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AN EMPIRICAL ANALYSIS OF DISAGGREGATED GOVERNMENT EXPENDITURE AND ECONOMIC GROWTH IN SOUTH AFRICA

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Abstract

The motivation for this study stems from the weak economic growth that the country has been experiencing lately, coupled with the concern over government spending in South Africa. Estimating only the effect of government spending on economic growth is not enough; the different components of government spending should also be investigated in order to observe their relationships with economic growth. Earlier studies in South Africa considered the effects of total government spending on economic growth. This is the first study to our knowledge that disaggregated government spending into government investment spending and government consumption spending. This study, therefore, examines the effects of government investment expenditure and government consumption expenditure along with groups of control variables on economic growth in South Africa, using the autoregressive distributed lag (ARDL) technique. Annual data spanning the period 1976 to 2015 was employed. The results show that the disaggregated government spending is positively related to economic growth both in the long run and the short run, during the period considered

Keywords: ARDL, consumption, economic growth, government spending, investment.

JEL Classification Code: C32, E22, E24, O47

1. Introduction

According to Easterly and Rebelo (1993), “If you ask an economist to explain the growth performance of a particular country he is likely to mention fiscal policy as being an important growth determinant”. Not only is government spending a critical determinant in the economic growth model, but its disaggregated component, which clearly highlights how each spending pattern affects economic growth, is equally imperative. Thus, the contribution of this study is to examine the effects of disaggregated government spending on economic growth, rather than observing the effect of total government spending as done in previous studies in South Africa. This study examines the effects of productive and unproductive government spending on economic growth.

There are several partial theories that discuss the role of different factors influencing economic growth. Two distinguished theories are the neoclassical of Solow’s (1956) growth model and the theory of endogenous growth by Romer (1986) and Lucas (1988). Other developments considered the effect of non-economic factors on economic growth. These developments are grouped under the “proximate” and “fundamental” sources of economic growth. While the proximate sources include capital accumulation, labour and technology, the fundamental sources are the legal and political systems, which include fiscal variables of government expenditure and taxation. South Africa as an emerging economy has been experiencing slow growth over the past few quarters and it is important to investigate the effect of government spending on economic growth and observe the component that contributes most significantly to it.

Government spending patterns in South Africa have been a major concern. According to policy recommendation, it is required that government budgets be constrained so that they do not outstrip economic growth (Christie, 2012). Based on this policy recommendation, the International Monetary Fund (IMF) reported that many countries faced with high fiscal deficits decided to consider reducing their government spending (IMF, 2003). South Africa has not been spared from the high budget deficit that resulted from the global financial crisis of 2008. In 2009/2010, government’s budget deficit was projected to be 3.9 per cent of GDP, which was quite high compared to the budget surplus of 0.6 per cent (Luus, 2009). This deficit continued until the 2015/2016 fiscal year due to the continuous weak economic growth, which has thus caused revenues to remain at low levels (Budget Review, 2013).

The overall growth for 2016 was 0.6 per cent, but it contracted by 0.3 per cent quarter-on-quarter (SARB, 2017), with a prediction of 0.8 per cent growth for 2017 by IMF. However, the average annual growth rate from 1993 to 2016 was 2.91 per cent, with an all-time high of 7.60 per cent in the last quarter of 1994 and as low as -6.10 per cent in the first quarter of 2009 (Trading Economics, 2017). Economic growth shrank in the last quarter of 2016, compared to the increased growth of 0.4 per cent in the third quarter. In the same period, government spending increased to R634,777 million in the last quarter of 2016 from R634,224 million in the third quarter.

As explained below, the relationship between economic growth and government spending is inconclusive; while some studies found a negative relationship (Bittencourt et al, 2014; Chirwa and Odhiambo, 2016), others found a positive association (Bose et al, 2007; Mo, 2007), and yet others found an insignificant relationship (Barro, 1989). To this end, the goal of this study is to empirically examine the effect of disaggregated government spending, namely, government investment expenditure and government consumption expenditure, along with other control variables, on economic growth. The result obtained will advise policy-makers on the component of government spending that should be encouraged or discouraged for growth enhancement. Figure 1 depicts the trend in government consumption expenditure, government investment expenditure and economic growth in South Africa from 1976 to 2015.

