PUBLIC EXPENDITURE AND ECONOMIC GROWTH CAUSAL LINKAGE: DISAGGREGATED EMPIRICAL ANALYSIS FOR ZIMBABWE

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ABSTRACT

The study explored whether government spending in Zimbabwe is an effective channel to growing the economy using a sample of economic data from 1980 to 2018. The ARDL model and VECM were applied using a dis-aggregated analysis of capital expenditure and consumption expenditure after controlling for growth variables like inflation, foreign direct investments, and real interest rates. To further check the effectiveness of government expenditure in Zimbabwe, three dummy variables were used: 1991-1995 Economic Structural Adjustment Program (ESAP), 2009 currency reform, and recurring droughts. The results showed a significant non-causal relationship between economic growth and consumption expenditure, in contrast to an unidirectional short-run and long run causal relationship running from economic growth to capital expenditure. Economic variables such as inflation, foreign direct investments and interest rates showed statistically significant relationships with economic growth. Furthermore, the results revealed that droughts and the use of a multi-currency system have long-run negative relationships with economic growth, and both adversely affect consumption expenditure's relationship with economic growth. Policy implications emerge from the study. In the Keynesian spirit, there is a need for the government to improve expenditure efficiency and raise more revenue to sustain its activities, rather than cut consumption expenditure as was done during the ESAP period. This is not only counterproductive, but may lead to unwarranted suffering of the public due to excessive austerity measures. Secondly, there is a need to adopt either a weaker currency than the US dollar, or introduce a local currency after establishing sound economic fundamentals.

Contribution/ Originality: This study contributes to the existing public policy literature by analyzing the short-run and long-run causal relationship between dis-aggregated public expenditure and economic growth in Zimbabwe. It is one of the few studies which have investigated how drought and currency reform moderates the expenditure and growth relationship in low-income countries.

1. INTRODUCTION

There are wide-ranging opinions on the capacity of fiscal policy to function as a national economic transmission channel which can be depended upon to rejuvenate economic progress in Zimbabwe and across the globe. There have been a series of fiscal reforms, especially in the developing world, in anticipation of increased economic

performance. The Zimbabwean economy has gone through several economic reforms to curb recurring budget deficits and stimulate the economy. The Zimbabwean economy has been deteriorating for a number of years, leading to critical reactions from local technocrats and international advisers on the need for fiscal economic reforms to rescue the economy from disaster and the population from extreme poverty.

As of September 2018, Zimbabwe had a high budget deficit of 10.9 percent of GDP (Government of Zimbabwe, 2018) which is considerably above recommended levels. This has been due to a lack of financial discipline, most notably the government exceed its borrowing threshold from the central bank through the issuance of treasury securities under its central bank overdraft facility. Uncontrolled government expenditure accompanied by deteriorating economic growth and inflationary pressures have aroused concerns from a number of economic analysts who suggest that ballooning public expenditure in Zimbabwe is responsible for sinking the country into an economic abyss. In the same vein, the IMF and the World Bank have been calling on the government to implement fiscal reforms to first stabilize the economy and then recover its former prosperity. It is necessary in this context to uncouple the public expenditure-economic growth nexus in Zimbabwe.

So, is fiscal adjustment important to the restoration of Zimbabwe's economic fortunes? Fiscal policy is the dominant and compelling instrument used in most economies to achieve macroeconomic stability, but its usefulness as a driver of economic growth driver is less certain. Some studies postulate that well-functioning fiscal policies accelerate economic growth by triggering both public and private sector productivity, while poorly functioning fiscal policies are an obstruction to economic progress and exacerbate poverty. Government expenditure led growth is grounded in the Keynesian model which resonates well with the endogenous growth proponents who contend that productive government expenditure has great potential to stimulate private investment (Barro, 1990). However, proponents of the neo-classical growth model are mute on government spending's contribution to a nation's growth trajectory (Nurudeen and Usman, 2010). It is apparent, then, that existing the literature on the public expenditure-economic growth nexus in Zimbabwe is inconclusive.

This study seeks to redress that situation, and also to proffer alternatives to aid sound policy formulation in countries like Zimbabwe, which are grappling with the public expenditure allotment conundrum. Such research can assist policymakers to more efficiently utilize limited fiscal resources in pursuit of sustainable growth. An empirical econometric analysis was undertaken using sample data gathered from ZimStats, the IMF, the World Bank and world economic indicators to this end.

The study is also similar in scope to Kunofiwa and Odhiambo (2013) which concentrated on overall government expenditure effects, while Mapfumo *et al.* (2012) and Saungweme and Matandare (2014) focused on the impact of agricultural spending. However, this study differs in scope in that it disaggregates government expenditure into consumption spending and investment spending. Using a dis-aggregated expenditure analysis, it becomes more useful for policymaking as multilateral institutions push the government towards reduced consumption expenditure, especially wages, and to redirect resources towards capital investment. Therefore, it informs public policy as to whether economic growth responds to either consumption expenditure or capital expenditure.

