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# Implications of fiscal policy on household consumption in Kenya: A nonlinear auto-regressive distributed lag approach

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**Orientation:** Fiscal policy can be applied with a stabilisation intention if government finance choices can influence household consumption behaviour. According to Keynes, expansionary fiscal policy is the best economic stabilisation tool.

**Research purpose:** This article examined the crowding in effects of fiscal policy on household consumption whilst investigating the effectiveness of fiscal policy in Kenya.

**Motivation for the study:** Household consumption is a key indicator of economic well-being in any economy. Despite its importance, empirical studies examining the relationship between fiscal policy and household consumption are limited in Kenya. In addition, empirical studies on this subject focused on the linear or the symmetric effects of fiscal policy on household consumption.

**Objective:** The objective of this study was to investigate the asymmetric effects of fiscal policy on household consumption in Kenya.

**Methodology:** This study employed a quantitative research method using time series data which ranged from 1971 to 2018. The nonlinear auto-regressive distributed lag (NARDL) model was used in the empirical analysis.

**Results:** In the short run, fiscal policy was found not to affect household consumption. However, fiscal policy was found to have asymmetric effects on household consumption in the long run.

**The managerial implications:** The study revealed that, in the long run, negative changes in tax revenue crowd in consumption whilst other factors do not have a significant effect on household consumption.

**Value-added:** This study informs the Kenyan government on the best way to follow when fiscal policy tools must be employed to boost household consumption.

**Keywords:** fiscal policy; household consumption; government consumption expenditure; tax revenue.

## Introduction

Fiscal policy entails the government's deliberate interventions established to boost a country's economic performance and achieve set objectives (Mutuku 2015; Sloman 2007). The policy guidelines can either be expansionary (intended to boost aggregate demand during a recession) or contractionary (used to even out booms in a country), depending on the economy's position in the business cycle (Parkin et al. 2010). The most commonly used fiscal policy tools are government expenditure and tax rates. An expansionary policy would be either an increase in government expenditure or a reduction in the tax rate. Adopting a fiscal policy can influence aggregate demand, boost the production of goods and services and distribute wealth (Mutuku 2015).

Kenya has previously used budgetary expenditure changes and tax adjustments as fiscal tools to boost aggregate demand and economic performance. The overuse of expansionary policy has fuelled rapid growth in government expenditure over the years. For instance, in the last five decades, government expenditure grew by more than 100% (WBG 2020). The World Bank reports also show that in 1971, final government consumption expenditure was KSh588.16 billion. A decade later, it had escalated to KSh938.78 bn (60% growth) and by 2018 it was KSh2268.11 bn (142% growth) (WBG 2020).

Tax rate adjustments and public debt were employed to finance the rapidly growing government expenditures. From the mid-1970s to the mid-1980s, financing of government expenditure was

through personal and corporate tax rates (Karingi & Wanjala 2005). In the early 1980s, the second world oil price shock fuelled uncontrolled government expenditure, which put the country into a budget deficit of more than 6%, leading to the formation of tax modernisation programmes (TMP). Tax modernisation programmes aimed to raise government revenue from 22% to 24% of the gross domestic product (GDP) by the mid-1990s (Muriithi & Moyi 2003). In 1990 the Kenyan government introduced a new tax system to increase income further and replaced sales tax with the value-added tax (VAT). By 1992, the tax base had broadened to 28% of the GDP (Muriithi & Moyi 2003). In 2014, the VAT rates were raised from 12% to 17% on all goods and services (Mutua 2012).

From time to time, Kenya has recorded a rise in fiscal deficit, resulting from the continued rapid growth of public expenditure unequal to growth in government revenue. According to Mutuku (2015), unstable fiscal policy exposes the economy to external shocks. It adversely affects the state welfare via large fiscal deficits, excess debt and generation of inefficient resource allocation. World Bank reports show that the ratio of fiscal balance to GDP for Kenya has deteriorated from a surplus of 0.2% to a deficit of 6.1%. On the other hand, the public debt to GDP ratio has increased from 30% to 57% between 1971 and 2019 (KNBS 2019).

Widening the tax bases in every fiscal year has become a norm in Kenya. Also, tax revenue has experienced some growth to match the rising government expenditure. According to Keynes (1936), increased government expenditure directly affects the economy by inducing high demand for goods and services. Consequently, this increases income and employment, thus indirectly boosting household consumption (Amusa & Oyinlola 2019; Parkin et al. 2010). Therefore, expansionary fiscal policy is believed to exhibit positive effects, which can stimulate economic activity by increasing consumption (Magazzino 2016; Saraswati & Wahyudi 2018). On the other hand, tax rate and tax base expansion reduce household purchasing power because of the negative effect it imposes on disposable income (Delong et al. 2012; Keynes 1936).

Consequently, household consumption expenditure should be crowded out as tax increases. However, in the case of Kenya, household consumption has been increasing. For example, household consumption was observed to grow at an average of 77% of GDP between 1997 and 2006 (Kenya 2003; WBG 2016). In addition, between 2006 and 2019, household consumption grew from 76% to 82% of GDP (WBG 2020). The conflicting evidence from the two fiscal policy tools necessitates further investigation as to whether fiscal policy crowds in or crowds out household consumption in Kenya. In addition, the relationship between fiscal policy, public debt and household consumption is investigated for the period between 1971 and 2019 using a nonlinear error correction model (ECM).

## Problem statement

Fiscal policy is amongst the tools many governments apply to maintain macroeconomic stability for growth and prevent market failures. Fiscal policy can affect the orientation of wealth accumulation and affect macroeconomic expansion and contraction. It can also influence intergenerational transfers via taxation on extractable resources, debt and subsidies (M'Amanja, Lloyd & Morrissey 2005). The Kenyan government has used a mix of fiscal policies, with more resources being directed to development projects. Again, there has been increased taxation on household income and luxury items and increased public debt (M'Amanja et al. 2005).

