International Journal of Science and Research (IJSR)
ISSN: 2319-7064
SJIF (2022): 7.942

An Econometrics Analysis of the Relationship between Real Gross Domestic Product and Different Sub-Expenditure Functions in Zambia (1999-2021)

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Abstract: ***This paper investigates the relationship between different types of government sub-expenditure functions and economic growth measured by Real Gross Domestic Product (GDP) in Zambia from 1999 to 2021. The study used the ARDL bounds -testing approach. The study is motivated by the dwindling economic growth reported by the Zambian Government over recent years, in the midst of ever increasing government expenditure. The ARDL bounds test showed that in the long run, social sector spending is positively correlated to economic growth, while spending on general public services and spending on economic affairs have no significant relationships with economic growth. In the short run, both social sector spending and spending on general public services contribute positively to economic growth. The study recommends that there is a need for government to prioritize spending in the social sector in order to attain economic growth as opposed to economic affairs expenditure which has no significant impact on economic growth. In practice, this will entail spending less on infrastructure projects and channeling funds to health education and social protection. In the short run, spending on both social sectors and general public services is critical for growth hence the sectors need to be prioritized.***

Keywords: Real GDP, Social Sector, Public Expenditure, Economic Growth

1. Introduction

1.1 Background of the Study

In pursuant of Sustainable Development, there is no doubt that public spending, its size and composition are important policy decisions that need to be made in the governance of any country. A national budget, which defines a countries resource mobilization and expenditure decisions, is the most powerful instrument used by any country. Government expenditure decisions impact greatly on the lives of the citizens and their ability to attain integral human development. The relationship between government spending and economic growth as measured by the Real Gross Domestic Product (GDP) has attracted widespread attention over the years as economists and politicians battle to establish the impact of government spending on economic growth[1]

As argued by Romer [2] while Keynesian economics dictates that government spending has a positive impact on economic growth, the Classicals and the Neoclassicals, postulate that government spending has a negative impact on economic growth. Some of the existing economic theory form Barro [3] and Friedman [4], also dictate that there exists a middle ground where government spending is postulated to have a positive impact on economic growth up to a certain optimal threshold, above which the impact of government spending on economic growth turns negative.

While there have been several empirical studies conducted on the relationship between public expenditure and economic growth, there remains two gaps. First, there are conflicting empirical conclusions on whether an increase in public expenditure is good for economic growth [5]. Secondly, uncertainty on which specific types of expenditure work to the advantage of economic growth. What is certain is spending requires revenue. Revenue is either granted, borrowed, or earned through taxation. In their quest for economic growth and development, governments particularly those in developing countries have resorted to spending more than the revenue that they generate.

1.2 Statement of the Problem

While governments can attempt to budget for expenditure within their domestic resource mobilization means, it often seems it is the targeted expenditure that determines the resource mobilization targets.Zambia in October 2022 announced an expansionary Budget of ZMK173 billion, for the year 2022, nearly 50% larger than the 2021 Budget at ZMK119.6 billion[6]. The objective of the budget was to bring economic growth, create jobs and take development closer to the people. The budget emphasized that it aimed at ensuring that GDP grows higher than the estimated population growth rate of 2.8%[6]. By implication, Zambia's public expenditure figures have grown from ZMK9 billion in 2007 to ZMK119.6 billion in 2022. This drive to spend more has also driven an increase in public debt. In 2011 Zambia's debt was US$3.51 billion [7], this amount increased significantly in the following years, by June 2021, it was reported by the government that the stock of debt officially stood at about US$26.44 billion [8]. Zambia Debt to GDP increased from 23.8 percent in 2014 to 141.3 percent by 2020 in GDP terms [9].

The importance of understanding the nature of impact, if any, of government spending on economic growth cannot be overemphasized in current times when domestic and global economic growth rates are depressed, and public debts are skyrocketing as governments borrow to increase their expenditure as they attempt to lift citizens out of poverty[1].

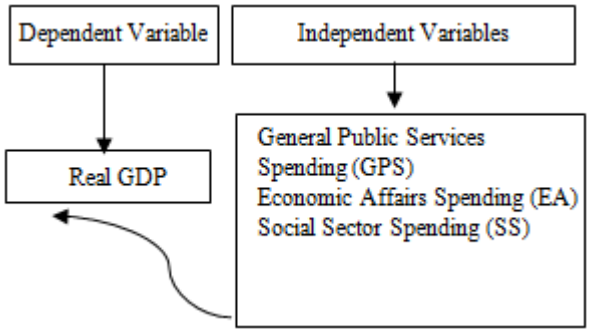
1.3 General Objective of the Study

The general objective of the study is to examine the effect of public expenditure in different sub-expenditures and what effect it means for economic growth.

