption (Ct) is that there is a growth in the household food expenditure, non-food expenditure, and services expenditure with time during the period of the sample. On the other hand, the Government spending (Gt) series is also having an upward trend indicating that the Kenyan government has employed an expansionary fiscal policy for the sampled period.

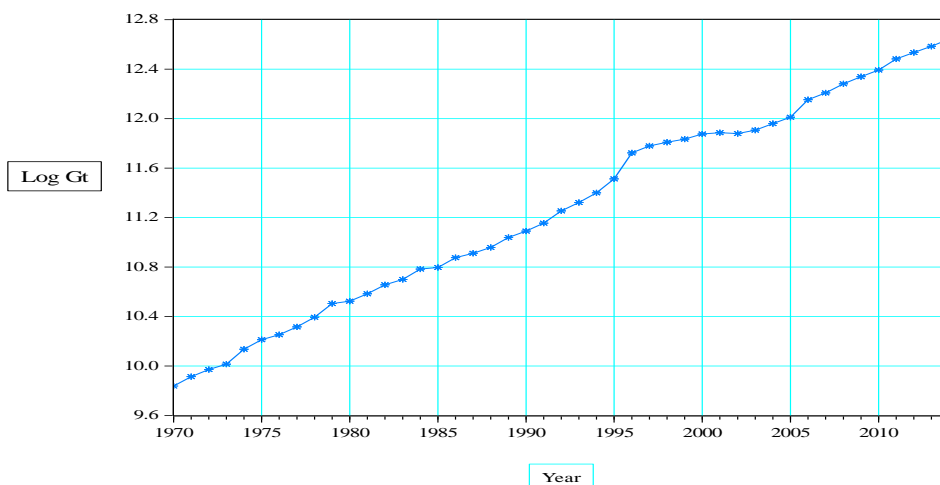


Fig-4.2: Trend analysis for Government spending (Gt)

Unit Root Test

To identify possible unit roots, the Augmented Dickey-Fuller (ADF) test was performed at levels and then on first differences both with constant and constant & linear trend. The ADF test takes the form of equation (3.13). From the results in Table 4.2 below, the study accepts the null hypothesis of non-stationarity at level, including the constant and Constant & trend.

At the levels the critical value of the Augmented dickey – fuller test in absolute terms is less than t - test critical values at all significance levels i.e. $1.709244 < 2.603064$ and $2.148757 < 3.188259$ at 10 % significance level for the constant and Constant & trend respectively.

The results for stationarity at difference level involving the constant and constant & trend accepts the alternate hypothesis that the data is stationary at first difference level at both 1% and 5% significance level. In the levels the critical value of the Augmented dickey – fuller test in absolute terms is greater than t - test critical values at all significance levels i.e. $5.748062 > 3.592462$ and $5.890116 > 4.186481$ at 1 % significance level for the constant and Constant & trend respectively. These results indicate that private consumption is stationary in the first difference, thus all the series are generated by an I (1) process.

Table-4.2: private consumption (CT) Stationarity Test

Variable CT	Null hypothesis: log_CT has a unit root				Null hypothesis: D(log_CT) has a unit root			
	Level				Fist Difference			
	Constant		Constant & linear trend		Constant		Constant & linear trend	
	t-statistic	Prob*	t-statistic	Prob*	t-statistic	Prob*	t-statistic	Prob*
Augmented dickey – fuller test static	-1.709244	0.4197	-2.148757	0.5052	-5.748062	0.0000	-5.890116	0.0001
Test critical values	1%	-3.588509	-4.180911		-3.592462		-4.186481	
	5%	-2.929734	-3.515523		-2.931404		-3.518090	
	10%	-2.603064	-3.188259		-2.603944		-3.189732	

*Mackinnon (1996) one-sided p-values.

*Lag length: 0 (automatic – based on SIC, Maxlag = 9)

The results in Table 4.3 below indicate that the study accepts the null hypothesis of non-stationarity at level, including the constant and Constant & trend. The results for stationarity at difference level involving the constant and constant & trend accepts the alternate hypothesis that the data is stationary at first difference level at both 1% and 5% significance level. These results indicate that Government spending is stationary in the first difference, thus all the series are generated by an I (1) process.