An increase in government expenditure directly affects the economy by inducing high demand for goods and services. Consequently, this leads to an increase in income and employment, thus indirectly boosting household consumption (Parkin et al. 2010). On the other hand, tax rate and tax base expansion reduce household purchasing power because of the negative effect they induce on disposable income (Delong et al. 2012; Keynes 1936). In Kenya, government expenditure has been observed to grow at a very high rate and to fund these expenses, tax and public debt have been increasing as well. The Keynesian theory postulates that household consumption is supposed to be crowded out as tax increases, but in the case of Kenya, household consumption has been increasing instead. This leads to the question, does lowering taxes crowd in household consumption to the point that the effect exceeds the crowding-out effect caused by tax base increment and expansion? The increase in household consumption can also insinuate that the impact of government expenditure exceeds the impact of tax increments, because wages exceed the tax increases, hence increasing consumption. From another angle, households in Kenya can be assumed to take public debt as net wealth, thereby increasing their consumption; thus making fiscal policy to have no significant effect on household consumption, as the Ricardian equivalence theory explains (Mankiw 2013). The study thus investigated whether expansionary and contractionary fiscal policies crowd in or out household consumption in Kenya.

The more specific objectives of the study are:

1. to evaluate the asymmetric effects of fiscal policy and public debt on household consumption in Kenya for the period between 1971 and 2018
2. to investigate whether fiscal policy crowds in household consumption in Kenya

## Theoretical literature review

The effect of fiscal policy on household consumption is controversial in both empirics and theories of economics. On theoretical grounds, there are various schools of thought on this issue. One is the absolute income hypothesis (AIH), in which Keynes (1936) argued that the current consumption of households is a direct function of their current disposable income. Thus, an increase in government expenditure leads to an increase in employment, income and aggregate demand, leading to a rise in household consumption (the crowding-in effect). Keynes (1936) postulated that consumption is the most reliable and predictable component of aggregate

demand. Keynes also stated that for an economy to be off recession and enjoy long-term economic growth, the government must boost aggregate demand by increasing its expenditure or lowering taxes.

On the contrary, under the neoclassical theory, the standard real business cycle model was of the idea that an increase in government expenditure decreases private or household consumption, and in general, the government can finance its expenditures from different sources (Friedman 1978). The neoclassical economists believe that an increase in government spending financed through taxes reduces permanent household income. Again, they argued that an increase in taxes induces a negative wealth effect which negatively affects household consumption (Christiano & Eichenbaum 1992; Friedman 1978). In the standard real business cycle model, the negative wealth effect overshadows the substitution effect, and as a consequence, household consumption decreases. This phenomenon is called the 'substitutability hypothesis' between public and private consumption or the crowding-out effect (Christiano & Eichenbaum 1992). From the neoclassical theories on fiscal policy and consumption, several studies introduced some modifications to generate crowding-in effect (Bouakez & Rebei 2007; Linnemann 2006).

Barro (1974) developed the Ricardian equivalence hypothesis (REH), which argues that the choice of fiscal policy in the economy (that is, taxes, government expenditures or transfer of payment), is neutral to the allocations made on household consumption. The Ricardian further affirms that an increase in government spending does not affect household consumption regardless of the financing structure because households are assumed to be foresighted and do not treat government spending as net wealth (Barro 1974).

## Evidence of crowding in effects of the fiscal policy on household consumption

There has been an upsurge in the empirical studies trying to unravel the crowding-in effect of fiscal policy on household consumption. However, the results are inconclusive. Further inconsistency emanates from the analytical approaches used to test the relationship between the two. The common analytical approach is to present a linear model of the relationship between the two.

Khanfir (2019) examined fiscal policy implications on household consumption by applying the smooth transition regression (STR) model. The study conducted a linearity test on the fiscal regimes of Tunisia against the linear STR model. Tunisia exhibited three regimes: a central regime and two extreme regimes. Government revenue and tax revenue were used as a proxy of fiscal policy. In the case of a small fiscal impulse (central regime), an increase in government consumption was found to crowd in household consumption. However, an increase in tax revenue led to a crowding-out effect on household consumption (Khanfir 2019). In the extreme regime, a large fiscal contraction, government

consumption reduction or tax increase led to a simultaneous rise in household consumption.

A study carried out by Merko et al., (2017) examined the implications of fiscal policy on household consumption in Albania, using time series data from 2000 to 2016. The static multiple regression model and Granger causality were utilised to accomplish the objective of the study. The study found that government expenditure and public debt crowd in household consumption, which is in harmony with the Keynesian arguments.

Using yearly data from 1990 to 2017, Kusairi, Maulina and Margaretha (2019) used a dynamic heterogeneous panel model to examine the effect of fiscal policy and public debt on household consumption in 18 Asian Pacific countries. Government expenditure was used as a proxy for fiscal policy, and it was found to have positive effects on household consumption. This led to the conclusion that fiscal policy crowds in private consumption (Kusairi et al. 2019).

Anderson, Inoue and Rossi (2016) evaluated the effects of unexpected changes in macroeconomic and fiscal policies (government shocks) on different types of consumers (heterogeneous consumers) of the United States of America. The study employed a structural vector autoregressive method in the analysis. The study results found that the consumption of the working (wealthy) people was crowded out more by government spending shocks than the poor. In response to the government shocks, the rich tend to experience a high cumulative decline in consumption whilst the poor significantly increase their consumption (Anderson et al. 2016). The behaviour of the rich was found to be in line with the standard real business cycle arguments, whilst the poor behave as in the IS-LM (non-Ricardian) model. The poor can be said to act like this because they are credit constrained.

Banday and Aneja (2019) also carried out a study examining the impacts of fiscal policy on households' consumption in China. Time-series data were used for the period between 1990 and 2016. The study employed the Engle-Granger two-step cointegration technique to empirically investigate the response of private consumption to fiscal policy and budget deficit. Tax, government consumption and budget deficit were observed to negatively impact household consumption in China (Banday & Aneja 2019). This means that fiscal policy and public deficit crowd out private consumption because an increase in any of the variables would reduce household consumption.

Belingher and Moroianu (2015) investigated whether the fiscal policy crowds in household consumption whilst trying to validate the existence of the REH in Romania using the linear regression model. Government expenditure and household disposable income were used as a fiscal policy proxy. The results obtained from this investigation validated the nonexistence of the Ricardian equivalence in Romania.