This study is also similar to the works of Mazorodze (2018) who dis-aggregated public expenditure and took account of the 2009 currency shock, but ignored the impact of drought which is a significant variable within the agricultural sector of the Zimbabwean economy. Zimbabwean economy depends heavily on agriculture, and drought cycles since 1980 have directly impacted on public spending as the government makes large outlays to feed the population in drought years. All years in which the country faced drought during the period of the study are taken into consideration. Unlike Mazorodze (2018), this study takes note of the IMF Economic Structural Adjustment Program (ESAP) implemented in Zimbabwe between 1991 and 1995. Since this policy was a fiscal adjustment program, it was the most obvious means of analyzing the impact of government expenditure on economic growth. The results of this study will also give insight to the new government which is also working on

implementing fiscal adjustment policies as contained in the 2018-2020 Transitional Stabilization Programme (TSP) blueprint which aims to curtail government expenditure, and at the same time support capital investment.

To deal with probable endogeneity issues that may affect the public expenditure-economic growth relationship, the ARDL model and causality tests were used to eliminate the reverse causality bias. Other macroeconomic control variables were added into the model: inflation, foreign direct investments and interest rates including three dummy variables for drought years, 2009 currency reform and the ESAP period. The study carried out the requisite diagnostic tests to ensure that the model produced reliable results and it satisfied all requirements. The study found consumption expenditure to be a significant contributor to economic growth, but no causal relationship was found. On the other hand, economic growth was found to Granger cause capital expenditure, both in the short and long runs. The results also showed no evidence of causality between capital expenditure and economic growth over both short and long runs. The remainder of the paper is structured thus: section two analyses public expenditure literature; section three covers the theoretical framework and hypothesis development followed by the research methodology employed by the study in section 4; section five is composed of empirical findings and analysis; and the conclusion and policy recommendations are in section 6.

2. LITERATURE REVIEW

There are different strands of fiscal spending literature with mixed results (Fan and Rao (2003)). Some studies support the contention that channeling public expenditure is very effective in growing the economy (see (Alexiou, 2009; Hakro, 2009; Lahirushan and Gunasekara, 2015)). While most literature seems to agree that not all government spending is beneficial, it is divided on the type of expenditure which stimulates growth. Another line of evidence shows that allocating more resources towards capital expenditure boosts the economy (Belgrave and Craigwell, 1995; Mazorodze, 2018). One opposing strand of research credits consumption expenditure as being a key driver of economic prosperity which is corroborated by a strong positive public expenditure-economic growth relationship (see (Devarajan *et al.*, 1996; Kweka and Morrisey, 2000)).

A couple of studies show that the strength of the fiscal policy can be seen through sector productivity as some sectors are productive and some counterproductive. Economic growth has been seen to derive from government spending on agriculture Udoh (2011); education (Ovidu, 2014); health (Nurudeen and Usman, 2010); transport, Nurudeen and Usman (2010) and infrastructure (Ovidu, 2014).

Some studies in various countries found a negative relationship between government expenditure and economic growth (see (Ghura, 1995; Knoop, 1999; Nketiah-Amponsah, 2009)). In Devarajan *et al.* (1996) and Kweka and Morrisey (2000) capital expenditure exhibited a counterproductive effect on economic growth which is contrary to other pro-fiscal policy growth theories. According to Belgrave and Craigwell (1995) allocating public resources for recurrent expenditure results in an adverse effect on economic progress. A telling negative short-run effect on economic growth is demonstrated in the allocation of government expenditure towards agriculture Loto (2011) communication, transport, and education (Usman *et al.*, 2011).

According to Carboni (2011) the linkage between public expenditure and economic growth is affected by the size of the government's budget. There is some evidence that large public expenditure suffers from operational inefficiencies which negatively affects economic growth(see (Ram, 1986; Fölster and Henrekson, 2001)). Some studies dispute the power of the fiscal policy, positing that public expenditure is an insignificant driver of economic growth (Nurudeen and Usman, 2010). According to Shen *et al.* (2018) public investment in low-income countries does not affect growth in the short run due to its inability to stimulate local demand given third world nations depend on foreign products for government investment projects. Some governments over-allocate resources resulting in inefficient use of resources which may nullify the contribution of public expenditure to economic growth (Tanzi, 1991).

Kunofiwa and Odhiambo (2013) in their study on the Zimbabwean economy using ARDL Bounds testing found that there is an unidirectional causal relationship in the long-run and the short-run between public expenditure and economic growth. In their study, government expenditure was found to stimulate economic growth in the short-run.

The mixed evidence in public policy literature illustrates the lack of a consensus among academics in this field, especially in developing countries. In light of this, the paper seeks to extend public finance literature by empirically analyzing how public expenditure affects economic growth in Zimbabwe.