1.3.1 Specific Objectives

1) To determine the effect of public expenditure in general public services on economic growth in Zambia.
2) To determine the effect of public expenditure in economic affairs on economic growth in Zambia.
3) To determine the effect of public expenditure in social sectors on economic growth in Zambia.

1.5 Conceptual Framework



2. Literature Survey

2.1 Theoretical Literature.

John Maynard Keynes, a British political economist, hypothesized that increases in government spending boosted growth by injecting purchasing power into the economy [10]. His theory, the Keynesian Theory, suggests that government spending has a positive impact on economic growth, in the sense that, the more a government spends, the higher the economic growth is, because of expansionary fiscal policy. Fundamentally, the premise of the theory is on the basis that the more government spends, the more production there would be in an economy leading to aggregate demand stimulation. This principally leads eventually to increased levels of GDP [2].

On the contrary, Classicals and Neo-classicals argue that government spending is bad for economic growth as it results into a "crowding-out effect", as spending by governments' displaces critical investments by the private sector due to resource constraints [11]. Essentially, the relationship between public spending and economic growth is negative. This perspective is born out of the Wagner Law("Law of Increasing Extension off State Activity"), hypothesized by a German political economist Adolph Wagner, which sugggests that it is actually economic growth that leads to an increase in public expenditure [12].

Little known are middle ground theorists, who argue that the relationship between government spending and economic growth is non-linear, as such, it has no optimal point below which government spending has a positive impact on economic growth and above which it has a negative impact on economic growth [3].

Ram [13] found a compromise between the Keynesian theory and the Classical and Neo-classical perspective, which is that expenditure on the core areas of government has positive effects on economic growth, while government spending on non-core areas has a negative impact on economic growth.

2.2 Empirical Literature

2.2.1 Empirical Findings Showing Positive Impact

A study by Yasin [14], examined the effect of government spending on economic growth in African countries from 1987-1997. The study focused on Sub-Sahara Africa, looking at 26 Countries. The examination used an aggregate production function, making use of fixed and random effect estimation techniques. The hypothesis test showed that government expenditure has a positive effect on economic growth.

Attari and Javed[15], explored the relationship between inflation, economic growth and disagreegated government expenditure(current expenditure and development expenditure), using time series data. Making use of the Auto Regressive Distributive Lag(ARDL) test, the study found that government expenditure has a positive effect on economic growth in both the long and shortrun.

Bose et al [16] made use of disaggregated government expenditure panel data from 30 developing countries from the period 1970 to the 1980s and found that government capital expenditure is positively and significantly correlated with economic growth. Current expenditure exhibited neutrality traits, as it was found to have no significant impact on economic growth.

Al-Fawwaz [17], examined the impact of government expenditure and growth in Jordan for the years 1980-2013 making use of linked multiple linear regression models and the OLS model. For both aggregate expenditure and current expenditure, the study found that these expenditures lead to economic growth.

Leshoro [18], studied the relationship between government spending and economic growth in South Africa using annual data covering the period from 1976 to 2015. The data in the study was disaggregated into investment spending and consumption spending, along with groups of control variables on economic growth in South Africa. The study made use of the Auto Regressive Distributed Lag (ARDL) estimation procedure. In both short and long run, the results of the study showed that government spending has a positive impact on economic growth in South Africa, irrespective of the government expenditure component under consideration.

Muyaba [1], made use of aggregated data from 1991 to 2015 to study the impact of public spending and economic growth in the Zambian context. Making use of the Auto Regressive Distributed Lag (ARDL) estimation procedure, Empirical finding from the study indicates that there is a positive and significant relationship between public expenditure and economic growth in Zambia both in the short-run and the long-run.

Ifarajimi & Ola [19] investigated the impact of government expenditure on economic growth from 1981 to 2015 using Dynamic Ordinary Least Squares. The findings obtained from the long run Dynamic OLS showed that government expenditure on administration, government expenditure on economic services and nominal exchange rate were significant and had the expected positive signs.