Government expenditure and household disposable income were found to have a positive relationship with household consumption, which is in line with the Keynesian arguments (Belingher & Moroianu 2015).

In addition, Saraswati and Wahyudi (2018) investigated the implications of fiscal policy and public debt on household consumption in Indonesia. The study used an ECM to analyse time-series data, which covered the period 1990 to 2015. Government expenditure and tax revenue were used as a proxy for fiscal policy. The results of this study found government expenditures and tax revenues not to affect household consumption both in the short run and long run (Saraswati & Wahyudi 2018). Their results were in concordance with the Ricardian equivalence perspective, which suggests that fiscal policies do not affect household consumption (Barro 1974).

From the reviewed literature, it is evident that there are mixed results on the crowding-in and crowding-out effects of fiscal policy on household consumption. For instance, Khanfir (2019), Merko et al. (2017), Kusairi et al. (2019) and Belingher and Moroianu (2015) supported the crowding-in effect of fiscal policy. However, Banday and Aneja (2019) and Saraswati and Wahyudi (2018) had different observations in their study.

Banday and Aneja (2019) found fiscal policy to crowd out household consumption, whilst Saraswati and Wahyudi (2018) found fiscal policy to have no significant effect on household consumption. In addition, it is also evident that there is limited research on the implication of fiscal policy on household consumption, more precisely in Kenya. Furthermore, methodologies adopted in these studies assumed the presence of a symmetric relationship between household consumption and the beta coefficient of fiscal policy (government consumption, tax revenue and public debt) (Banday & Aneja 2019; Khanfir 2019; Kusairi et al. 2019; Merko et al. 2017). A symmetric relationship means that the degree of impact of the explanatory variables on the dependent variables is the same when the regressors increase as when the regressors decrease. However, this is not always the case. The magnitude of the impact of expansionary policies and contractionary policies on household consumption may not necessarily be the same. This study improved the existing work by adopting an ECM that assumes an asymmetric relationship amongst the variables. This nonlinear model considered the effects of positive and negative changes of fiscal policy on household consumption separately.

# Methodology
## Research design

The study sought to examine the crowding-in and crowding-out effects of fiscal policy on household consumption, considering a nonlinear relationship between household consumption, fiscal policy (proxied by government consumption and tax revenue) and the other control variables

(public debt and inflation). A quantitative research design was adopted as it allows for correlational research analysis. Correlational research design helps identify relationships amongst variables and also predicts possible outcomes. If a relationship of sufficient magnitude between variables exists, it is feasible to forecast a score on either variable with a known score of the other variable. This research design actualised the general study objective to establish the relationship between fiscal policy and household consumption in Kenya.

## Conceptual framework

The empirical work of this study was built from the AIH (developed by Keynes in 1930), which assumes consumption to be an increasing factor of income (Alimi 2013). The AIH consumption function takes the form:

$$C_t = \alpha + \beta Y_t^d \qquad \text{[Eqn 1]}$$

with $0 < \beta < 1$ and $Y^d = Y - T$

The given consumption function was modified to take aggregate consumption and income, as represented in Equation 2:

$$C_t = \alpha + \beta(Y_t - T) \qquad \text{[Eqn 2]}$$

where $C_t$ is the aggregate consumption, $Y_t$ is the aggregate income (GDP), $T$ stands for tax, $\beta$ is the marginal propensity to consume (MPC) and $\alpha$ is the autonomous consumption.

When the government increases taxation, disposable income $Y^d$ reduces. On the other hand, when taxes are reduced, disposable income goes up, meaning there exists a negative relationship between income and taxes, and so it is with consumption.

According to Keynes (1936), three key assumptions are behind the AIH: firstly, consumption expenditure changes with the changes in income although not proportionally. This nonproportionate relationship between consumption and income means that in the long run, MPC is less than the average propensity to consume (APC), where MPC = $\frac{\Delta C}{\Delta Y}$. This is because in the short run, exogenous consumption remains unchanged despite the changes in income. On the other hand, in the long run, exogenous consumption rises as wealth and income rise and the MPC is closer to the APC (Keynes 1936). Secondly, the proportion of income consumed is assumed to reduce as income rises: $\frac{\partial APC}{\partial Y} < 0$; thus, income elasticity, which is defined as, $\frac{MPC}{APC}$ would be less than one. Finally, the consumption function is steady in both the short run and long run.

Keynes (1936) viewed consumption as the most appropriate economic factor which can be used to boost aggregate demand. Keynes further asserted that during bad times, the

government should use fiscal policy to stimulate household consumption, which in turn promotes economic performance. According to Keynes, the most effective fiscal policy tools that can be used include government expenditure and taxation (Keynes 1936; Pigou 1936).

For most of the studies conducted to evaluate the impacts of fiscal policy on household consumption, government expenditure and tax revenue have been used as proxies for fiscal policy. Likewise, the current study used government consumption expenditure and tax revenue as proxies for fiscal policy.

Therefore, the aggregate consumption function at time $t$ becomes a function of aggregate income ($Y_t$), tax revenue ($TR_t$) and government consumption expenditure ($GC_t$):

$$C_t = (Y_t, TR_t, GC_t) \qquad \text{[Eqn 3]}$$

Keynes (1936) further postulated that government consumption expenditure has a positive relationship with household consumption, whilst tax revenue negatively affects household consumption. To boost household consumption, the government can either increase it's expenditure or lower taxes (expansionary fiscal policy). Other variables such as public debt and inflation were included in the model as control variables.

The study relied on secondary data for empirical analysis. A time-series data set covering the period from 1971 to 2018 was retrieved from various public domains in percentage form with no further transformation. Table 1 summarises the variables and briefly describes the data collected.

## Correlation analysis

Table 2 reports the results of the strength of the relationship between the variables analysed. Under each correlation coefficient is the probability value, which indicates whether the correlation is statistically significant or not.