3. THEORETICAL FRAMEWORK AND HYPOTHESIS DEVELOPMENT

Keynesian proponents emphasize the role of the government in promoting growth; they posit that a change in public spending via the multiplier effect channel contributes immensely to economic growth. Wagner's law also echoes the same sentiments, and postulates that an increase in public sector activities will eventually contribute to economic growth. This is supported by many prominent public policy researchers who argue that public spending can be used to increase economic growth (see (Romer and Romer, 2010; Wu *et al.*, 2010; Lahirushan and Gunasekara, 2015)). Barro (1990) and Bleaney *et al.* (2001) in the spirit of public expenditure composition theory postulated that public expenditure can either be productive or unproductive, the productivity of public expenditures depends on what is being financed (Adam and Bevan, 2005; Gemmell *et al.*, 2011). Though there are different methods used to categorize public expenditure, there is some consensus that it can be broken down into capital expenditure and recurrent expenditure (see (Dalton, 1954; Aronson, 1985; Hayman, 1990; Mazorodze, 2018)). Channeling of resources towards capital expenditure leads to economic growth while recurrent expenditure is said to be unproductive (Aronson, 1985; Visser and Erasmus, 2005). However, there is still debate on which type of expenditure stimulates growth. Choi and Son (2016) in their study on Korea found out that increasing government consumption expenditure has a positive influence on economic growth. According to Tanzi and Zee (1997) in the spirit of endogenous growth theory, fiscal policy allocations yield results in the long run while (Barro, 1991) using a cross country data shows a modest trivial relationship between government spending and growth.

The Ricardian equivalence hypothesis posits that there is a neutral relationship between government expenditure and economic growth. Levine and Renelt (1992) in line with the Ricardian equivalence argue that there is no linkage between public expenditure and growth in the third world countries. Subsequently, Sattar (1993) found no impact of public expenditure on the growth of industrial economies in contrast to a positive effect in underdeveloped nations. The literature is divided on economic growth public expenditure relationship leading to the following hypothesis:

H₁: There is a linkage between dis-aggregated government expenditure and economic growth.

4. DATA AND METHODOLOGY

4.1. Sample Description

Secondary data in time series form from 1980 to 2014 was used to analyze the impact of public expenditure composition on economic growth in Zimbabwe. The study did not include some years after 2014 as the economy faced some currency distortions which may affect the study's results reliability. Data used in this study was acquired from credible sources which are Reserve Bank of Zimbabwe (RBZ), International Monetary Fund (IMF), Zimbabwe Statistics, World Bank and Global World Indicators.

4.2. General Model Specification

The log-log model was used to establish the effect of government expenditure on economic growth. Gross domestic product (GDP) has been used as a proxy measure for economic growth. Our main explanatory variables

are government capital expenditure (CAPEX) and consumption expenditure (CONEX). The model used is as follows:

$$LGDP=f(LNCAPEX, LNCONEX, LNGDP, LNINF, LNINT, LNFDI, DRGHT, MC, ESAP) \qquad (1)$$

The model in Equation 1 can be expressed in a linear form as follows:

$$LNGDP=\beta_0+\beta_1 LNCAPEX_t+\beta_2 LNCONEX_t+\beta_3 LNGDP_{t-1}+\beta_4 LNINF+\beta_5 LNINT_t+\beta_6 LNFDI +\gamma DRHT_t+\delta MLC_t +$$
$$\theta ESAP_t+\varepsilon_t \qquad (2)$$

Where; LGDP = Logarithm of gross domestic product, $LNCAPEX_t$ = Logarithm of government spending on capital projects at time t (% of GDP), LNCONEX = Logarithm of government consumption expenditure at time t (% of GDP) , $LNINF_t$ = Logarithm of inflation at time t, $LNINT_t$ = Logarithm of real interest rates, $LNFDI_t$ = Logarithms of foreign direct investments, $DRHT_t$ = Dummy for drought where drought year is given a value of 1 and 0 for other years, MC_t = Dummy for change of currency where one is given for years after currency reform and 0 for other years, $ESAP_t$ = Dummy for policy years under ESAP where value of one is given for policy years and zero for other years outside the ESAP period, ε_t = Error term that captures missing and unobserved variables in the model (Gujarati, 2004).

4.3. Stationarity Tests

Stationarity is a common problem when dealing with time series data, with non-stationary data resulting in spurious inferences. To curb this problem, the first step was to test the variables for stationarity using the Augmented Dickey-Fuller (ADF) and Philips-Perron (PP) unit root tests.

