Effects of Public Expenditure on Gross Domestic Product in Zambia from 1980-2017: An ARDL Methodology Approach

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Abstract: The paper explored the fundamental changes in public expenditure and the resulting effect on the gross domestic product using an ARDL approach for time series data over the period 1980-2017. The control variables included foreign direct investment and current account balance. The objective was to determine changes which had occurred with regard to the performance of GDP since 1980. A quantitative method approach was used to ascertain the relationship between the variables and analysed using the E-views 9 software. Cointegration results showed a long run relationship between GDP and government expenditure. In this regard, changes in government expenditure have a strong converse effect on GDP. Government expenditure, which has increased significantly in the past decade, is seen to have had negative effects both in the short run and long run. Contrary to theory, increased government expenditure may not be ideal for growing the Zambian economy. This could be due to the allocation of this public expenditure, i.e. the 2018 Budget had 24% of the expenditure directed to economic activities. Thus it is recommended that government practice increased fiscal discipline or reallocated resources as their expansionary fiscal policies are not yielding the intended results. Additionally, policies to promote private investment may be more beneficial for the Zambian economy. On the other hand, increased investment is also recommended with government encouraging more investment promoting policies as FDI is observed to have a positive impact in the short run though insignificant in the long run. These should ensure more investors are encouraged to stay longer and the impacts/externalities of their investments be accrued to the nationals to ensure long run benefits. The Zambian government should also ensure that the country diversifies its export base and enhances its external debt management to ensure positive and consistent impact of Current Account Balance in the long run.

Keywords: *Cointegration, Performance, Economic Growth, Government Expenditure, Investment*

1. Introduction

According to Osei-Hwedie (2003), Zambia at independence was among the richest countries in Sub-Sahara Africa. With copper, the countries major export, enjoying high rates on the market, the country had the necessary resources for development. Copper mining accounted for 90 per cent of export earnings for the country. The leadership was committed to the promotion of economic development and restructuring the economy. The government, therefore, undertook rapid nationalisation of the economy shortly after independence, paving the way for state-led development. State intervention in the economy was set in motion with the 1968 Mulungushi Economic Reforms that allowed the government to acquire 51 per cent shares from private retail, transportation, and manufacturing firms, Turok (1989). Nationalisation enabled the state to control 80 per cent of the economy through parastatals involved in mining, energy, transport, tourism, finance, agriculture, trade, manufacturing and construction. In this regard, the state became the engine of growth, Republic of Zambia (2000). Gnynne (1996) highlighted that State-led industrial development was possible because of the availability of copper revenues that were channelled to industrial transformation and rural development.

The government relied on both monetary and fiscal policies to promote growth in the manufacturing sector, Osei-Hwedie (2003). The import substitution strategy was clearly stipulated in the national development plans. The state, through the National Commission for Development Planning, formulated four national development plans between 1964 and 1991. The development plans had several objectives which included; diversification away from copper mining to promote balanced economic development and rural development, investment in social and physical infrastructure. Domestic ownership through the reduction of dependency on Southern Rhodesia (now Zimbabwe) routes to the world market by building the Tanzania – Zambia Railway (TAZARA) the fourth objective was to work on employment creation in the country. Eventually, there were reasonable growth rates in the 1960s and early 1970s primarily due to high copper production and prices and increases in maize and manufacturing output, as well as increases in numbers of social facilities and physical infrastructure, Republic of Zambia (2000).