Table-4.3: Government spending (GT) Stationarity Test

Variable GT	Null hypothesis: log_GT has a unit root				Null hypothesis: D(log_GT) has a unit root			
	Level				Fist Difference			
	Constant		Constant & linear trend		Constant		Constant & linear trend	
	t-statistic	Prob*	t-statistic	Prob*	t-statistic	Prob*	t-statistic	Prob*
Augmented dickey – fuller test static	-0.641917	0.8505	-1.982456	0.5945	-5.349792	0.0001	-5.302097	0.0005
Test critical values	1%	-3.588509	-4.180911		-3.592462		-4.186481	
	5%	-2.929734	-3.515523		-2.931404		-3.518090	
	10%	-2.603064	-3.188259		-2.603944		-3.189732	

*Mackinnon (1996) one-sided p-values.

*Lag length: 0 (automatic – based on SIC, Maxlag = 9)

In the levels the critical value of the Augmented dickey – fuller test in absolute terms is less than t - test critical values at all significance levels i.e. $0.641917 < 2.603064$ and $1.982456 < 3.188259$ at 10 % significance level for the constant and Constant & trend respectively.

The results for stationarity at difference level involving the constant and constant & trend accepts the alternate hypothesis that the data is stationary at first difference level at both 1% and 5% significance level. In the levels the critical value of the Augmented dickey – fuller test in absolute terms is greater than t - test critical values at all significance levels i.e. $5.349792 > 3.592462$ and $5.302097 > 4.186481$ at 1 % significance level for the constant and Constant & trend respectively.

CORRELATION ANALYSIS

To identify if there exists a correlation between the private consumption (Ct) and government spending (Gt) variables, the study used the Pearson correlation coefficient. The results summarized in Table 4.4 show that there is a relatively significant strong positive correlation between the variables thus the correlation coefficient (r) is 0.998 with a p-value of 0.000 implies that private consumption (Ct) move in the same direction with and government spending (Gt). From the results, the study rejects the null hypothesis of no correlation, thus $r \neq 0$ at both 1% and 5% significance level. These results are consistent with the findings by Nieh and Ho [9], Hamid and Ali [15], D’Alessandro [10], who established that private consumption and government spending have positive correlation. Chen, Luan, & Huang [16], estimated the relationship between government spending and private consumption in 29 provinces of China between 1996 and 2013. The results of their study indicated that there was a significant strong positive correlation between private consumption and government spending at 0.998 correlation coefficient (r).

Table-4.4: Correlation Analysis

	LOG_CT	LOG_GT
LOG_CT	1.0000000	0.998488*
LOG_GT	0.998488*	1.0000000

*P-value = 0.0000

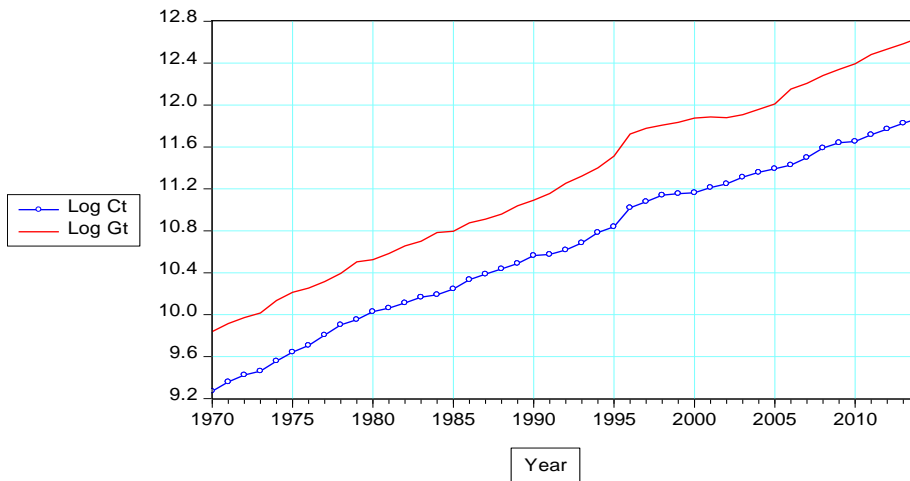


Fig-3: below graphically summarizes the above analysis

Estimation of Economic Model

Model Selection Summary

To estimate the model lag length this study employed the Akaike Information Criteria (AIC). Among the top 20 models, the selected model is ARDL (3,7) which has the lowest AIC value. This is three lags for the dependent variable (private consumption) and seven lags for the independent variable (Government spending). Figure 4.4 below shows, model selection summary.