2.2.2 Empirical Findings Showing Both Positive and Negative Impact for Disaggregated Data

A study by Ghosh and Gregoriou [20], made use of panel data for 15 developing countries over a 28 year period to investigate the relationship between disaggregated government expenditure and economic growth. Making use of the Generalized Method of Moments (GMM) technique, the study found that current spending has positive and significant effects on the economic growth rate. While capital spending has negative effects on the growth rate..

With a focus on Nigeria, Nurudeen and Usman [21], empirically assessed the impact of disaggregated government spending on economic growth from 1979-2007. Government expenditure was disaggregated into capital expenditure, recurrent expenditures, expenditure on education, expenditure on transport and communication, and expenditure on health. Making use of cointegration and error correction methodology. The study found that that government expenditure on transport and communication, and on health, leads to an increase in economic growth in Nigeria. On the contrary, the results also revealed that government total expenditure, total recurrent expenditure and government spending on education have negative effect on economic growth.

Egbetunde and Fasanya [22], employed the ARDL bounds test to examine the impact of public expenditure in Nigeria for the period 1970 to 2010, making use of annual time series data. The bounds test suggested that the variables are bound together in the long run. This study disaggregated Government spending into two categories, capital and recurrent spending. The study found that the impact of public spending on growth is negative. Recurrent expenditure was found to have little significant positive impact on growth. The study further revealed that total government spending had an insignificant impact on economic growth in Nigeria.

Lupu et al. [23], assessed impact of disaggregated public expenditure on economic growth in 10 selected Central and Eastern European countries using 1995-2015 data. Using the ARDL approach, the results of the study revealed that public expenditures on education and health care have a positive impact on economic growth. On the contrary, expenditures on defense, economic affairs, general public services and social welfare have a negative impact

Okoye et al. [24] examined the relationship between government expenditure both aggregated and disaggregated and economic growth to determine the extent to which output growth in Nigeria is affected by government spending, during the period from 1981–2017. The findings showed a strong positive effect of lagged capital expenditure on growth. The study found significant negative effect of lagged current expenditure on economic growth. However, within the scope of the study, there is no evidence of long-run effect of government expenditure on economic growth.

Guandong and Muturi [25], examined the relationship and dynamic interactions between government expenditure and economic growth in South Sudan from 2006-2014, a small sample size owning to South Sudan being the youngest state. Making use of the random effect model the study found that public expenditure on infrastructure, productive sector and security are positively corelated to economic growth. On the other hand, the study found that public expenditure on social services has a negative impact on economic growth in South Sudan [30].

2.2.3 Empirical Findings Showing Negative Impact

A study by Landau [25], made use of panel data to empirically examine the relationship between government spending and economic growth in over 100 countries for the period 1961 to 1976. The study made use of disaggregated data on capital and investment spending. It was deduced from the study that there is an inverse relationship between government consumption expenditure and economic growth in the study countries.

Making use of panel data, Barro [26] carried out an empirical investigation to investigate the determinants of economic growth for a panel of 100 countries across different regions with data from 1960-1995. The hypothesis tests across variables showed that government expenditure on consumption and investment both have an inverse relationship on economic growth.

Schaltegger and Torgler [28] made use of government expenditure on operational budgets and capital budgets from local and central government in Switzerland from 1981-2001 to examine the impact of the two variables of economic growth. The findings of the study showed that from the time series data analysis the overall spending by the government as -well as government spending from operating budgets, has a robust negative impact on economic growth. The study concluded that in Switzerland, government spending from capital budgets has an insignificant impact on economic growth.

Ndambiri et al. [29], examined the determinants of economic growth in a panel using the Generalized Method of Moments (GMM) in 19 sub-Saharan African countries, in the period from 1982 to 2000. The study indicated that government expenditure leads to negative economic growth in the sample study countries.

A study by Hasnul [30], made use of the OLS technique to examine the fixed effects of government expenditure and economic growth in Malaysia for a 45 year period between 1970-2014. The study found that there is a negative correlation between aggregate government expenditure and economic growth in Malaysia. The results of the study confirmed that operating government expenditure and expenditure on the education, defense and healthcare sectors had no impact on economic growth in Malaysia.

Chirwa and Odhiambo [31] carried out a study to

empirically determine the long-run drivers of economic growth in South Africa from 1970 to 2013. Making use of the ARDL technique, the results of the study indicated that government spending had a significant negative impact on economic growth in South Africa, both in the short run and in the long run.