4.4. ARDL Bounds Test

Following recent public economy studies (Bikorimana *et al.*, 2018; Mazorodze, 2018; Chawala, 2019) we used the linear Autoregressive Distributed Lag (ARDL) bounds testing procedure to cointegration. This method was championed by Pesaran *et al.* (2001) and later refined for small samples by Narayan (2005). The power of this method lies in its ability to test for cointegration regardless of order l (1) or l (0). Secondly the ARDL test can be applied to small sample data unlike other methods which are applied with large data samples. Furthermore, this method helps to deal with the endogeneity problem in the establishment of long-run estimates which is usually a problem in most economic growth variables. The following ARDL model was used in the analysis:

$$\Delta LNGDP= \sigma_0 + \sum_{i=1}^{m} \sigma_{1i}\Delta LNGDP_{t-1} + \sum_{i=0}^{n} \sigma_{2i}\Delta LNCAPEX_{t-1} + \sum_{i=0}^{o} \sigma_{3i}\Delta LNCONEX_{t-1} + \sum_{i=0}^{p} \sigma_{4i}\Delta LNINF_{t-1} +$$

$$\sum_{i=0}^{q} \sigma_{5i}\Delta LNINT_{t-1} + \sum_{i=1}^{r} \sigma_{6i}\Delta LNFDI_{t-1} + \sigma_7 LNGDP_{t-1} + \sigma_8 LNCAPEX_{t-1} + \sigma_9 LNCONEX_{t-1} +$$

$$\sigma_{10} LNINF_{t-1} + \sigma_{11} LNINT_{t-1} + \sigma_{12} LNFDI_{t-1} + \gamma DRHT_t + \delta MC_t + \theta ESAP_t + \varepsilon_t \qquad (3)$$

$$\Delta LNCAPEX= \sigma_0 + \sum_{i=1}^{m} \sigma_{1i}\Delta LNCAPEX_{t-1} + \sum_{i=0}^{n} \sigma_{2i}\Delta LNGDP_{t-1} + \sum_{i=0}^{o} \sigma_{3i}\Delta LNCONEX_{t-1} + \sum_{i=0}^{p} \sigma_{4i}\Delta LNINF_{t-1}$$

$$+ \sum_{i=0}^{q} \sigma_{5i}\Delta LINT_{t-1} + \sum_{i=1}^{r} \sigma_{6i}\Delta LNFDI_{t-1} + \sigma_7 LNGDP_{t-1} + \sigma_8 LNCAPEX_{t-1} + \sigma_9 LNCONEX_{t-1} +$$

$$\sigma_{10} LNINF_{t-1} + \sigma_{11} LNINT_{t-1} + \sigma_{12} LNFDI_{t-1} + \gamma DRHT_t + \delta MC_t + \theta ESAP_t + \varepsilon_t \qquad (4)$$

$$\Delta LNCONEX = \sigma_0 + \sum_{i=1}^{m} \sigma_{1i}\Delta LNCONEX_{t-1} + \sum_{i=0}^{n} \sigma_{2i}\Delta LNGDP_{t-1} + \sum_{i=0}^{o} \sigma_{3i}\Delta LNCAPEX_{t-1} + \sum_{i=0}^{p} \sigma_{4i}\Delta LNINF_{t-1}$$

$$+ \sum_{i=0}^{q} \sigma_{5i}\Delta LNINT_{t-1} + \sum_{i=1}^{r} \sigma_{6i}\Delta LNFDI_{t-1} + \sigma_7 LNGDP_{t-1} + \sigma_8 LNCAPEX_{t-1} + \sigma_9 LNCONEX_{t-1} +$$

$$\sigma_{10}LNINF_{t-1} + \sigma_{11}LNINT_{t-1} + \sigma_{12}LNFDI_{t-1} + \gamma DRHT_t + \delta MC_t + \theta ESAP_t + \varepsilon_t \qquad (5)$$

$$\Delta LNINFL = \sigma_0 + \sum_{i=1}^{m} \sigma_{1i}\Delta LNINFL_{t-1} + \sum_{i=0}^{n} \sigma_{2i}\Delta LNGDP_{t-1} + \sum_{i=0}^{o} \sigma_{3i}\Delta LNCAPEX_{t-1} + \sum_{i=0}^{p} \sigma_{4i}\Delta LNCONEX_{t-1} +$$

$$\sum_{i=0}^{q} \sigma_{5i}\Delta LNINT_{t-1} + \sum_{i=1}^{r} \sigma_{6i}\Delta LNFDI_{t-1} + \sigma_7 LNGDP_{t-1} + \sigma_8 LNCAPEX_{t-1} + \sigma_9 LNCONEX_{t-1} +$$

$$\sigma_{10}LNINF_{t-1} + \sigma_{11}LNINT_{t-1} + \sigma_{12}LNFDI_{t-1} + \gamma DRHT_t + \delta MC_t + \theta ESAP_t + \varepsilon_t \qquad (6)$$

$$\Delta LNINT = \sigma_0 + \sum_{i=1}^{m} \sigma_{1i}\Delta LNINT_{t-1} + \sum_{i=0}^{n} \sigma_{2i}\Delta LNGDP_{t-1} + \sum_{i=0}^{o} \sigma_{3i}\Delta LNCAPEX_{t-1} + \sum_{i=0}^{p} \sigma_{4i}\Delta LNCONEX_{t-1} +$$