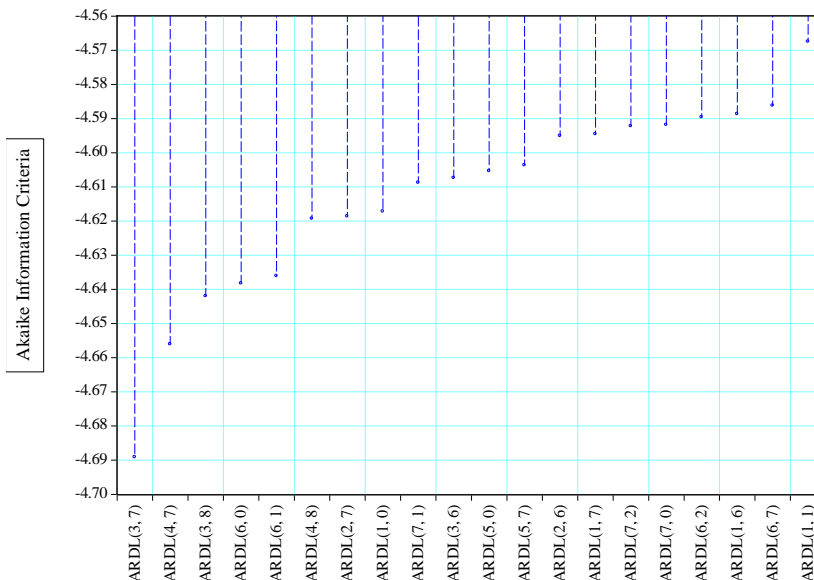


Fig-4. 3: Akaike Information Criterion Graph (top 20 models)

The output in table 4.5 below first gives a summary of the settings used during estimation. The study used automatic selection (using the Akaike Information Criterion) with a maximum of 8 lags of both the dependent variable and the regressor. Out of the 72 models evaluated, the procedure has selected an ARDL (3,7) model that is 3 lags of the dependent variable, LOG_CT, and seven lags (along with the level value) of LOG_GT. In this study since the selected model has fewer lags than the maximum, the sample used in the final estimation will not match that used during selection. The rest of the output below is standard least squares output for the selected model. Note that each of the

regressors (apart from the constant and government spending) are insignificant, and that the constant, is quite high, at 0.74.

Table-4. 5: The ARDL Model Estimation output

Variable	Coefficient	Std. Error	t-statistic	Prob*
LOG_CT (-1)	0.297563	0.169188	1.758771	0.0904
LOG_CT (-2)	-0.041862	0.176517	-0.237154	0.8144
LOG_CT (-3)	-0.240684	0.144934	-1.660653	0.1088
LOG_GT	0.375676	0.099794	3.764529	0.0009
LOG_GT (-1)	0.197879	0.167674	1.180142	0.2486
LOG_GT (-2)	0.058355	0.147875	0.394621	0.6963
LOG_GT (-3)	-0.043172	0.140248	-0.307829	0.7607
LOG_GT (-4)	0.085249	0.136071	0.626505	0.5364
LOG_GT (-5)	-0.051300	0.135196	-0.379451	0.7074
LOG_GT (-6)	0.062681	0.140460	0.446258	0.6591
LOG_GT (-7)	0.189576	0.106931	1.772887	0.0880
C	0.744125	0.129815	5.732194	0.0000

R-squared	0.999260	Mean Dependent var	10.87486
Adjusted R-squared	0.998947	S.D. dependent var	0.625727
S.E. of regression	0.020306	Akaike info criterion	-4.703761
Sum squared resid	0.010720	Schwarz criterion	-4.186628
Log Likelihood	101.3714	Hannan-Quinn criter.	-4.519769
F-statistic	3191.755	Durbin-Watson stat	2.217153
Prob (F-statistic)	0.000000		

Dependent variable: LOG_CT

Method: ARDL

Sample (adjusted):1977 2014

Included Observations: 38 adjustments

Maximum Depend lags: 8(automatic selection)

Model selection method: Akaike info criteria (AIC)

Dynamic regressors (8 lags, automatic): LOG_GT

Fixed Regressor: C

Number of models evaluated:72

Selected model: ARDL (3,7)

Note: final equation sample is larger than selection sample

*Note: p-value and any subsequent tests do not account for the model selection

Residual Diagnostic Test

In Table 4.6 below, the results of the Breusch-Godfrey serial correlation LM test, demonstrate that there is no serial correlation. The null hypothesis of the test is that there is serial correlation in the residuals up to the specified order. The p value is = 0.1477 thus we accept the alternative hypothesis that there is the no serial correlation.