However, a lack of investment in the mining sector eventually led to low levels of copper output. The country started experiencing high levels of unemployment as it was mostly dependent on mining Osei-Hwedie (2003). The Zambia Advisor Blog (2016) stated that under Movement for Multiparty Democracy (MMD) government, the Zambian economy underwent massive economic reforms. State industries including the huge state-owned, Zambia Consolidated Copper Mines were privatized and sold as separate entities. The privatization process, in turn, brought the much needed foreign investment in the country but a lot of companies which were a drain on national resources such as Zambia Airways and United Bus Company of Zambia were liquidated, causing the levels of unemployment to rise. The new government pushed liberal policies supported by the IMF and World Bank SAP, in anticipation of a more efficient private sector led economy, Bank of Zambia (2015). World Bank (2003) pinned Zambia's Growth Domestic Product (GDP) in 2012 at USD 22.38 Billion, with a GDP Growth of 6.4 %. According to the World Economic Forum's 2014-2015 "The Global Competitiveness", Zambia is the 8th most competitive economy in Sub-Saharan Africa, out of 33 economies analysed.

Background to the Study: Fagernas and Roberts (2004) showed that Zambia's terms of trade had suffered an enduring decline under the dual influence of a collapse in copper prices and the first oil crisis around 1975. Between 1970 and 1980 the net barter terms of trade fell by 66% and fell a further 7% between 1980 and 1990. Copper production reached a plateau and began to decline for lack of investment following progressive nationalisation thereby falling from 700,000 metric tonnes per annum in the early 1970s to 400,000 metric tonnes per annum in 1990-1991. The government made episodic attempts to curb public expenditure in order to reduce persistent fiscal deficits and overcome mounting balance-of-payments problems. These led to a collapse in real public service wage rates and low public investment expenditure resulting in real economic growth between 1975 and 1990 being a mere 0.7% per annum. In the fevered pre-electoral atmosphere of 1991 restraint on public expenditure was abandoned. Public expenditure leapt from 28% of GDP in 1990 to 60% in 1991, giving rise to a fiscal deficit of 45% of GDP.

This was financed by domestic borrowing equivalent to 25% and foreign financing equivalent to 20% of GDP, Rakner (2003). According to the World Bank (2016), Zambia's GDP has been growing substantially since the year 2000. Copper output in Zambia has increased steadily since 2004, due to higher copper prices and the opening of new mines. Furthermore, the maize harvest was good in 2005, helping boost GDP and agricultural exports. During the financial crisis period in 2007-2009, GDP growth rate for the country slowed due to a decrease in the demand for the major export product copper. Unemployment increased causing low productivity in the manufacturing and mining sectors. Agricultural inputs were also inhibited during the recession putting more strain on economic growth, Bloomberg (2015). Zambia is faced with growing risks to macroeconomic stability as its deficit has risen to 6.6 percent of GDP. With growing debt levels, the country is vulnerable to a downturn in copper prices. There has been some success in diversification through the expansion of commercial agricultural production and exports as well as increased tourism but growth remains dependent on the demand for services and construction.

Figure 1: Change in Zambia's Gross Domestic Product, 2000-2012
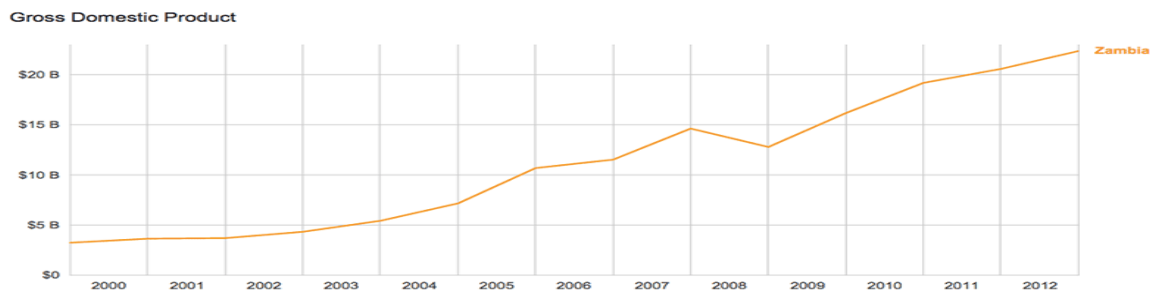
Source: Zambia Economy, World Bank (2016)

According to the World Bank (2016), Zambia's GDP has been growing substantially since the year 2000. Copper output in Zambia has increased steadily since 2004, due to higher copper prices and the opening of new mines. Furthermore, the maize harvest was good in 2005, helping boost GDP and agricultural exports. During the financial crisis period in 2007-2009, GDP growth rate for the country slowed due to a decrease in the demand for the major export product copper. Unemployment increased causing low productivity in the manufacturing and mining sectors. Agricultural inputs were also inhibited during the recession putting more strain on economic growth, Bloomberg (2015).