$$\sum_{i=0}^{q} \sigma_{5i}\Delta LNINFL_{t-1} + \sum_{i=1}^{r} \sigma_{6i}\Delta LNFDI_{t-1} + \sigma_7 LNGDP_{t-1} + \sigma_8 LNCAPEX_{t-1} + \sigma_9 LNCONEX_{t-1} +$$

$$\sigma_{10}LNINF_{t-1} + \sigma_{11}LNINT_{t-1} + \sigma_{12}LNFDI_{t-1} + \gamma DRHT_t + \delta MC_t + \theta ESAP_t + \varepsilon_t \qquad (7)$$

$$\Delta LNFDI = \sigma_0 + \sum_{i=1}^{m} \sigma_{1i}\Delta LNFDI_{t-1} + \sum_{i=0}^{n} \sigma_{2i}\Delta LNGDP_{t-1} + \sum_{i=0}^{o} \sigma_{3i}\Delta LNCAPEX_{t-1} + \sum_{i=0}^{p} \sigma_{4i}\Delta LNCONEX_{t-1} +$$

$$\sum_{i=0}^{q} \sigma_{5i}\Delta LNINFL_{t-1} + \sum_{i=1}^{r} \sigma_{6i}\Delta LNINT_{t-1} + \sigma_7 LNGDP_{t-1} + \sigma_8 LNCAPEX_{t-1} + \sigma_9 LNCONEX_{t-1} +$$

$$\sigma_{10}LNINF_{t-1} + \sigma_{11}LNINT_{t-1} + \sigma_{12}LNFDI_{t-1} + \gamma DRHT_t + \delta MC_t + \theta ESAP_t + \varepsilon_t \qquad (8)$$

After establishing the optimal lag order, the F-test was used to test the long-run cointegration relationship against the lower and upper bounds critical values proposed by Pesaran *et al.* (2001). In Narayan's work (2005) critical values are preferred as they apply to a smaller sample of between 30 and 80 observations which matches this study's sample size of 39 observations. The null hypothesis of no long-run relationship is as follows:

$H_0 = \sigma_1 = \sigma_2 = \sigma_3 = \sigma_4 = \sigma_5 = \sigma_6 = 0$, against the alternative hypothesis.

$H_1 \neq \sigma_1 \neq \sigma_2 \neq \sigma_3 \neq \sigma_4 \neq \sigma_5 \neq \sigma_6 \neq 0$. If the F-statistic is below the lower bound, we do not reject the null hypothesis signifying that there is no long-run relationship. However, if the F-statistic is above the upper bound we reject the null hypothesis and conclude that cointegration exists suggesting a long-run relationship among the variables. If the F-statistic falls between the boundaries, the test is said to be inconclusive (Pesaran *et al.,* 2001).

4.5. Granger Causality Tests

After establishing the existence of a long-run relationship of the variables, it is imperative to do causality tests to establish the direction of flow. Granger causality tests were done using the Narayan approach. Following Narayan (2005) if cointegration exists among the variables the Granger causality test is conducted after adding a lagged error correction term using the Vector Error Correction Model (VECM). When the long-run relationship is not established the Granger causality test is done without the error correction term on the equations and the relationship can be conducted using vector auto-regressive (VAR) modeling. The Akaike Information Criterion (AIC) procedure is used to find the length of the optimal lags for the variables. The following model in Equation 9 shows a representation of an error correction model when LNGDP is the dependent variable:

$$\Delta LNGDP = \sigma_0 + \sum_{i=1}^{m} \sigma_{1i}\Delta LGDP_{t-1} + \sum_{i=0}^{n} \sigma_{2i}\Delta LCAPEX_{t-1} + \sum_{i=0}^{o} \sigma_{3i}\Delta CONEX_{t-1} + \sum_{i=0}^{p} \sigma_{4i}\Delta LINF_{t-1} +$$

$$\sum_{i=0}^{q} \sigma_{5i}\Delta LINT_{t-1} + \sum_{i=1}^{r} \sigma_{6i}\Delta LFDI_{t-1} + \sigma_7 LGDP_{t-1} + \sigma_8 LCAPEX_{t-1} + \sigma_9 CONEX_{t-1} + \sigma_{10} LINF_{t-1}$$

$$+ \sigma_{11} LINT_{t-1} + \sigma_{12} LFDI_{t-1} + \gamma DRHT_t + \delta MC_t + \theta ESAP_t + \alpha ECT + \varepsilon_t \qquad (9)$$

Where; ECT is the long run error correction term.

5. EMPIRICAL FINDINGS AND DATA ANALYSIS

5.1. Descriptive Statistics and Correlation Matrix

The results in Table 1 describe the data and variables used for the study; 39 observations for each variable. The correlation matrix in Table 2 shows that there is no multicollinearity problem amongst the variables used in the study.

Table-1. Descriptive statistics.