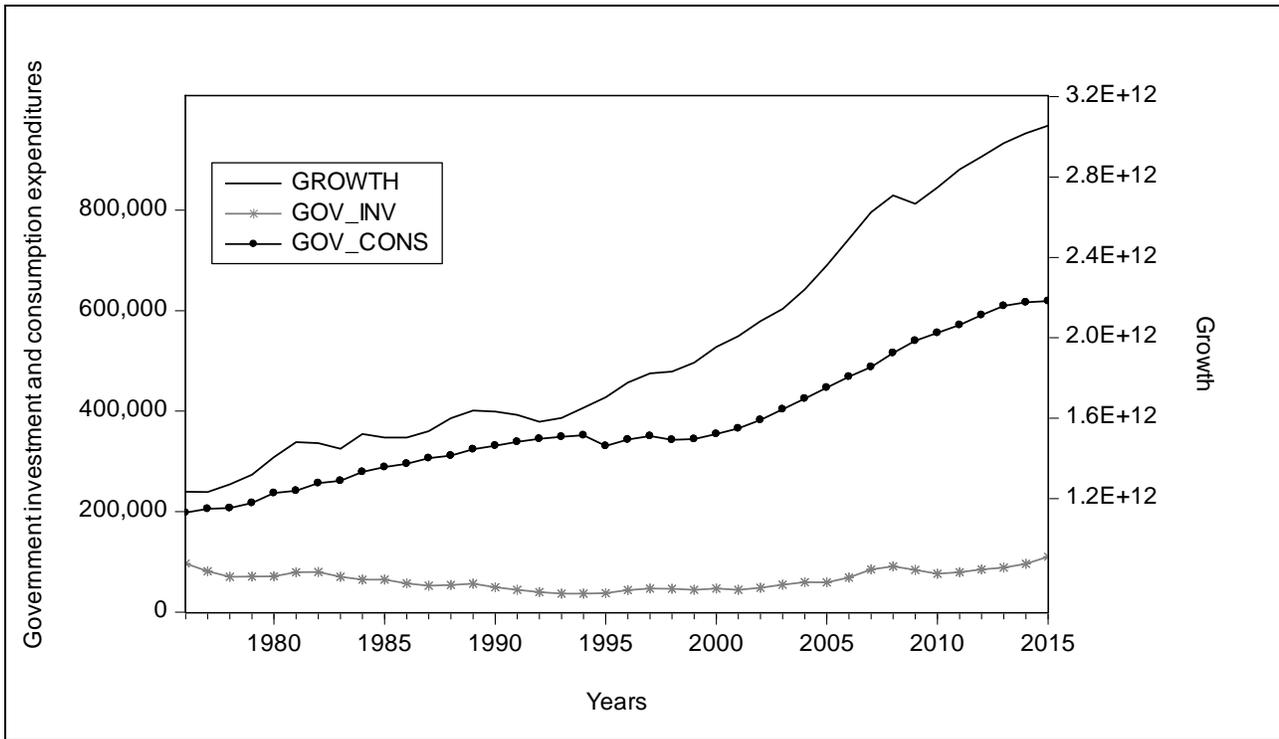


Figure 1: GDP growth rate of South Africa: 1976–2015.

Data Source: SARB; World Bank

There is a clear positive trend among the three variables, with economic growth having the highest increase and government investment the lowest. As shown in the figure, growth continuously increased from 1993 with a small decline at the onset of the global financial crisis in 2008. It, however, continued to increase, although slowly. Government investment expenditure did not increase significantly over the entire period.

The rest of the study proceeds as follows: Section 2 reviews earlier empirical studies on government spending and economic growth, while Section 3 presents the methodology. Section 4 discusses the findings of the study and Section 5 covers the conclusion as well as the policy recommendations.

2. Government expenditure and economic growth: A review of literature

Various studies have investigated the impact of government expenditure on economic growth for different countries. Seminal studies on the factors that have impact on economic growth include Kormendi and Meguire (1985), Grier and Tullock (1989) and, especially, Barro (1991). However, one strand of literature suggests that government spending could positively affect economic growth if government spending is investment-oriented, but a negative effect could be experienced if the government spending is consumption (Biswal et al, 1999; Akitoby et al, 2006; Bose et al, 2007; Barro, 1991; Ndambiri et al, 2012; Bittencourt et al, 2014). However, no consensus has been reached on the relationship between economic growth and government spending, mainly due to the disparities in the composition of government expenditures, data sample and model specification (Agell et al, 1997). Some of the studies that investigated the effect of government spending on economic growth are reviewed below.

Many studies have followed the Keynesian theory in finding that government spending has a positive impact on economic growth (Biswal et al, 1999; Bose et al, 2007; Mo, 2007). The Keynesian theory postulates that increased government spending will increase economic growth through expansionary fiscal policy. When government spending increases, production will increase, thus causing an increase in aggregate demand, and ultimately leading to an increase in GDP. However, other studies that also followed the Keynesian theory, found that increased government spending has an adverse effect on economic growth (Barro, 1991; d'Agostino et al, 2012; Ndambiri et al, 2012; Bittencourt et al, 2014; Chirwa & Odhiambo, 2016). Barro (1991) argued that increased government spending is normally associated with an increase in taxes, which leads to the distortion of economic incentives and discourages savings, investment and enterprise, thus hindering economic growth. The literature provides evidence of both positive and negative impacts of government spending on economic growth.

The study carried out by Barro (1999) investigated the determinants of economic growth for a panel of 100 countries, while including government consumption as one of the vital variables. The study used annual data over the period 1960 to 1995 and applied the results to the case of Chile. The study concluded that in order to have high economic growth, government consumption and fertility rate

should be relatively low, while investment should be encouraged. The study also pointed out that the inflation rate, schooling levels and international openness do not seem to explain growth differentials. Ndambiri et al (2012) explored a number of determinants of economic growth from a panel of 19 sub-Saharan African countries, using a Generalised Method of Moments (GMM) and annual data over the period 1982 to 2000. Their results showed that government spending, among other control variables, is significantly inversely related to economic growth.