Exports: The Bank of Zambia (2015), highlighted that in 2014 Zambia exported $12.6B, making it the 83rd largest exporter in the world. During the last five years, the exports of Zambia have increased at an annualized rate of 16.1%, from $5.96B in 2009 to $12.6B in 2014. The most recent exports are led by refined copper which represent 64% of the total exports of Zambia, followed by raw copper, which account for 13.4%. Zambia's economy has mostly been dependent on mining with exports usually comprising of copper. Changes in the global economy such as the price of copper impact on the economy heavily. The main countries that the country exports to include, Switzerland, China, Democratic Republic of Congo and Australia, World Bank (2015). According to the International Monetary Fund (2016), each of these countries accounts for 44.7%, 18.5%, 8.3% and 3.6% respectively of total Zambian exports.

Figure 2: An Overview of Zambian Exports

Source: Central Statistical Office, Zambia

However, according to the Central Statistical Office (2016), exports in Zambia decreased to 5,274 ZMK Million in February from 6,238 ZMK Million in January of 2016. Exports in Zambia averaged 2,573.62 ZMK Million from 2003 until 2016, reaching an all-time high of 8,139.30 ZMK Million in November of 2015 and a record low of 271 ZMK Million in January of 2003, CSO (2016).

Imports: The Ministry of Finance and National Planning (2006) reported that Zambian imports grew faster than exports by approximately 13% in the years 2000-2004. The size of the trade deficit increased steadily from 34,104 ZMK in 2000 to 2,668,169 ZMK in 2004. The increase in the size of the deficit was partly due to higher demand for imports, as required by the refurbishment of the country's privatised mines, and the high costs of imports such as machinery, crude oil, chemicals, iron and steel, Ministry of Commerce (2005). Zambia's trade with its primary trading partner, South Africa, grew by 31% over the period. South Africa is

the main source of Zambia's current account deficit as it has replaced Asia and Europe as the primary source of intermediate inputs, machinery and vehicles imported into the country. Compared to the rest of SADC, South Africa accounts for almost half of Zambia's imports and exports markets, Ministry of Commerce (2005).

Figure 3: An Overview of Zambian Imports

Source: Central Statistical Office, Zambia

Based on the Central Statistical Office (2016), report, Zambian imports increased to 7756 ZMK Million in June from 5494 ZMK Million in May of 2016. Imports in Zambia averaged 2623.15 ZMK Million from 2003 until 2016, reaching an all-time high of 9553 ZMK Million in November of 2015 and a record low of 518 ZMK Million in September of 2003, CSO (2016).

Fiscal Policy: According to the Country Profile-Zambia (2015), the country recorded a budget deficit of 1.5 per cent of GDP in the first quarter of 2015. This was due to reduced revenue from low mineral royalty inflows and the non-receipt of grants, Bank of Zambia (2015). The budget deficit for 2015 increased to 6.9 per cent of GDP, up from the projected 4.6 per cent, due to declining copper prices, depreciation of the kwacha and a rise in interest rate payments for fuel and crop purchases, Ministry of Finance (2015). Fiscal deficits from 2010-2014 ranged from 2.2 to 5.7 per cent of GDP. One if the supreme reform strategy which the government of Zambia used as a reform strategy was the public financial reform strategy for 2013-2015, which aims to create more fiscal space, improve public expenditure and financial management, expand the tax base and enhance tax administration, Ministry of Finance (2014). The study by Chileshe and Kafula (2015), showed after the 2001 general elections, the government introduced national planning through the introduction of five national development plans which anchored government's fiscal policy objectives. In order to anchor the five-year development plans. Since 2005, Zambia's long term fiscal policy objectives have been enshrined in a document called the "Vision 2030" and operationalized through several five year national development plans, Chileshe and Zgambo (2014) the five year national development plans and annual budgets are used as vehicles for the achievement of the objectives in the Vision 2030.