Variable	Obs.	Mean	Std. Dev.	Min.	Max.
LNGDP	39	7.1138	0.1745	6.5870	7.3293
LNCONEX	39	2.7740	0.5014	0.7164	3.3137
LNCAPEX	39	2.5111	0.6486	0.6933	3.2018
NFL	39	3.8973	3.1828	-2.3717	19.2586
LNFDI	39	-0.0033	0.8931	-3.0479	2.0069
LNINT	39	3.8699	1.2054	-0.3667	7.0690

Source: Compiled by author.

Table-2. Correlation matrix.

Variable	LNGDP	LNCONEX	LNCAPEX	LNINFL	LNFDI	LNINT
LNGDP	1					
LNCONEX	0.7049	1				
LNCAPEX	0.5121	0.5310	1			
LNINFL	-0.4686	-0.7674	-0.5444	1		
LNFDI	-0.1896	-0.2739	-0.1773	0.0535	1	
LNINT	-0.4826	-0.6094	-0.5379	0.7056	0.1174	1

Source: Compiled by author.

5.2. Stationarity Tests

The variables were tested for stationarity using the Augmented Dickey-Fuller Test (ADF) and Philips Perron Test (PP). All the variables except for LNINF had a unit root (i.e. non-stationary) using both methods, however they all became stationary after being integrated to order one 1(1) as indicated in Table 3. LNINFL was stationary at all levels.

Table-3. Stationarity test results.

Variable	ADF test		PP test		Integration order
	Level	First difference	Level	First difference	
LNGDP	–0.1478097	–.6504016*	0.8990107	–4.160**	I(1)
LNCAPEX	–0.4055088	–1.414159***	0.5702875	–0.2555233***	I(1)
LNCONEX	–0.40313	–0.9102257**	0.706329	0.1407475***	I(1)
LNINFL	–0.716813*	–1.821899***	0.241622***	–0.4166197***	I(0)
LNFDI	–0.5413479	–1.660296***	0.4238297**	–0.3407909***	I(1)
LNINT	–0.1050017	–1.173431**	0.8680566	–0.1534358***	I(1)

Note: *** stationarity at 1% ** stationarity at 5% levels *stationary at 10%.
Critical values for ADF test are based on MacKinnon approximate p-value and truncation lags for PP test are based on Newey-West Bandwidth.
Source: Compiled by author.

5.3. ARDL Cointegration Bounds Test

The AIC method was used to select the optimal lag length which was used to calculate the F-statistic for ARDL bounds testing to establish the existence of a long-run relationship. The bounds test results are shown in Table 4, Narayan (2005) bounds test critical values for small samples were used as they fit the study sample. The F-statistic when LNGDP is the dependent variable is above the upper bound at all levels of significance. This means we reject the hypothesis of no cointegration and conclude that there is a long-run relationship among variables when LNGDP is a dependent variable. The higher F-statistics above the upper bound critical values when LNCONEX and LNINFL are dependent variables further confirm that long-run relationship exists among the variables. However, when LDI is the dependent variable the F-statistic is lower than the lower bound critical value. This means we cannot reject the null hypothesis of no co-integration and we conclude that there is no long-run relationship among variables when LNFDI is the independent variable. When LNINT and LNCAPEX are dependent variables the F-statistics fall between the upper and lower bounds which means we cannot make any decision on whether there is evidence of co-integration or not.

5.4. Granger Causality Tests

After establishing that cointegration exists using the ARDL bounds test when LNGDD, LNCONEX, and LNINFL are dependent variables, we tested for causality as the results suggest a long-run causal relationship among the variables. Narayan-Granger causality approach was used to test for causality. The short-run and error correction model results are shown in Table 5.

The results show that only inflation Granger causes economic growth both in the short run and long run. A bi-directional causal relationship exists between economic growth and inflation in the short run and long run. Economic growth also Granger causes government capital expenditure in the short run and long run. The coefficient of the error correction term is significant and negative, which confirms the results of the ARDL bounds test that there is a long-run relationship among the variables with economic growth.

The short-run and long-run results confirm a causal relationship running from economic growth, government consumption expenditure, inflation, foreign direct investments and real interest rates to capital expenditure. However, no causal relationship was observed flowing from capital expenditure to economic growth and other variables. On the other hand, only inflation and government consumption expenditure Granger causes each other, both in the short run and long run. There is no causal relationship established running from economic growth and other variables to government consumption expenditure in the short run and long run. The other results show a bi-directional short-run causal relationship between inflation and real interest rates, as they Granger cause each other in the short-run while real interest rates Granger cause inflation in the long run.

Table-4. Bounds F-test for cointegration.