Table-4. 6: Serial Correlation Test

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	1.048379	Prob. F (8, 18)	0.4383
Obs* R-squared	12.07817	Prob. Chi-Square (8)	0.1477

Stability Diagnostic Test

A significant characteristic of an empirical ARDL Model is its stability. This means that it generates stationary time series with time-invariant means, variance, and covariance structure, given sufficient starting values. The stability of this ARDL Model has been analyzed using CUSUM Test. The results of the CUSUM test, demonstrate that the model is stable, The CUSUM curve lies between the 5% significance level. This is shown in Figure 4.5 below.

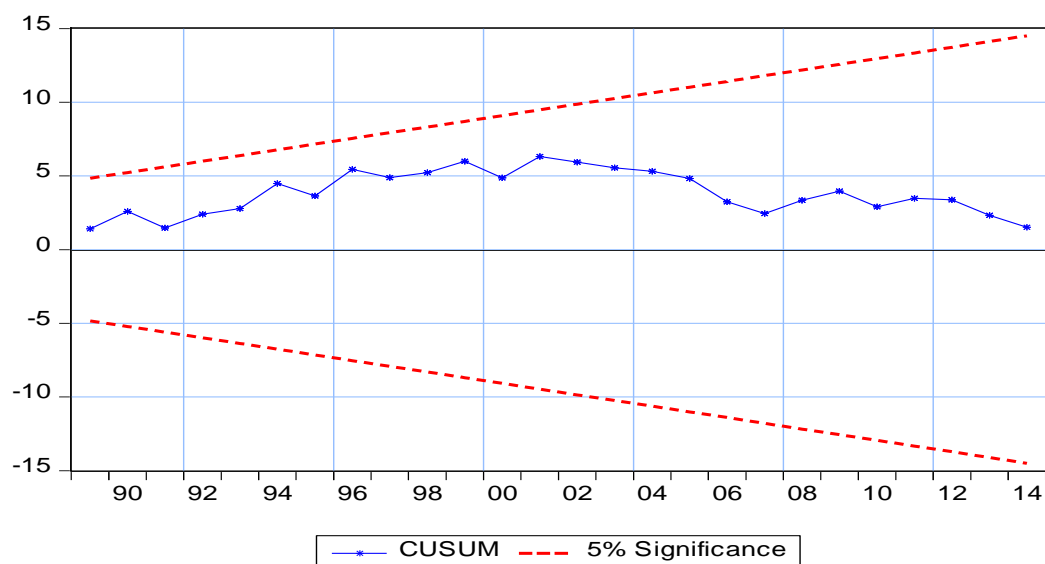


Fig-4. 4: CUSUM Test

Bounds Testing

Bounds testing technique is a powerful econometric tool in the estimation of level relationships when the underlying property of time series is entirely I (0), entirely I (1) or jointly co-integrated. Bound testing as an extension of ARDL modelling uses *F* and *t*-statistics to test the significance of the lagged levels of the variables in a univariate equilibrium correction system when it is unclear if the data generating process underlying a time series is a trend or the first difference stationary[30].

In Table 4.7 below the results of the bounds co-integration test demonstrate that the null hypothesis is rejected at all significance levels. The computed F-statistic of 11.6379 is greater than the upper critical bound values, thus indicating the existence of a steady-state long-run relationship among the variables Government Spending (Gt) and Private Consumption (Ct).