2.3 Lessons drawn from the literature review.

We note from the literature reviewed that both theoretical and empirical literature are split among positive, negative and insignificant impact. We note from the literature reviewed, the importance of studying disaggregated data which shows contrasting outcomes of different forms of government sub-expenditures, this supports the theory by Ram [13]. It is noted that the ARDL, GMM and OLS technique are most used in empirical studies on determining the relationship between public expenditure and economic growth.

3. Methodology

3.1 Source and Nature of Data

The study makes use of data covering a period between 1999 and 2021. The data on economic growth is proxied by the Real GDP, whose data is obtained from the World Bank Database [32]. Sub-government expenditures on general public services, social sectors and economic affairs are obtained from Zambia annual budget speeches and Estimates of Government Revenue and Expenditure (Yellow Books).

General Public Services(GPS) includes spending on; General Government Services, Legislation, Centralized Administration Services, the Executive, Defense and Public Order and Safety.

Economic Affairs spending includes; Infrastructure, Transport, Agriculture Forestry Fishing, Mining Tourism Fuel and Energy.

Social Sector spending includes, Health, Education, Recreation and Culture, Social Protection, Housing and Community Amenities and Environmental Protection.

Data was standardized to the United States Dollar from the Zambian Kwacha to reduce the effects of data volatility from inflation and currency depreciation.

3.2 Model Specification

The model for this study was adapted from the works of Ifarajimi & Ola [19].

We first consider:

$$GDP_t = \beta_0 + \beta_1 GPS_t + \beta_2 EA_t + \beta_3 SS_t + \mu_t \ldots.(1)$$

Where GDP_t denotes the Real Gross Domestic Product. GPS_t denotes expenditure of General Public Services, EA_t denotes expenditure on Economic Affairs and SS_t denotes expenditure of Social Sectors.

Equation (1) can be expressed in logarithmic form as:

$$lnGDP_t = \beta_0 + \beta_1 lnGPS_t + \beta_2 lnEA_t + \beta_3 lnSS_t + \mu_t \ldots(2)$$

Where the expected values of $\beta_1 \beta_2 \beta_3$ >considering finding by Muyaba [1] on the relationship between economic growth and government spending.

The Autoregressive Distributed Lag (ARDL) bounds testing approach to cointegration developed by Pesaran et al., [33], is used to examine the relationship amongst the public sub-expenditures and economic growth in Zambia. The ARDL representation of the empirical expression can be expressed as follows:

$$\Delta lnGDP_t = \beta_o + \beta_1 T_t + \sum_{i=1}^{n} \beta_{2i} \Delta lnGDP_{t-i} + \sum_{i=0}^{n} \beta_{3i} \Delta lnGPS_{t-1} + \sum_{i=0}^{n} \beta_{4i} \Delta lnEA_{t-1} + \sum_{i=0}^{n} \beta_{5i} \Delta lnSS_{t-1} + \alpha_1 lnGDP_{t-1} + \alpha_2 lnEA_{t-1} + \alpha_1 lnSS_{t-1} + \varepsilon_t \ldots\ldots(3)$$

In the equation the parameters $\beta_2, \ldots, \beta_3$ are short run multipliers and $\alpha_1 \ldots, \alpha_3$ are the long run multipliers. The white noise residual is denoted by ε_t. Once a long-run cointegrating relationship has been confirmed,stage two of the ARDL model includes the estimation of the error correction model (ECM)associated with equation (3) The ECM measures the speed of adjustment towards the long run equilibrium path estimated by the ARDL. The ECM is, therefore, expressed as follows:

$$\Delta lnGDP_t = \beta_o \Delta T_t + \sum_{i=1}^{n} \beta_{1i} \Delta lnGDP_{t-i} + \sum_{i=0}^{n} \beta_{2i} \Delta lnGPS_{t-1} + \sum_{i=0}^{n} \beta_{3i} \Delta lnEA_{t-1} + \sum_{i=0}^{n} \beta_{5i} \Delta lnSS_{t-1} + \rho ECM_{t-1} + \varepsilon_t (4)$$

4. Results

4.1Descriptive Statistics of the Variables

Table 1: Descriptive Statistics

	GDP	GPS	EA	SS
Mean	16441.74	1753.932	974.6944	1284.339
Median	19320.00	1642.514	670.7243	1445.196
Maximum	28050.00	3358.808	2115.261	2460.725
Minimum	3410.000	489.0000	312.0000	209.3400
Std. Dev.	8722.682	880.6144	580.4747	709.3402
Skewness	-0.336651	0.217704	0.463085	-0.103508
Kurtosis	1.619042	1.885412	1.796836	1.803814
Jarque-Bera	2.262031	1.372225	2.209334	1.412311
Probability	0.322705	0.503530	0.331321	0.493538
Sum	378160.0	40340.44	22417.97	29539.79
Sum Sq. Dev.	1.67E+09	17060600	7412920.	11069598
Observations	23	23	23	23