2. Literature Review

Introduction: The literature review will attempt to provide the theoretical foundations and empirical review upon which this paper is based. Firstly, the paper will analyse the theories that form the foundation of thought in regard to analysing the relationship between public expenditure and gross domestic product. In addition, it will look at the evidence from empirical works done by other scholars. Lastly, it will provide a conceptual framework.

Theoretical Framework: The study will look at three theories in trying to analyse the effect of public expenditure on economic growth: Classical Theory, Keynesian Theory and Wagner's theory (Law).
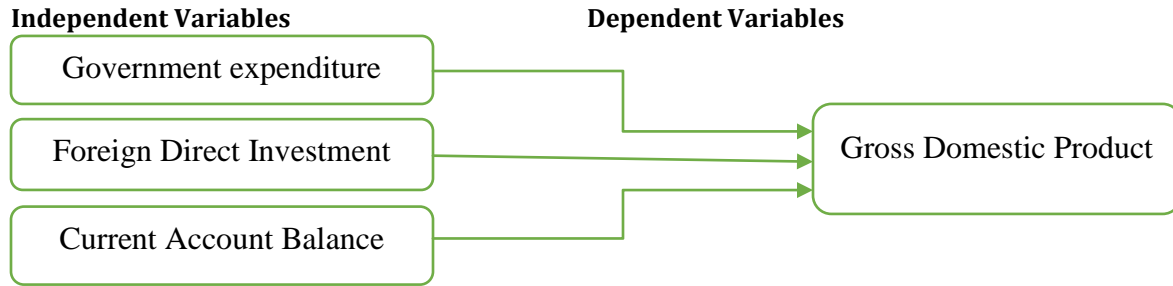
Keynesian Theory: Following the 1929-30 Great Depression, the classical economic argument for governments' minimal level of involvement in the economy did not seem to hold. This brought about the development of Keynesian economics which is an economic theory of total spending in the economy and its effects on output and inflation. Keynesian economics was developed by the British economist John Maynard Keynes during the 1930s in an attempt to understand the Great Depression. Keynes advocated for increased government expenditures and lower taxes to stimulate demand. Keynes believed that when governments increase public spending, it gives individuals' purchasing power and producers will produce more, creating more employment and overall output. This is the multiplier effect that shows causality from public expenditure to national income. However, it should be noted that Keynes developed this theory during depression and therefore, the conditions that were prevailing at that point were such that logical economic principles were not holding. Keynes equally acknowledged that government intervention was necessary as a short term cure and in the long-run, the economy should have minimal government intervention.

Wagner's Theory: Wagner (1883) predicted that economic growth would be accompanied by an increase in state activity (growth of government spending). A formulation of Wagner's "law", mentioned by Bird (1971), might run as follows: as per capita income rises in industrializing nations, their public sectors will grow in relative importance. Thus, the causality according to Wagner's law is running from economic growth to government spending. Further, Wagner's hypothesis emphasizes that, in the process of economic development, government economic activity increases relative to private economic activity. Wagner offers three reasons why this would be the case. Firstly, with economic growth industrialization and modernization would take place, which will diminish the role of public sector for private one. Secondly, the rise in real income would lead to more demand for basic infrastructure particularly education and health facilities. Wagner asserts, "it is the government who provide these facilities more efficiently than private sector". Thirdly, to remove monopolistic tendencies in the country and to enhance economic efficiency in those sectors where large amounts of investment are required, government should come forward and invest in those particular areas that will again increase public expenditure (Bird, 1971).