The results show that government consumption expenditure, real GDP and inflation are negatively associated with household consumption with pairwise correlations of 0.25, 0.15 and 0.35, respectively. However, the real GDP growth correlation was not statistically significant. Interestingly, tax revenue is positively associated

with household consumption with a pairwise correction of 0.57 ($p < 0.01$). This implies that household consumption increases as tax revenue increases. This is where the problem discussed in this study emanates from, as theory suggests otherwise. This study investigated this relation further, and the results are presented in the next section under the regression analysis.

Results in Table 2 also show that public debt has a weak positive association with household consumption with a pairwise correlation of 0.38 ($p < 0.01$). On the other hand, government consumption has both a positive and a negative association with other explanatory variables (tax revenue, public debt and real GDP growth), but only its association with inflation is statistically significant (0.274229, PV = 0.0594). Real GDP has a weak negative correlation with tax revenue, public debt and inflation and their pairwise correlations are (0.38, $p < 0.01$), (0.47 0.41, $p < 0.01$) and (0.41, $p < 0.01$), respectively.

A strong positive association was observed between public debt and tax revenue with a pairwise correlation of 0.69, which is statistically significant ($p < 0.01$). Regressing the two variables in the same model can cause multicollinearity with this kind of relationship. However, neither of the variables is dropped because the effects of both variables on household consumption will help answer the first objective. Moreover, a test for multicollinearity showed that the estimated model is a good fit with no indication of multicollinearity.

## Structural break test

Visual inspection of the data trends suggested the existence of structural breaks. A structural break test was also conducted on all the variables using the Zivot–Andrew test.

The Zivot–Andrew breakpoints graph, represented in Figure 1 indicated that only one structural break was observed in 1995. Further analysis through the Chow breakpoint test proved it to be a significant structural break (f statistic 34.97145; $p$-value; 0.0000). A dummy variable, MD, was included in the estimation model to capture the impact of this structural change. The

**TABLE 1:** Data source.

| Variable | Source | Description of the variable |
| --- | --- | --- |
| Household consumption (HC) | World Bank | Total household consumption expenditure (% of GDP) |
| Government consumption expenditure (GC) | World Bank | Total government consumption expenditure (annual) |
| Real GDP (Y) | World Bank | Real gross domestic product (annual % growth) |
| Tax revenue (TR) | IMF and KNBS | Total tax revenue plus grants (% of GDP) |
| Public debt (PD) | Kenya public debt reports and KNBS | National public debt (% of GDP) |
| Inflation rate (INF) | World Bank | Inflation rate (CPI index) |

**TABLE 2:** Correlation matrix results: Household consumption and independent variables.

| Variables | HC | GC | TR | PD | Y | INF |
| --- | --- | --- | --- | --- | --- | --- |
| HC | 1.000 | - | - | - | - | - |
| GC | **−0.255** | 1.000 | - | - | - | - |
|  | **0.080** | - | - | - | - | - |
| TR | **0.570** | −0.138 | 1.000 | - | - | - |
|  | **0.000** | 0.351 | - | - | - | - |
| PD | **0.381** | −0.171 | 0.692 | 1.000 | - | - |
|  | **0.008** | 0.245 | 0.000 | - | - | - |
| Y | −0.151 | 0.217 | −0.382 | −0.471 | 1.000 | - |
|  | 0.307 | 0.138 | 0.007 | 0.001 | - | - |
| INF | **−0.354** | 0.274 | −0.014 | 0.102 | −0.411 | 1.000 |
|  | **0.013** | 0.059 | 0.926 | 0.488 | 0.004 | - |

Note: The values on bold were meant to stress on the most important correlation coefficients.

HC, household consumption; GC, government consumption expenditure; TR, tax revenue; PD, public debt; Y, real GDP; INF, inflation.
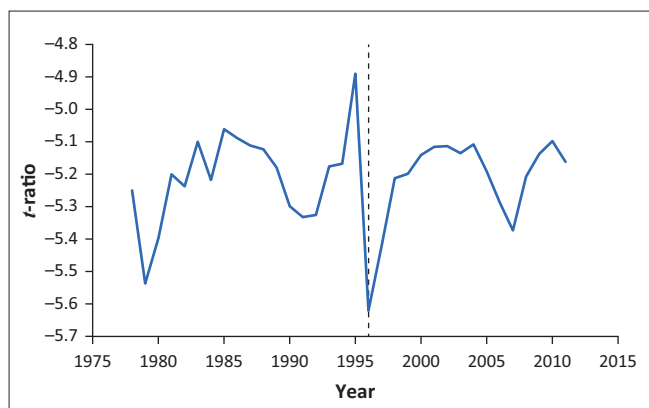
**FIGURE 1:** Zivot–Andrew breakpoint test.

dummy variable MD took the value 1 for the period 1995 onwards, symbolising the period the country transitioned to multiparty leadership and 0 otherwise.

## Model specification

The nonlinear autoregressive distributed lag (NARDL) bounds testing model established by Shin, Yu and Greenwood-Nimmo (2014) was then used to estimate short-run and long-run dynamics. The key advantages of the NARDL model are that:

1. It can capture the asymmetric effects and hence can capture economic frictions, leading to vertical movements in the economy (Chen et al. 2020).
2. The model can be used on variables with I (0) and I (1) orders of cointegration.
3. It can capture both the short-run and the long-run effects.

The model also assumes that the response of the dependent variable to the decomposed positive and negative changes of the independent variable (increase [+] and decrease [−] of each independent variable) is asymmetric (Shin et al. 2014). The decomposed positive and negative asymmetries for real GDP (Y), government consumption (GC), tax revenue (TR), public debt (PD) and inflation (INF) are expressed as follows:

$$Y_t^+ = \sum_{i=1}^t \Delta y_i^+ = \sum_{i=1}^t max\left(\Delta Y_i, 0\right).$$
$$Y_t^- = \sum_{i=1}^t \Delta y_i^- = \sum_{i=1}^t min\left(\Delta Y_i, 0\right)$$

$$GC_t^+ = \sum_{i=1}^t \Delta GC_i^+ = \sum_{i=1}^t max\left(\Delta GC_i, 0\right).$$
$$GC_t^- = \sum_{i=1}^t \Delta GC_i^- = \sum_{i=1}^t min\left(\Delta GC_i, 0\right)$$