Table 1 above presents the summary of the descriptive statistics informing the study. We can note that the data presented in the table above shows high levels of consistency as the mean and median are within the range of the minimum and maximum values of the series. The Kurtosis shows that all variables under considerations were platykurtic. All variables being considered neared normal

skewness. Considering that the Jarque-Bera test for all variables are above 5% level of significance the hypothesis which states that the residuals are normally distributed is not rejected.

4.2 Stationarity test Results

Considering the potential stochastic trends that macroeconomic data often poses, it was important to conduct stationarity tests on the data to avoid spurious regression results. Determination of the order of integration of the variables was extremely important as the ARDL technique is sensitive to I(2) variables. The study made use of the Augmented Dickey Fuller test for this purpose. The results are presented in Table 2 below. All the variables are integrated of order one, I(1); essentially they become stationary at first difference. Considering that all the variables are purely I(1), the ARDL was a valid test to be used for the study.

Table 2: Stationarity test results

Variables	Model	Level/Difference	Critical Value 5%	ADF	Decision
lnGDP	Intercept	Level	-3.004861	-2.130172	I(1)
		First Difference	-3.012363	-3.355920	
	Trend and Intercept	Level	-3.632896	-0.391189	
		First Difference	-3.644963	-4.153811	
lnGPS	Intercept	Level	-3.012363	-1.591895	I(1)
		First Difference	-3.029970	-3.532239	
	Trend and Intercept	Level	-3.632896	-2.788920	
		First Difference	-3.673616	-4.025239	
lnEA	Intercept	Level	-3.004861	-1.221165	I(1)
		First Difference	-3.012363	-4.054128	
	Trend and Intercept	Level	-3.632896	-1.171814	
		First Difference	-3.644963	-4.068504	
lnSS	Intercept	Level	-3.004861	-2.522321	I(1)
		First Difference	-3.012363	-3.586298	
	Trend and Intercept	Level	-3.632896	-0.720970	
		First Difference	-3.673616	-4.730776	

4.3 Optimal Lag Selection and Cointegration Test Results

Prior to estimating the ARDL, determination of the ARDL is of paramount importance. The maximum lag length for the study was chosen by the Akaike Information Criterion (AIC), considering the regressors that had been included in the economic growth model, the maximum lag length chosen is 2. The ARDL growth model obtained for the ARDL is (1,2,2,2), with an adjusted R-squared of 0.995615. Table 3 below shows the VAR Order Selection Criteria

Table 3: Optimal Lag Length

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-2.999084	NA	2.29e-05	0.666579	0.865536	0.709758
1	60.57656	96.87718	2.56e-07	-3.864435	-2.869651	-3.648541
2	90.05207	33.68629*	8.65e-08*	-5.147816*	-3.357206*	-4.759208*

Table 4: ARDL Bounds Test Results

Dependent Variable		Function		Value (F-statistic)	Cointegration Status
Real GDP		(GDP|[GRS, EA,SS)		8.936***	Cointegrated
Null Hypothesis: No long-run relationship exists Asymptotic Critical Vales for k=3 (Pesaran et al.,[33], Case I, p.300)					
1%		5%		10%	
I(0)	I(1)	I(0)	I(1)	I(0)	I(1)
4.29	5.61	3.23	4.35	2.72	3.77

We note in table 4 above that the compound statistic for the bounds test is based on Case I:no intercept and no trend as the inclusive deterministic components. As noted in table 4, the F-statistic is 8.936, higher that the upper critical bound, and is statistically significant at the 1%. Essentially, there is a cointegrating relationship and there exists a long run relationship between the Real GDP and the different sub-expenditures under consideration.