Empirical Review: There was little empirical literature available on public expenditure prior to post-era 1929-30 Great Depression where economies underwent rising public expenditure. Subsequently, the post-war economic reconstruction and public welfare programmes become an interesting subject area for many economists to understand the effect of public expenditure on economic growth. This required a rigorous theoretical approach to public expenditure to be developed. It should be noted that empirical results have shown contrasting results on the effects of government expenditure on gross domestic product. Balaj and Lani (2017) analysed the Impact of Public Expenditure on Economic Growth of Kosovo. Their econometric model was built on two economic theories, Wagner and Keynesian. The results obtained from their study showed that there is a positive relationship between public expenditure and economic growth. However, their findings revealed that public expenditure does not have a direct impact on economic growth, but can have a stimulating effect on the economic growth process. Garba and Abdullahi (2013) investigated the causal relationship between public expenditure and economic growth in Nigeria and used Johansen co-integration approach and the Granger causality test.

Their results indicated a significant long-run positive relationship between public expenditure and economic growth in Nigeria. Their study also found that there is a positive long-term relationship between population growth rate and economic growth. Katrakilidis and Tsaliki (2009) examined the relationship between spending and economic growth by using annual data of the Greek economy during the period 1958-2004. They applied recent developments in the theory of cointegrated processes (ARDL) and obtained empirical results indicating that the causality runs from income to government expenditures, which is in accordance with Wagner's law. Conversely, they found that causality runs from expenditures to income, which supports the Keynesian hypothesis and claims that their study brought new evidence of two-directional causality between expenditures and income for the case of Greece. Akitoby et al. (2006) examined the short- and long-term behaviour of government spending with respect to output in 51 developing countries using an error-correction model. They find evidence that is consistent with the existence of cyclical racketing and voracity in government spending in developing countries, resulting in a tendency for government spending to rise over time.

Conceptual Framework

Independent Variables   **Dependent Variables**

Government expenditure

Foreign Direct Investment   Gross Domestic Product

Current Account Balance

The study applies an Autoregressive Distributed Lag (ARDL) model to analyse time series data spanning a period of 1980 – 2017. The data comprises yearly Zambian data for GDP growth rate, Government expenditure, Foreign Direct Investment (FDI) and the Current Account Balance (CAB). The data was retrieved from the United Nations Conference on Trade and Development (UNCTAD) and International Food Policy Research Institute (IFPRI) databases. The aim is to understand the behaviour of changes in public spending, with other control variables based on the Keynesian model, on Gross Domestic Product (GDP) both in the long run and short run.

The model specification is stipulated as follows:
$$GDP\ growth = f(Government\ expenditure, FDI, Current\ Account\ Balance\ ) + \varepsilon \quad (1)$$
$$GDPr_j = \beta_{00} + \sum_{i=1}^{k} \beta_1 \Delta GDPr_{t-ij} + \sum_{i=0}^{k} \beta_{2i} \Delta GOVT\ exp_{t-ij} + \sum_{i=0}^{k} \beta_{3i} \Delta FDI_{t-ij} + \sum_{i=0}^{k} \beta_{4i} \Delta CAB_{t-ij} + \alpha_1 GOVTexp_j + \alpha_2 FDI_j + \alpha_3 CAB_j + e_t \quad (2)$$
Where:
GDPr = Gross Domestic Product growth rate
GOVT exp= Government Expenditure
FDI= Foreign Direct Investment
CAB = Current Account Balance
K = is the maximum lag of a regressor in the model
α, β = Parameters
ε = error term