$$TR_t^+ = \sum_{i=1}^t \Delta TR_i^+ = \sum_{i=1}^t max\left(\Delta TR_i, 0\right).$$
$$TR_t^- = \sum_{i=1}^t \Delta TR_i^- = \sum_{i=1}^t min\left(\Delta TR_i, 0\right)$$

$$PD_t^+ = \sum_{i=1}^t \Delta PD_i^+ = \sum_{i=1}^t max\left(\Delta PD_i, 0\right).$$
$$PD_t^- = \sum_{i=1}^t \Delta PD_i^- = \sum_{i=1}^t min\left(\Delta PD_i, 0\right)$$

$$INF_t^+ = \sum_{i=1}^t \Delta INF_i^+ = \sum_{i=1}^t max\left(\Delta INF_i, 0\right).$$
$$INF_t^- = \sum_{i=1}^t \Delta INF_i^- = \sum_{i=1}^t min\left(\Delta INF_i, 0\right)$$

$$\Delta HC_t = \alpha + \rho HC_{t-1} + Q_1^+ GC_{t-1}^+ + Q_1^- GC_{t-1}^- + Q_2^+ TR_{t-1}^+ + Q_2^- TR_{t-1}^-$$
$$+ Q_3^+ PD_{t-1}^+ + Q_3^- PD_{t-1}^- + Q_4^+ y_{t-1}^+ + Q_4^- y_{t-1}^- + Q_5^+ INF_{t-1}^+$$
$$+ Q_5^- INF_{t-1}^- + Q_6 MD + \sum_{i=1}^{q-1} \delta 1 \Delta HC_{t-i} + \sum_{i=0}^p \beta_1^+ \Delta GC_{t-i}^+$$
$$+ \sum_{i=0}^p \beta_1^- \Delta GC_{t-i}^- + \sum_{i=0}^p \beta_2^+ \Delta TR_{t-i}^+ + \sum_{i=0}^p \beta_2^- \Delta TR_{t-i}^-$$
$$+ \sum_{i=0}^p \beta_3^+ \Delta PD_{t-1}^+ + \sum_{i=0}^p \beta_3^- \Delta PD_{t-1}^- + \sum_{i=0}^p \beta_4^+ \Delta l_{t-i}^+$$
$$+ \sum_{i=0}^p \beta_4^- \Delta y_{t-i}^- + \sum_{i=0}^p \beta_5^+ \Delta INF_{t-i}^+ + \sum_{i=0}^p \beta_5^- \Delta INF_{t-i}^- + \beta_6 MD + \mu$$

$$[Eqn 4]$$

where $\alpha$ is the intercept, $Q_{1,2,\dots,6}$ captures the long-run dynamics and $\beta_{1,2,\dots,6}$ captures the run parameter, and $\Delta$ is the first difference operator (showing the short-run effects), whilst $q$ and $p$ indicate the optimal lag lengths for the dependent variable and the explanatory variables, respectively. The positive (+) and negative powers (−) on every independent variable represent each variable's positive and negative changes.

## Model estimation

The model estimation was initiated with a unit root analysis to determine the stationarity of the variables and ensure the order of integration of the variables using the standard augmented Dickey–Fuller test and Philips Perron unit root test. From the stationarity test, household consumption, tax revenue and public debt were found to be integrated of order one, I(1). On the other hand, government consumption, national income and inflation were integrated of order zero, I(0). After confirming that none of the variables was integrated of order two I(2), the study went ahead to test for the appropriate lag length.

The Schwarz information criterion (SIC) identified one lag as the optimal length for independent and dependent variables. The NARDL bounds test for long-run asymmetric cointegration was performed by checking Wald F-statistics against Pesaran et al. (2001) lower and upper bound critical values. This method is regarded as better because, unlike the Johansen criterion, which uses a system of multiple equations, the NARDL bounds test uses a reduced form equation and it is able to accommodate variables that are purely I (1), purely I (0) or a mixture of both (Duasa 2007).

The bounds test results showed the calculated *F*-statistic of 4.67 to be greater than the upper bound critical *t*-value of 3.61 at 1% significance level. Therefore, the null hypothesis $H_0$; the variables have no long-run asymmetric cointegration was rejected in favour of the alternative hypothesis $H_1$; the variables have a long-run asymmetric cointegration and concluded that there was a long-run asymmetrical relationship between household consumption and the explanatory variables used in the model.

The results of the NARDL ECM specified in Equation 4 are reported in the next section.

# Model estimation results

This section presents the findings of both the long-run and the short-run NARDL models.

## Long run nonlinear auto-regressive distributed lag

The long-run NARDL model helped evaluate the long-run asymmetric relationship between the dependent and the independent variables. Table 3 summarises the long-run NARDL results as obtained from EViews.

In the long run, both positive and negative changes in government expenditure (GC+, GC−) were found to have no significant effect on household consumption. The results also revealed that positive changes in tax revenue (TR+) had no significant effect on household consumption. However, negative changes in tax revenue (TR−) had a statistically significant coefficient of −0.944, meaning that if tax revenue decreases by 1%, household consumption expenditure increases by about 0.94%.[1]

In the long run, both positive and negative changes in public debt (PD+, PD−) have no significant effect on household consumption. In addition, positive changes in real GDP positively impacted household consumption (0.640, $p$-Value, 0.0221). This meant that a 1% increase in real GDP led to a 0.64% increase in household consumption. On the other hand, negative changes in real GDP have no significant effect on household consumption. In the case of inflation, neither the positive nor the negative changes in inflation significantly affect household consumption.

An $R^2$ of 0.95 revealed that the effects of the independent variables combined explain approximately 95% variation in household consumption for Kenya from 1971 to 2018. The F-Statistic (36.29) is larger than 5, with an F-probability of 0.000, meaning that all the independent variables combined were statistically significant in explaining household consumption behaviour.

## Short-run nonlinear auto-regressive distributed lag

The short-run impacts of fiscal policy and public debt on households' consumption are summarised in Table 4.