Table 5: Estimated Results (Short and Long-run Coefficients)

Panel 1:-Estimated Long-Run Coefficients (Elasticities) [Dependent Variable : Log if Real GDP $ln(GDP)_t$]				
Regressor	**Coefficient**	**Standard Error**	**t-statistic**	**Probability**
$ln(GPS)t$	-0.289528	0.604955	-0.478594	0.6425
$ln(EA)_t$	-0.721032	0.508739	-1.417291	0.1868
$ln(SS)_t$	1.520735***	0.605954	2.509653	0.0309
Panel 2:- Estimated Short-Run Coefficients(Elasticities) [Dependent Variable: change of Real GDP $\Delta\ ln(GDP)_t$				
$\Delta ln(GPS)_t$	0.463208***	0.118598	3.905687	0.0029

$\Delta ln(EA)_t$	-0.103552	0.070353	-1.471891	0.1718
$\Delta ln(SS)_t$	0.515582***	0.083341	6.1863399	0.0001
ECM_{t-1}	-0.306962***	0.045029	-6.817001	0.0000

R-Squared	0.995612	Adjusted R Squared	0.991224
S.E of Regression	0.060395	F-Statatistic	226.8913
Residual Sum of Squares	0.036476	DW- Statistic	2.293635
Akaike Info. Criteria	-2.470135	Schwarz-Bayesian Criteria	-1.923004

Note: *** 1%level of significance; ** 5% significance level; 10% significance level.

In Table 5, panel 1 shows the long-run coefficients, while panel 2 shows the short-run coefficients of the estimated economic growth equation. As can be noted in panel 2, the equilibrium error correction coefficient is estimated as -0.31 and is statistically significant at 5% level of significance. This shows the speed of adjustment from shortrun to long run. The ECM value is within the range of 0 to -1, as such implies that real GDP in Zambia converges monotonically toward its long-run equilibrium path. Essentially, this confirms the long run equilibrium relationship between the real GDP and the regressors in the model. The regression results as shown in the table for the underlaying ARDL model reveal a good fit represented by R-squared at 0.995% and an adjusted R-squared value of 0.9912.

Panel 1 of table 5 shows the long run coefficient estimates for the Zambia economic growth equation. The results suggest that the only key determinant that reveals a significant relationship with economic growth is social sector spending (SS). Suggesting that a 1% increase in social sector spending leads to a 1.5% increase in the Real GDP. These findings are consistent with the findings of Lupa et al [23] and by Ghosh and Gregoriou [20].

As noted in the panel 1 of table 5, general public service spending and spending on economic affairs take the unexpected negative signs, however the results are not statistically significant, hence there is no long run relationship between spending on general public servces and economic affair spending. These results are consistent with the findings of Shaltegger and Torgler [28] and the underlaying arguments of Egbetunde and Fasanya [22] and Okoye et al., [24] on the relationship between economic growth and public spending in the long run.

In the short run, as noted in table 5 panel 2, there is a significant positive relationship between spending on general public services and social sector spending. The findings show that, in the short run, an increase in spending on general public services by 1% leads to an increase in the real GDP by 0.46%. On the other hand, an increase in the social sector spending by 1% leads to an increase in the real GDP by 0.52%. Both of these results are statistically significant at the 1% level of significance. The significance and positive sign taken by spending on general public services in the shortrun, while the opposite stands in the long run is consistent with the theory postulated by Barro[3] and Friedman[4]

On the other hand, economic affairs spending did not take the expected positive sign and the result was not statistically significant. Hence, there is no short-run relationship between spending on economic affairs and economic growth as measuref by real GDP.

4.3 Post Diagnostic Tests

Lastly, to determine the reliability of the results, diagnostic tests were run on the data. These tests include; the Breusch-Geofrey test for serial correlation; Breusch-Pagan-Geofrey test for Heteroskedasticity, the ARCH test for Heteroskedasticity, Residual Test for Normality and CUSUM and CUMUM of Squares test.

Table 6: ARDL-VECM Post Estimation Diagnostic Tests

Test Statistic	Results
Breusch-Godfrey Serial Correlation LM Test F(2,8)	0.464149(0.6646)
Breusch-Pagan-Godfrey Test: No Heteroskedasticity F(10,10)	0.844469(0.6028)
Ramsey RESET Test: Functional Form F(1,9)	0.016573(0.9004)
ARCH Test: Heteroskedasticity F(2,16)	0.400904(0.6763)

The results for the tests shown in Table 6 above suggest that we cannot reject the null hypothesis for all post diagnostic tests at the 5% significance level. This essentially implies that the ARDL model for Zambia's growth equation is correctly specified, and the parameter estimates are not biased.