Function	F-statistic	10% critical value bounds I(0) I(1)	5% critical value bounds I(0) I(1)	1% critical value bounds I(0) I(1)
LNGDP(LNCAPEX,LCONEX,LNINFL,LNFDI,LNINT)	4.358	2.483 3.708	2.962 4.338	4.045 5.898
LNCAPEX(LNGDP,LCONEX,LNINFL,LNFDI,LNINT)	4.263	2.483 3.708	2.962 4.338	4.045 5.898
LCONEX(LNGDP,LNCAPEX,LNINFL,LNFDI,LNINT)	8.546	2.483 3.708	2.962 4.338	4.045 5.898
LNINFL(LNGDP,LNCAPEX,LCONEX,LNFDI,LNINT)	8.840	2.483 3.708	2.962 4.338	4.045 5.898
LNFDI(LNGDP,LNCAPEX,LCONEX,LNINFL,,LNINT)	1.405	2.483 3.708	2.962 4.338	4.045 5.898
LNINT(LNGDP,LNCAPEX,LCONEX,LNINFL,LNFDI,)	2.706	2.483 3.708	2.962 4,338	4.045 5.898

Note: Bounds tests critical values obtained from Narayan (2005).
Source: Compiled by author.

Table-5. Narayan- Granger causality tests.

	Wald χ^2 test						
Dependent variable	Δ LNGDP$_t$	Δ LNCAPEX$_t$	Δ LNCONEX$_t$	Δ LNINFL$_t$	Δ LNFDI$_t$	Δ LNRINT$_t$	ECM$_t$
Δ LNGDP$_t$	----------	1.43116 (0.2410)	2.830869 (0.1028)	6.615083 *** (0.0042)	0. 179562 (0.6748)	0.200075 (0.6579)	- 0.152193*** (-7.8593)
Δ LNCAPEX$_t$	4.305023** (0.0473)	----------	9.2315*** (0.0008)	3.8862* (0.0586)	4.0305** (0.0290)	6.7375 *** (0.0041)	-0.729437*** (-7.2661)
Δ LNCONEX$_t$	2.250339 (0.1235)	2.289640 (0.1193)	----------	38.55134*** (0.0000)	1.486706 (0.2326)	0.123014 (0.7283)	-0.645997*** (-9.6546)
Δ LNINFL$_t$	10.0085*** (0.0005)	1.397734 (0.2467)	51.2144*** (0.0000)	----------	2.3660 (0.1156)	3.2104* (0.0550)	-1.2782*** (-17.7236)
Δ LNFDI$_t$	0.029344 (0.8651)	0.465418 (0.5002)	0.417149 (0.5231)	0.490858 (0.4888)	---------	0.599419 (0.4447)	
Δ RINT	0.91712 (0.7641)	0.46793 (0.4992)	2.187428 (0.1391)	10.16692*** (0.0004)	0.0093000 (0.9238)	---------	

Note: ***, **, * are levels of significance at 1%, 5% and 10% respectively.
Numbers in brackets are probabilities except for t-statistics in the ECM.
Source: Compiled by author.

5.5. Long Run Parameter Estimates

Table 6 shows that a long-run relationship exists between government consumption and economic growth. A one percent change in government consumption expenditure will contribute to a 0.2759 percent change in economic growth. The coefficient of consumption expenditure lowered but remained significant after including the dummy variables accounting for drought and the change of currency. A positive, insignificant relationship was established between capital expenditure and economic growth. The probable reason why capital expenditure is positively related to economic growth but insignificant can be because of low efficiency in the use of the funds, and also possibly due to corruption.

Foreign direct investments were found to be significant after accounting for currency changes. This long-run relationship implies that that foreign direct investment played a big role to boost the economy of Zimbabwe during the post-multi-currency area. A negative long-run relationship between economic growth and real interest rates was established after accounting for the currency reform which took place in 2009.

The long-run estimation results show a negative relationship that exists between economic growth and drought in Zimbabwe. This result is consistent with the fact that Zimbabwe is an agro-based country which means a poor rainfall season will affect the economy leading to low growth. However, the ESAP coefficient is positive but not significant, which possibly means that the Economic Structural Adjustment Program did not have any effect on

economic growth in Zimbabwe. After controlling for ESAP, the coefficient of consumption expenditure increased which suggests that consumption expenditure is very efficient and productive when there is public financial management discipline. Lastly, the currency reform dummy variable is very significant with a negative coefficient positing a long-run negative relationship between economic growth and the use of a basket of currencies. The results show that using a multi-currency system in Zimbabwe dominated by a strong United States dollar has the potential to reduce economic growth. This suggests that even though the use of the United States dollar as the main currency stabilized the economy from the hyperinflationary environment, its continued use is counterproductive in the long run.

Table-6. Long run estimation.