From the ARDL model above, a long run model and short-run model (Error Correction Model) was estimated. This is on the basis of the Bounds test showing existence of a long run relationship. This approach is much easier than the Johansen cointegration as it uses a single equation approach and can, therefore, be used on smaller sample sizes. The long run and short run model are specified in equation 3 and 4 respectively below;
$$\Delta GDPr_t = \alpha_{01} + \sum_{i=0}^{k} \gamma_{1i} \Delta GDPr_{t-1} + \sum_{i=0}^{k} \alpha_{1i} \Delta GOVTexp_{t-i} + \sum_{i=0}^{k} \alpha_{2i} \Delta FDI_{t-i} + \sum_{i=0}^{k} \alpha_{3i} \Delta CAB_{t-i} + \delta EC_{t-1} + U_{t2} \quad (3)$$
Where:
ECT = Error Correction Term
All other variables are defined as before
$$GDPr_t = \alpha_0 + \alpha_1 GOVTexp_j + \alpha_2 FDI_j + \alpha_3 CAB_j + U_{t2} \quad (4)$$

To ensure reliable estimators, the ARDL model was subjected to diagnostic testing. These included the Breusch-Pagan test for autocorrelation and Whites Heteroscedasticity test for heteroscedasticity testing. The Jarque-Bera was used to test for normality of the residuals and finally a Cusam test to ensure stability of the model.

4. Results and Discussion

Table 1: Unit Root Tests

Variable	ADF		KPSS		Summary
	Statistic at Level (p-value)	Result	Statistic at level (5% critical value)	Result	
GDP	-5.19936* (0.0008)	I(0)	0.105 (0.146)	I(0)	I(0)
Government Exp (Govt_x)	-5.11233* (0.0010)	I(0)	0.095 (0.146)	I(0)	I(0)
FDI	-4.824* (0.0022)	I(0)	0.119771 (0.146)	I(0)	I(0)
Current Account Balance (CAB)	-2.118725* (0.00344)	I(0)	0.457 (O.463)	I(0)	I(0)

Note: I (1), indicates a unit root at levels and stationarity after first difference *denotes significant at 5% level and the rejection of the null hypothesis

The results in Table 1 show that all the variables of interest are stationary at levels. The ADF test was able to reject each null hypothesis of no stationary at 5% as observed from the p-values. Similarly, the KPSS was unable to reject any of the null hypotheses of stationary as KPSS statistic observed to be lower than the 5% critical value. To allow for a long run and short run estimation, the ARDL model was used. To ensure the viability of this model, the bounds cointegration test is first presented.

Table 2: ARDL Bounds Test

F statistic			5.2748713
Critical values		I0	I1
	10%	2.97	3.74
	5%	3.38	4.23
	1%	4.3	5.23

The Bounds test in Table 2 indicates the presence of cointegration as expected. The F-statistic is greater than the upper bound at 10%, 5% and 1% indicating that the null hypothesis of no long-run relationship is rejected. Having verified the existence of a long run relationship between the dependent and independent variable, the long run model is shown below in Table 3.

Table 3: Long Run Model

Variable	Coefficient	T-statistic	P-value
Govt_Exp	-0.94422*	-2.594272	0.0183
FDI	1.657286	1.591175	0.1290
CAB	-0.116239	-0.834115	0.4151
Trend	-0.276561	-1.242937	0.2298

* denotes the statistically significant coefficients

Table 3 indicates that only government expenditure has a significant impact on the growth rate in the long run. However, this impact is noted to be negative which may be contrary to expectations and to previous studies such as Muyaba (2016). This also goes against the Keynesian theory that suggests increased government expenditure will have a positive impact on economic growth. Foreign direct investment has a positive impact as expected whilst the current account balance has a contrary, negative impact. However, both FDI and the current account do not have a significant impact on economic growth in the long run. The R-squared showed how well the model fits it's the data, specifically, 89% of changes in economic growth are

explained by explanatory variables. To get a picture of changes in GDP in the short run, the Error correction model is estimated in Table 4 below.