Negative changes in real GDP, positive and negative changes in government consumption, positive and negative changes in public debt and the positive changes in tax revenue were omitted from the ECM output as they have no significant effect on household consumption in the short-term run. Moreover, in the short run, negative changes in tax revenue (D [TR−]) have no significant impact on household consumption. Likewise, positive and

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1. A negative coefficient on a negative change in the independent variable is interpreted as a positive relationship with the dependent variable as the two forces are moving in the same direction.

**TABLE 3:** Long-run results.

| Variable | Coefficient | Standard error | $t$-statistic | Probability value |
|---|---|---|---|---|
| GC+ | −0.156 | 0.111 | −1.399 | 0.173 |
| GC− | 0.041 | 0.155 | 0.264 | 0.794 |
| TR+ | 0.073 | 0.548 | 0.134 | 0.894 |
| TR− | −0.944 | 0.507 | −1.864 | 0.073 |
| PD+ | −0.046 | 0.082 | −0.557 | 0.582 |
| PD− | 0.032 | 0.068 | 0.471 | 0.641 |
| INF+ | 0.196 | 0.138 | 1.419 | 0.167 |
| INF− | −0.181 | 0.128 | −1.413 | 0.169 |
| Y+ | 0.640 | 0.264 | −2.422 | 0.022 |
| Y− | 0.043 | 0.286 | 0.149 | 0.883 |
| C | 63.882 | 4.022 | 15.883 | 0.000 |
| $R^2$ | - | 95.40% | - | - |
| Adjusted $R^2$ | - | 92.77 | - | - |
| Durbin–Watson statistics | - | 2.15 | - | - |

GC, government expenditure; TR, tax revenue; PD, public debt; INF, inflation; Y, real GDP.

**TABLE 4:** Error correction model results.

| Variable | Coefficient | Standard error | $t$-statistic | Probability value |
|---|---|---|---|---|
| D(TR−) | −0.153 | 0.392 | −0.390 | 0.699 |
| D(INF+) | −0.028 | 0.058 | −0.492 | 0.626 |
| D(INF−) | 0.023 | 0.055 | 0.415 | 0.681 |
| D(Y+) | 1.152 | 0.186 | −6.208 | 0.000 |
| MD | 5.593 | 0.702 | 7.971 | 0.000 |
| ECT | −1.107 | 0.124 | −8.927 | 0.000 |

ECT, error correction term.

negative changes in inflation (D [INF+], D [INF−]) do not have a significant impact on households' consumption. Looking at the coefficient of the positive changes of real GDP(D[Y+]; 1.1519), it can be said that in the short run, if national income increases by 1%, household consumption increases by about 1.15%, and the relationship is statistically significant at 1% level of significance ($p$-value; 0.0000). The study thus concluded that, in the short run, only the positive changes in real GDP affected household consumption.

The dummy variable MD is statistically significant, revealing that household consumption was higher between 1995 and 2018 compared with 1971–1994. The change of governance from a single party to a multiparty country significantly affected household consumption in Kenya.

The error correction term (ECT) captured the speed of adjustment towards equilibrium, and it also showed the amount of disequilibrium corrected in the model each year. The ECT (−1.106805) is negative and statistically significant; $p$-value (0.0000) confirms that the variables can converge back to long-run equilibrium even after a short-run shock.

## Household consumption response to fiscal policy shocks

The study used cumulative dynamic multipliers for fiscal policy to check the dependent variable's adjustment pattern (household consumption) to its new long-run equilibrium following the positive and negative unitary shocks in government consumption and tax revenue.

Figure 2 portrays an asymmetric adjustment of household consumption to positive and negative shocks of government expenditure. The multiplier for the positive changes in government expenditure shows that household consumption reacts negatively to the positive shocks of government expenditure in the short run. Again, the negative changes seem to have an insignificant impact on household consumption. The asymmetry line indicates that the magnitude of decrease in household consumption dominates, leading to an overall negative relationship between government expenditure and household consumption. This reveals that, in the short run, expansionary fiscal policy (through government expenditure) crowds out household consumption. Moreover, in the long run, the effect of government expenditure on household consumption is constant as portrayed in figure 3.

The dynamic multiplier for the negative changes in tax revenue indicates that household consumption responds positively to the negative shocks of tax revenue. On the other hand, the multiplier for positive changes in tax shows that household consumption does not react to tax increments in Kenya. In the long run, the dynamic multiplier effects are constant as portrayed in Figure 3.

## Diagnostic tests

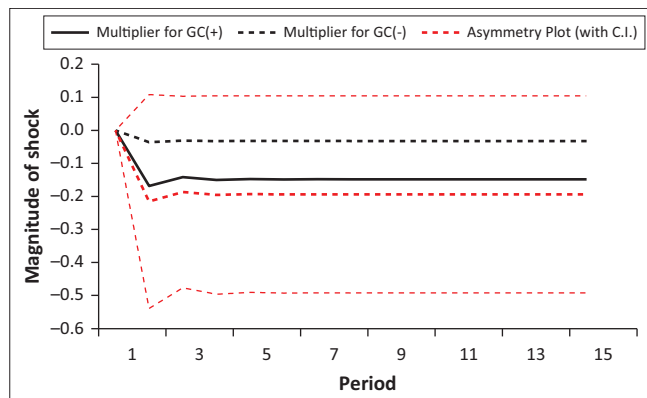Several model diagnostic tests were carried out. The Breusch–Godfrey Lagrange multiplier (LM) method was adopted in testing for serial correlation. The null hypothesis $H_0$; no serial correlation, was tested against the alternative $H_1$; the presence of serial correlation. The test results recorded in Table 5 show that the probability value of 0.2361 was greater than the 0.05 critical value. Thus, we failed to reject the null hypothesis of no serial correlation.

Moreover, the Ramsey RESET model specification test was conducted to test model specification errors. The results showed that the calculated $F$-test probability had a probability value of 0.2693, which is higher than the critical $p$-value of 0.05. Hence, it failed to reject the null hypothesis of no model specification errors and conclude that the model was well specified.

The CUSUM and CUSUM SQ tests of stability revealed that the parameters used in the regression model were stable. Both lines lie within 5% critical bounds, as presented in Figure 4.