Dependent variable=LNGDP					
Per capita	1	2	3	4	5
Constant	6.2009 (0 .2595)	6.19295 (0 .2594)	6.1615 (0.2654)	6.8932 (0.2204)	6.7714 (0.2250)
LNCAPEX	0.05948 (0 .0392)	0.0653 (0.0395)	0.0224 (0.0430)	0.0314 (0.0283)	0.0325 (0.0309)
LNCONEX	0.2759*** (0 .0684)	0.2749*** (0.0683)	0.3140*** (0.0695)	0.1887*** (0.0510)	0.2177*** (0.0533)
LNINFL	0 .0194 (0.01167)	0.0199* (0.0117)	0.0203* (0.0113)	0.0057 (0.0086)	0.0080 (0.0085)
LNFDI	0 .01248 (0.0246)	0 .0122 (0.0244)	0.0089 (0.0236)	0.0809*** (0.0211)	0.0774*** (0.0214)
LNINT	-0.01997 (0.0246)	-0.0173 (0.0246)	-0.0150 (0.0248)	-0.0846*** (0.0208)	-0.0712 (0.0213)
Drght dummy		-0.0426 (0.0416)			-0.0513* (0.0291)
ESAP dummy			0.0684 (0.0598)		-0.0097 (0.0456)
Multi-currency dummy				-0.2980*** (0.0518)	-0.2862*** (0.0545)

Note: ***, **,* are levels of significance at 1%,5% and 10% respectively.
Source: Compiled by author.

5.6. Diagnostic Tests

Several diagnostic checks were done for serial correlation, heteroskedastic, and model specification of the long-run equation. The results are shown in Table 7 and indicate that there is no evidence of serial correlation as shown by the Breusch-Godfrey LM test. The Ramsey test shows that the model is correctly specified and does not suffer from omitted variables bias. Lastly, the Breusch-Pagan test results indicate that there is no problem of heteroskedasticity.

Table-7. Diagnostic tests.

Test	F-statistic	Probability
Breusch-Godfrey LM test	1.005	0.3161
Ramsey test	0.86	0.4743
Breusch-Pagan test	0.05	0.8244

Source: Compiled by author.

Stability tests for the model were done using the recursive CUSUM squared test with the result shown in Figure 1. The residual plot falls within the five percent significant boundaries which indicate that the model is stable.
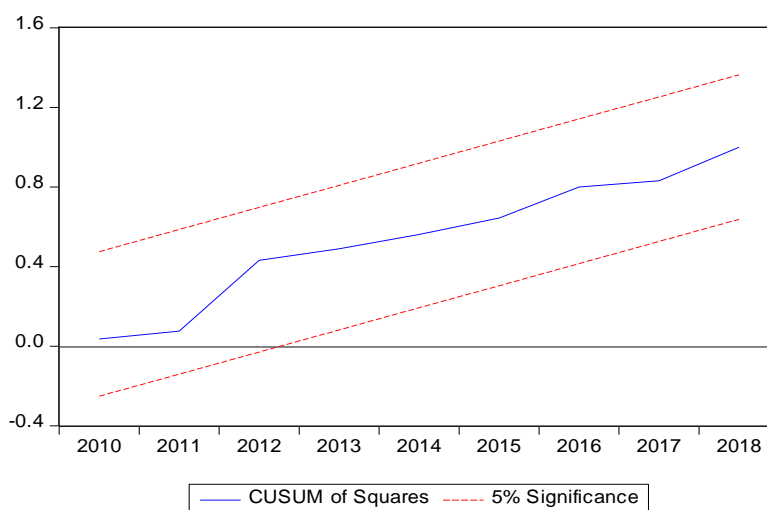
Figure-1. Stability tests.
Source: Compiled by the author using Stata 13.

6. CONCLUSION

The study examined the impact of government capital expenditure and consumption expenditure on economic growth in Zimbabwe during the period 1980 to 2018. The model was controlled using other economic growth variables like inflation (percentage of GDP), FDI (as a percentage of GDP) and real interest rates. To accommodate structural breaks during the period under the study, ESAP, drought, and currency reform were incorporated as dummy variables. The ARDL bounds test was used for cointegration, and causality tests were done using the Narayan Granger causality test. Short-run estimates and long-run estimates were calculated.

The study results revealed that there is a significant long-run relationship between government consumption expenditure and economic growth. These results support the Keynesian view that an increase in government spending leads to economic growth as far as increase in consumption expenditure is concerned. This means the government of Zimbabwe should be careful when implementing structural programs that reduce consumption expenditure as this may retard economic growth. After accounting for the currency reform of 2009 the coefficient of consumption expenditure dropped, indicating that the use of the multi-currency system poses some harm to the economy in the long run.

The government of Zimbabwe may need to consider using a weaker currency than the US dollar as the main trading currency, or adopt a local currency in the long run given the continual use of the US dollar will ultimately weaken the economy. Using the Granger causality test, economic growth was found to cause government capital expenditure both in the short and long run. However, no causal relationship was established running from capital expenditure to economic growth.

Looking at other macroeconomic variables in the study, inflation, foreign direct investments and real interest rates show some relationship with economic growth in the long run. This suggests that the government may need to strengthen its foreign policy to attract substantial investment from abroad. The results also support the use of monetary policy as an instrument of steering growth in Zimbabwe, as inflation has bidirectional causality with economic growth in the short-run and long-run. Real interest rates have a long-run negative relationship which requires the monetary authorities to promote favorable rates that stimulate investment.

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