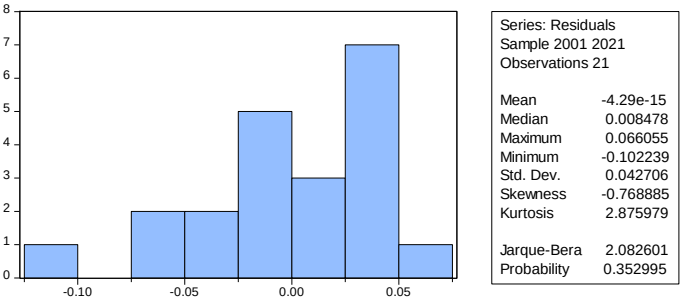


Figure 1: Test for Residuals

As we note in Figure 1 above, the residuals are normally distributed with a Jarque-Bera statistic of 2.0826 corresponding to a probability value of 0.35299 which is greater than 0.05, hence the residuals are normally distributed.

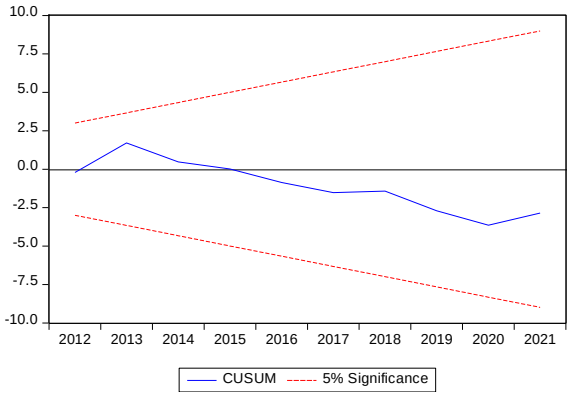


Figure 2: Plot of Sum of Recursive Residuals- Zambia

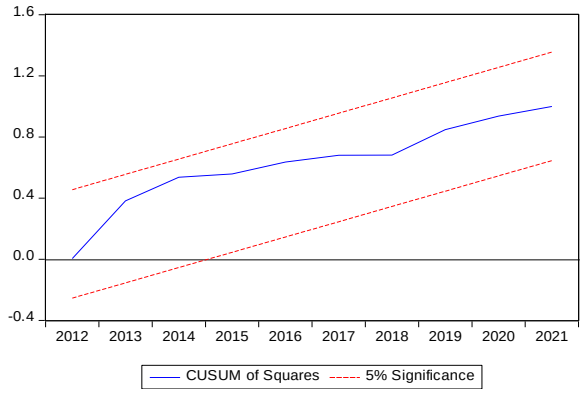


Figure 3: Plot of Cumulative Sum of Squares of Recursive Residuals-Zambia

As illustrated in figure 1 the CUSUM and well as the CUSUMSQ illustrated in Figure 2 are within the 5% critical lines and the results of the regression are as such suggestive of parameter and variance stability.

5. Conclusion

This paper empirically examined the effects of sub-public expenditures on economic growth proxied by the Real Gross Domestic Product in Zambia for a period of 1999-2021. A period in which Zambia went from being pardoned of its huge debt stock upon being categorized as aHighly Indebted Poor Country (HIPC) in 2000 to having a debt to GDP ratioof 141.3% in 2021. The sub-government expenditures included in the study are; general public services, economic affairs expenditure and social sector spending. Having carried out a Augmented Dicky Fuller Unit Root Test on the data and determining the optimal lag length using the Akaike Information Criteria, the study employed the Autoregressive Distributed Lag (ARDL) modeling approach to estimate both the short-and long run elasticities of the selected determinants. The study revealed that social sector spending is positively correlated to Real GDP growth in both the short run and long run while spending on general public services is positively correlated to Real GDP growth in the short run. These results have very important policy implications in both the short and long run. In the short run, it is recommended that the Government of Zambia increase the share of social sector spending in its national budget. In essence, this would entail spending more resources on education, health, social welfare programs as opposed to spending on economic affairs spending like infrastructure on commercial activities which have over the year been the recipient sectors of money accumulated form creditors. The study showed these have no significant impact on economic growth in both the short run and long run. From the study, it is further recommended that more resources be channeled into government and local authority system functionalities as they form most of general public services and positively contribute to economic growth in the short run.

6. Further Scope

This study built on the work of Muyaba [1], who recognized the need for a disagreegated study on the relationship between sub-expenditures and growth in Zambia. This study recommends further efforts of disagreegating public expenditures and studying their individual effects on economic growth.

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