## Discussion of results

In the long run, the results show that contractionary fiscal policy (decrease in government consumption) and an increase in tax revenue did not have any significant effect on household consumption in Kenya. These findings are in line with Saraswati and Wahyudi (2018) and Ayunasta, Setiaji and Hakim (2020). On the other hand, a decrease in tax revenue was found to crowd in household consumption in Kenya when using tax revenue in an expansionary fiscal policy. Per

**TABLE 5:** Postestimation diagnostic tests.

| Diagnostic test | Critical value | $F$-statistic | Probability | Decision |
|---|---|---|---|---|
| Serial correlation | 0.05 | 3.396701 | 0.2361 | Do not reject |
| Specification test | 0.05 | 1.2721 | 0.2693 | Do not reject |



**FIGURE 2:** Dynamic multiplier, government consumption expenditure on household consumption.



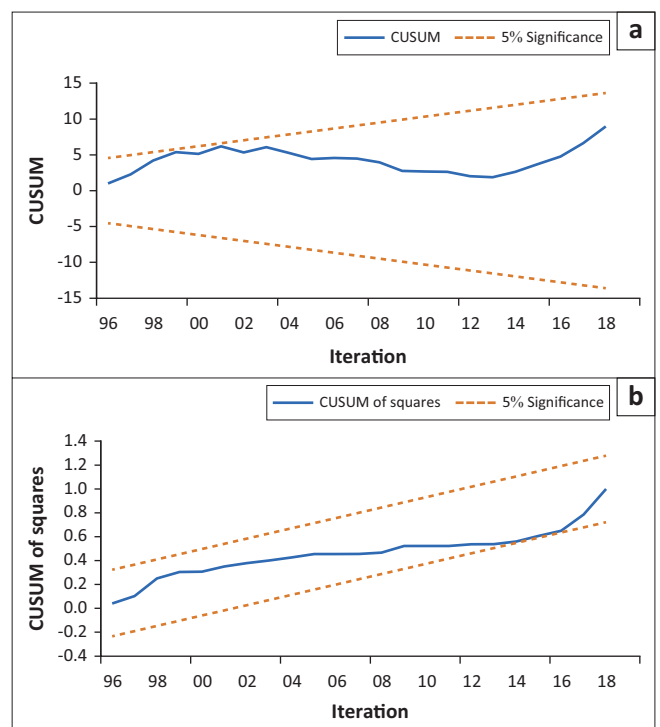**FIGURE 3:** Dynamic multiplier, tax revenue on household consumption.



**FIGURE 4:** (a) CUSUM and (b) CUSUM of square.

contra, expansionary fiscal policy (through an increase in government expenditure) did not significantly affect household consumption. Therefore, the study failed to reject the null hypothesis $H_0$; the expansionary fiscal policy does not crowd in household consumption in the long run. On the same note, Khanfir (2019), Merko et al. (2017) and Kusairi et al. (2019) found low tax rates to have positive impacts on household consumption.

Both the positive and the negative changes in public debt were found not to have significant effects on household consumption in the long run. This indicates that households in Kenya are long-sighted and they do not view public debt as net wealth; hence they do not alter their consumption patterns as a result of an increase or decrease in public debts.

This study improved the existing literature on the relationship between fiscal policy and household consumption by adopting a different methodology that allowed for asymmetry in the independent variables. In the long run, the findings on whether fiscal policy crowds in household consumption revealed that only low tax rates were able to boost household consumption during bad times. Hence, it can be said that expansionary fiscal policy crowds in household consumption in Kenya. This suggests that keeping taxes at low levels could work better at crowding in household consumption in bad times.

In the short run, fiscal policy and public debt did not have a significant impact on household consumption. However, only real GDP significantly affected household consumption, suggesting that maintaining stability in the national income in Kenya is crucial.

## Conclusion

This article aimed to examine the asymmetric effects of fiscal policy on household consumption and to investigate whether fiscal policy crowds in or crowds out household consumption in Kenya. The study examined both the short-run and the long-run effects using the nonlinear ARDL model. The main findings were that expansionary fiscal policy (through a decrease in tax revenue) has a significant crowding-in impact on household consumption. From the dynamic multiplier observation, the crowding-in effect of tax revenue dominates that of government expenditure.

Public debt and inflation, which were used as control variables, were found not to have significant effects on household consumption, both in the short run and in the long run. National income is the only variable found to have a significant impact on household consumption, thereby emphasising the importance for the country to concentrate more on factors that boost national income in order to boost household consumption.

## Limitations of the study

As usual, researchers encounter many challenges in their research. Some of the limitations that the researcher came across in this study are as follows:

- Household disposable income data for Kenya could have helped to directly observe tax adjustments' implications on consumption. However, household disposable income data were not available.
- The available tax revenue included grants, so it is not pure tax revenue.

## Policy recommendations

The government of Kenya needs to watch the enormous growth of government expenditure and develop long-term policies that control redundant government expenditures, because it makes the country continuously operate under a budget deficit, hence an excess public debt.

## Area of further study

Having used secondary data in this study, the results of this study could be improved by using primary data. A different method of data analysis could also be used to validate this study's findings.

## Acknowledgements

## References

Alimi, R.S., 2013, *Keynes' absolute income hypothesis and Kuznets paradox*, MPRA paper, Germany, viewed 10 May 2020, from https://mpra.ub.uni-muenchen.de/id/eprint/49310.

Amusa, K. & Oyinlola, M.A., 2019, 'The effectiveness of government expenditure on economic growth in Botswana', *African Journal of Economic and Management Studies* 10(3), 368–384. https://doi.org/10.1108/AJEMS-03-2018-0081

Anderson, E., Inoue, A. & Rossi, B., 2016, 'Heterogeneous consumers and fiscal policy shocks', *Journal of Money, Credit and Banking* 48(8), 1877–1888. https://doi.org/10.1111/jmcb.12366

Ayunasta, P., Setiaji, B. & Hakim, L., 2020, 'Debt and consumption in Indonesia: Ricardian equivalence approach', *Issues on Inclusive Growth in Developing Countries* 1, 49–60.