Table-4. 7: ARDL BOUNDS TEST

Test Statistic	Value	K
F-Statistic	11.63794	1
Critical Value Bounds		
Significance	I0 Bound	I1 Bound
10%	3.02	3.51
5%	3.62	4.16
2.5%	4.18	4.79
1%	4.94	5.58

*Null Hypothesis: No Long-run relationship exist

There exists a steady-state long-run relationship among the variables Government Spending (Gt) and Private Consumption (Ct) as shown in the above bounds test. The estimation of the long run ARDL model is shown in Table 7 below. Using Hendry’s general-to-specific method, the Akaike Information criteria (AIC) gives the optimal lag as (3,7), the goodness of fit of the specification, that is *R*-squared is 0.998 and the have variables have a strong positive correlation with the correlation coefficient (*r*) is 0.998. The robustness of the model has been ascertained by several diagnostic tests such as Breusch- Godfrey serial correlation LM test, CUSUM test and Bound test. All the tests indicated that the model comply with the required econometric properties, that is, the model is stable, the residuals are serially uncorrelated and there exists steady long-run relationship. Therefore, the results reported are valid and reliable.

The output in table 4.8 below first gives a summary of the short-run effect of government spending on private consumption. The Cointegrating coefficients, show that there are lagged-effects in the short run. The period one lag on the dependent variable (private consumption LOG_CT) is statistically significant at 0.28. The elasticities results indicate that, a one percent (change) increase in private consumption in period one and period two will (change) increase the current private consumption by 0.28 percent respectively. The period two lag of the dependent variable (private

consumption LOG_CT) is statistically insignificant. The coefficient of government spending $\beta_1 = 0.376$ is statistically significant in the short run with P-value of 0.0009. These results indicate that a one percent (change) increase in government spending will (change) increase private consumption by 0.376 percent.

Table-4. 8: ARDL Cointegrating and Long Run Form

Cointegrating Form				
Variable	Coefficient	Std. Error	t-statistic	Prob*
D(LOG_CT (-1))	0.282546	0.130578	2.163804	0.0398
D(LOG_CT (-2))	0.240684	0.131511	1.830148	0.0787
D(LOG_GT)	0.375676	0.084065	4.468853	0.0001
D(LOG_GT (-1))	-0.301389	0.125664	-2.398382	0.0239
D(LOG_GT (-2))	-0.243034	0.117946	-2.060559	0.0495
D(LOG_GT (-3))	-0.286207	0.100379	-2.851273	0.0084
D(LOG_GT (-4))	-0.200958	0.090698	-2.215677	0.0357
D(LOG_GT (-5))	-0.252258	0.087811	-2.872739	0.0080
D(LOG_GT (-6))	-0.189576	0.096168	-1.971301	0.0594
CointEq(-1)	-0.984983	0.160634	-6.131843	0.0000
CointEq = LOG_CT-(0.8883* LOG_GT + 0.7555)				

Original Dependent variable: LOG_CT
 Selected model: ARDL (3,7)
 Included Observations: 38
 Sample:1970 2014
 Included obseravations:38

The coefficients, at the bottom of the output show that the short-run effect of a change in LOG_GT on LOG_CT has lagged-effects. The effect of period one, two, three, four and five lags of LOG_GT on the LOG_CT (dependent variable) are statistically significant at -0.3, -0.24, and -0.2, -0.19 respectively. The elasticities results illustrate that, a one percent increase in government spending in period one, two, three, four and five lags will decrease the current private consumption by -0.3, -0.24 and -0.2, -0.19 percent respectively. In the lagged period, the government spending crowds out the private consumption.

The Error Correction Term (ECT) shows the speed of adjustment from an unsteady state to equilibrium in the next period. The value of the ECT is negative (-0.984983) and statistically significant $P = 0.000$, which indicates that private consumption will approach to equilibrium with a speed of -0.985 i.e. from disequilibrium to equilibrium. Importantly, the long-run coefficients of the cointegrating equation are reported in table 4.9 below, with their standard errors, t-statistics, and p-values.

Table-4. 9: ARDL Cointegrating and Long Run Model

Long Run Coefficients				
Variable	Coefficient	Std. Error	t-statistic	Prob*
LOG_GT	0.888283	0.005182	171.410790	0.0000
C	0.755470	0.064483	11.715775	0.0000

The estimated long-run model is expressed as follows:

$$\text{Log}(C_t) = 0.76 + 0.89\text{Log}(G_t) \dots \dots \dots (4.1)$$

The results from table 4.9 above, illustrate that the parameter estimates for the equation are all significant at both the 1% and 5% significant levels. The estimated coefficient (elasticity) of GT is 0.8883 which indicates that there is a positive significant relationship between private consumption and government expenditure in Kenya. Based on economic theory (p priori expectation) the estimated coefficient β_1 can either take a positive, zero or a negative value.