Table 4: Short Run Model

Variable	Coefficient	T-statistic	P-value
ECT(-1)	-0.519067*	-5.677616	0.0000
D(GDP(-1))	-0.554758*	-4.313223	0.0004
D(GDP(-2))	-0.305082*	-2.319577	0.0323
D(GDP(-3))	-0.269714*	-2.813015	0.0115
D(Govt_exp)	-0.169750*	-3.636914	0.0019
D(Govt_exp(-1))	0.177382*	3.031643	0.0072
D(Govt_exp(-2))	0.150246*	2.545659	0.0203
D(FDI)	0.37185*	2.089709	0.0511
D(FDI(-1))	-0.634135*	-3.288530	0.0041
D(FDI(-2))	-0.576605*	-3.327873	0.0037
D(CAB)	0.128317*	2.443381	0.0251
C	-0.519067*	-5.677616	0.0000
R-squared = 0.908318	F-statistic (p-value) = 0.00000		

*D indicates a differenced variables, ECT indicates the Error Correction Term and C, the intercept term.

The short run model indicates that all the variables of interest have a statistically significant impact on the economic growth rate of Zambia. Government expenditure in the short run, as in the long run, has a negative impact on the economy contrary to expectations. FDI, on the other hand, has a positive impact on Zambia's economy in the short run. This is expected as investors will upon investing pump money into the economy, employ several citizens and among other things, create an environment for other businesses to grow, inevitably increasing output in the short run. The current account balance has a positive impact on the economy of Zambia as a surplus inevitably indicates increases output as it suggests increased exports over imports. This may be related to the impact of FDI as increased investment will increase CAB also in the short run. Generally, the short run model also reflects a good fit with the explanatory variables explaining 90.8% of changes in the growth rate. This R-squared value is also statistically significant as the F Statistic has a very low p-value. The Error correction term (ECT) reemphasizes the existence of a long run relationship due to negative coefficient and it's statically significance. The term has a value of -0.51907 indicating that 51.9% of disequilibrium in the short run is adjusted towards the long run equilibrium within a year. Diagnostic test for autocorrelation, heteroscedasticity, model stability and normality of residuals is shown in the Appendix.

5. Conclusion

Zambia experienced a significant increase in GDP growth after it gained independence. The main contributor to this increase was the boom in mining which is the hub of the country with copper reserves being amongst the top in the world. Exports of copper increased and impacted positively on GDP growth and reduced inflation the movement for multi-party democracy however decided to privatise a large portion of the mines after 1991 to foreign investors. The move was applauded by some financial players and it helped Zambia reach the heavily indebted poor countries (HIPC) completion point. This move enabled the International Monetary Fund and World Bank to cancel the remaining debt which the country owed. The social status of people was uplifted as the government could now channel money to other projects in the country for development. However, in the past 6 years, Zambia has experienced setbacks in its economic performance. Fiscal deficit has increased and the low prices of copper on the London Stock Exchange have contributed to the poor economic performance of the country. Cointegration results show that there is a long run relationship between GDP and government expenditure. In this regard, changes in government expenditure have a strong converse effect on GDP.

Government expenditure, which has increased significantly in the past decade, is seen to have had negative effects both in the short run and long run. Contrary to theory, increased government expenditure may not be ideal for growing the Zambian economy. This could be due to the allocation of this public expenditure, i.e. the 2018 Budget had 24% of the expenditure directed to economic activities. Thus it is recommended that

government practice increased fiscal discipline or reallocated resources as their expansionary fiscal policies are not yielding the intended results. Additionally, policies to promote private investment may be more beneficial for the Zambian economy. On the other hand, increased investment is recommended that government also encourage more investment promoting policies as FDI is observed to have a positive impact in the short run though insignificant in the long run. These should ensure more investors are encouraged to stay longer and the impacts /externalities of their investments be accrued to the nationals to ensure long-run benefits. The Zambian government should also ensure that the country diversifies its export base and enhances its external debt management to ensure positive and consistent impact of CAB in the long run.

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