Banday, U.J. & Aneja, R., 2019, 'Ricardian equivalence: Empirical evidences from China', *Asian Affairs: An American Review* 46(1), 1–18. https://doi.org/10.1080/0927678.2019.1639003

Barro, R.J., 1974, 'Are government bonds net wealth?', *Journal of Political Economy* 82(6), 1095–1117. https://doi.org/10.1086/260266

Belingher, D. & Moroianu, N., 2015, 'Empirical evidence on the Ricardian equivalence in Romania', *Theoretical and Applied Economics* 22, 603.

Bouakez, H. & Rebei, N., 2007, 'Why does private consumption rise after a government spending shock?', *Canadian Journal of Economics* 40(3), 954–979. https://doi.org/10.1111/j.1365-2966.2007.00438.x

Chen, H., Hongo, D.O., Ssali, M.W., Nyaranga, M.S. & Nderitu, C.W., 2020, 'The asymmetric influence of financial development on economic growth in Kenya: Evidence from NARDL', *Sage Open* 10(1), 215824401989407. https://doi.org/10.1177/2158244019894071

Christiano, L.J. & Eichenbaum, M., 1992, 'Current real-business-cycle theories and aggregate labor-market fluctuations', *The American Economic Review* 82(3), 430–450.

Delong, J.B., Summers, L.H., Feldstein, M. & Ramey, V.A., 2012, 'Fiscal policy in a depressed economy [with comments and discussion]', *Brookings Papers on Economic Activity* 2012(1), 233–297. https://doi.org/10.1353/eca.2012.0000

Duasa, J., 2007, 'Determinants of Malaysian trade balance: An ARDL bound testing approach', *Global Economic Review* 36, 89–102. https://doi.org/10.1080/12265080701217405

Friedman, B.M., 1978. Crowding out or crowding in? The economic consequences of financing government deficits (No. w0284). National Bureau of Economic Research. https://www.nber.org/papers/w0284

Karingi, S.N. & Wanjala, B., 2005, *The tax reform experience of Kenya*, WIDER Research Paper.

KNBS, 2019, 'Kenya population and housing census', in K.N.B.O. STATISTICS (ed.), *Kenya: KNBS*. https://housingfinanceafrica.org/documents/2019-kenya-population-and-housing-census-reports/#:~:text=The%20first%20volume%20of%20the,average%20household%20size%20is%203.9

Keynes, J.M., 1936, *The general theory of interest, employment and money*, MacMillan, London.

Khanfir, W., 2019, 'Keynesian or non-keynesian effects of fiscal policy changes: The case of Tunisia', *Journal of the Knowledge Economy* 10, 335–347. https://doi.org/10.1007/s13132-017-0457-1

Kusairi, S., Maulina, V. & Margaretha, F., 2019, 'Public debt and private consumption in Asia Pacific countries: Is there evidence for Ricardian equivalence?', *Journal of International Studies* 12(1), 50–64. https://doi.org/10.14254/2071-8330.2019/12-1/3

Linnemann, L., 2006, 'The effect of government spending on private consumption: A puzzle?', *Journal of Money, Credit, and Banking* 38(7), 1715–1735. https://doi.org/10.1353/mcb.2006.0094

Magazzino, C., 2016, 'Fiscal variables and growth convergence in the ECOWAS', African Journal of Economic and Management Studies 7(2), 147–163. https://doi.org/10.1108/AJEMS-03-2015-0032

M'Amanja, D., Lloyd, T. & Morrissey, O., 2005, *Fiscal aggregates, aid and growth in Kenya: A vector autoregressive (VAR) analysis*, The University of Nottingham, Centre for Research in Economic Development and International Trade (CREDIT), viewed 13 February 2020, from http://hdl.handle.net/10419/81814.

Mankiw, N.G., 2013, *Macroeconomics*, 8th edn., Worth Publishers/Palgrave Macmillan.

Merko, F., Kalaj, E. & Zisi, A., 2017, *Estimating the effects of fiscal policy on the private consumption: Evidence from Albania*. Association of Economic Universities of South and Eastern Europe and the Black Sea Region (ASECU).

Muriithi, M.K. & Moyi, E.D., 2003, *Tax reforms and revenue mobilization in Kenya*. African Economic Research Consortium (AERC), viewed 13 February 2020, from http://aercafricalibrary.org:8080/123456789/434.

Mutua, J.M., 2012, *A citizen's handbook on taxation in Kenya*, Institute of Economic Affairs, Nairobi.

Mutuku, C., 2015, 'Assessing fiscal policy cyclicality and sustainability: A fiscal reaction function for Kenya', *Journal of Economics Library* 2(3), 173–191.

Parkin, M., Kohler, M., Lakay, L., Rhodes, B., Saayman, A., Schöer, V. et al., 2010, *Economics: Global and Southern African perspectives*, Philippa van Aardt, Pinelands.

Pesaran, M.H., Shin, Y. & Smith, R.J., 2001, 'Bounds testing approaches to the analysis of level relationships', *Journal of Applied Econometrics*, 16(3), 289–326. https://doi.org/10.1002/jae.616

Pigou, A.C., 1936, 'Mr. JM Keynes' General theory of employment, interest and money', *Economica* 3(10), 115–132. https://doi.org/10.2307/2549064

Saraswati, B.D. & Wahyudi, S.T., 2018, 'The effect of fiscal policy on the Indonesian household consumption: The application of the Ricardian equivalence hypothesis', *Review of Integrative Business and Economics Research* 7(4), 90–98.

Shin, Y., Yu, B. & Greenwood-Nimmo, M., 2014, 'Modelling asymmetric cointegration and dynamic multipliers in a nonlinear ARDL framework', in *Festschrift in honor of Peter Schmidt,* pp. 281–314, Springer link, New York, NY, https://doi.org/10.1007/978-1-4899-8008-3_9

Sloman, J., 2007, *Economics and the business environment*, Pearson Education, New York City.

WBG, 2016, *World development report 2016: Digital dividends*, World Bank Publications. https://apo.org.au/node/61123

WBG, 2020, *World Bank development indicators*, 2020 edn., World Bank Database: World Bank. https://databank.worldbank.org/source/world-development-indicators