From the results $\beta_1 = 0.8883$. These results indicate that a one percent (change) increase in government spending will (change) increase private consumption by 0.89 percent. This analysis demonstrates that, in the long-run, government spending complements private consumption in Kenya.

The study supports the findings of Hamid and Ali [15], who investigated the relationship of government spending and private sector consumption in G7 Countries. The results of the model estimated by using fixed effects method indicate that government spending has a significant long-run positive relationship on private consumption. The study is also consistent with the results of Chen, Luan & Huang [16], who studied the Effect of Government Expenditure on Private Consumption in china. The results of this study indicated that an increase in the aggregate level of government spending has a positive effect on private consumption.

The behavior of the government spending is one of the major determinants of economic activity. The estimated coefficient (elasticity) of government spending is considered a vital instrument for economic policymakers. Policy makers employ both expansionary and contraction fiscal policies to influence the level of economic activity in scenarios where the Keynesian framework holds.

Results from this study indicate that the relationship between the Government Spending (Gt) and Private Consumption (Ct) in Kenya follows the Keynesian theoretical framework in the long run. Therefore, government spending is a crucial instrument or tool which is applicable in formulating the appropriate fiscal policy for the economy.

Granger Causality

The basic principle of Granger causality analysis is to test whether past values of macro variables help to explain current values. The results from the above analysis indicated that there exists a long run cointegration and a positive correlation between Private consumption and government consumption. However, association or long run relationship does not necessarily imply causation. Consequently, it is vital to conclusively determine the causal linkage between the government spending and private consumption in Kenya. In this study Granger causality tests were performed in the Autoregressive Distributed Lag [8,8] model. The reported F-statistics are the Wald statistics for the joint null hypothesis. The results are reported in Table 4.10 below.

Table-4. 10 : Granger Causality Tests

Pairwise Granger Causality Tests					
Null hypothesis:	Obs	F-statistic	Prob*	Conclusion	Inference
LOG_GT does not Granger Cause LOG_CT	37	3.14628	0.0179	Reject H_0	LOG_GT → LOG_CT
LOG_CT does not Granger Cause LOG_GT		0.50886	0.8356	Do not Reject H_0	

Notes:

Sample:1970 2014

Lags: 8;

the sign → indicates the direction of causality;

Test at 5% significance level.

From the above empirical results, the null hypothesis of LOG_GT does not Granger Cause LOG_CT is rejected at the 5 % significance level. This implies that government expenditure causes private consumption in Kenya, this confirms the Keynesian economic theory that government expenditure stimulates household consumption. These findings are inconsistent with the findings of Mahumd, M. N., & Ahmed, M. [7] in their study to establish the relationship between government spending and private consumption in Bangladesh economy. The results of their study indicated that there was no long run causal relationship between government consumption and household consumption. Thus, validating the Barro[2]-Ricardian[23] equivalence hypothesis of government spending that household consumption is unrelated with government consumption decision in the long-run.

On the other hand, the null hypothesis of LOG_GT does not Granger Cause LOG_CT is not rejected at the 5 % significance level, implying that the private consumption does not cause the government expenditure.

Conclusions, Policy Implications And Recommendations

CONCLUSION

From the findings, the study concluded that both private consumption (Ct) and government spending(Gt) had an upward trend with a strong statistically significant positive association (0.998, $p = 0.000$). In addition, the study

established that government spending had a significant positive effect on private consumption both in short run $\beta_1 = 0.376$ and long-run $\beta_1 = 0.888$. The Granger causality test results, revealed that there is a long run unidirectional causal relationship running from government expenditure to private consumption which provides evidence in support of the Keynesian theoretical framework that public expenditure stimulates private consumption.

Recommendations/Policy Implication

Based on the results, this study recommends the enhanced use of public spending to stimulate the private consumption.

Contribution of the Study to Policy

The results of this study indicate that Fiscal policy stimulation through expansion of government spending would generate a crowding in effect on private consumption in Kenya. The findings shall help policy makers to formulate prudent public finance management policies.

Areas for further Research

This study took in account only government final consumption expenditure. It would be more interesting to study the relationship between private consumption and government spending using disaggregated government spending component. Therefore, this study recommends that more studies to be carried out on the effects of disaggregated components of public expenditure on private consumption.

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