According to Ram (1986), expenditure on core areas of government has a positive effect on growth. However, according to the public choice theorists, as the size of government increases, given the high distortionary effects of taxes, governmental inefficiencies will increase, and government spending will have an adverse effect on economic growth (Christie, 2012). In line with this, Chirwa and Odhiambo (2016) carried out a study on the long run drivers of economic growth in South Africa, using the Autoregressive Distributed Lag (ARDL) technique. The results obtained showed that among other variables, total government spending is a key macroeconomic determinant that is significantly related to economic growth. The study further found that both in the short run and the long run, total government spending negatively affects economic growth. By contrast, authors such as Barro (1989) and Schaltegger and Torgler (2006) respectively found the relationship between economic growth and government spending to be insignificant and inconclusive.

On the other hand, Bose et al (2007) evaluated the effects of aggregated capital expenditure and disaggregated government investment on education on economic growth in 30 developing countries. Knowing that fiscal and economic variables tend to affect one another, they used three-stage least squares (3SLS) to capture the endogeneity aspect of the model and to confirm the robustness of the baseline results. The results obtained are robust across aggregated or disaggregated government expenditure on education, which shows that government expenditure on education is positively related to economic growth with long-lasting effects. Also, while aggregate capital expenditure is positively related to economic growth, aggregate current expenditure has no effect.

Likewise, Aschauer (1989) found that non-military public capital stock is positively and significantly related to economic growth, while expenditure in transport and communication has the most

explanatory power in determining economic growth. Easterly and Rebelo (1993) investigated the relationship between government investment expenditure on transport and the communication sector and economic growth, and found that they are consistently correlated.

Furthermore, Ghosh and Gregorious (2008) used GMM to examine the effect of capital and current government spending on economic growth for 15 developing countries from 1972 to 1999. They further picked out expenditure on education and health to capture the capital spending, while expenditure on operations and maintenance capture the current spending. Contrary to common views, the study found that current spending has a positive and significant effect on economic growth while capital spending is significantly negatively related to economic growth. This confirms the study carried out by Devarajan et al (1996) who investigated the relationship between the composition of government spending and economic growth on 43 developing countries. They suggested that productive spending could become unproductive if it is in excess.

3. Data and methodology

3.1 Data sources

This study adopts annual data spanning over the period 1976 to 2015, making 40 observations. The variables of interest are the growth rate of real GDP, (Y), as obtained from the World Development Indicator (WDI) database; and government consumption (GC) and government investment (GI) expenditures obtained from the South African Reserve Bank (SARB) database. As discussed above, the expected relationship between economic growth and government expenditure can be positive or negative. However, a positive relationship is generally expected between economic growth and government investment expenditure (productive government spending on public goods), while a negative relationship is expected between economic growth and government consumption expenditure (unproductive government spending) (Heller, 2005; Christie, 2012). Productive government spending includes expenditure on infrastructure, health and education, while unproductive government spending is expenditure on consumption and social grants.

The control variables are divided into different groups of variables that determine economic growth; these are labour, capital, institutional variables, macroeconomic variables and human capital. Population growth (*POPG*) is used to proxy labour and is obtained from the WDI. There are also inconclusive findings regarding the effect of population growth on economic growth. While some studies found a negative relationship between population growth and economic growth (Checherita-Westphal & Rother, 2012; Chirwa & Odhiambo, 2016), others found a positive relationship (Radelet et al, 2001). Thus, either a positive or a negative relationship is expected between population growth and economic growth. Investment (*INV*) is the variable that captures capital; it is the ratio of gross fixed capital formation to GDP, and it is expected to positively affect growth. *INV* comes from the World Development Indicator.

The institutional variable used in this study is the political right (*PR*) provided by Freedom House. These are the rights that are used to protect an individual's freedom from governments', private individuals' and social organisations' infringements. It is expected that the more the rights of individuals are protected, the faster the economy grows. The inflation rate, which measures price stability and/or macroeconomic stability (Barro, 2003), is an important macroeconomic variable that determines economic growth. The consumer price index (*CPI*) is sourced from the World Development Indicator. Although, it is expected that the inflation rate negatively affects economic growth, as found by many studies (Bittencourt et al, 2014; Chirwa & Odhiambo, 2016), it exhibits threshold effects (Khan & Senhadji, 2001; Phiri, 2010; Leshoro, 2012). Thus, a priori expectation is either a positive or a negative relationship between inflation rate and economic growth.

Lastly, an economic growth model is not complete without including the human capital variable, which accounts for the role of education (*HC_SE*), and this is obtained from the UNESCO Institute for Statistics' database. This is the gross enrolment ratio of primary schools, which is defined as the total enrolment in primary education, regardless of age, expressed as a percentage of the population of official primary education age. The relationship between human capital and economic growth is also inconclusive. While some studies found a positive relationship (Barro, 2003; Chirwa & Odhiambo, 2016), others found a negative relationship (Hamilton & Monteagudo, 1998). Thus, either a positive or a negative relationship is expected between human capital and economic growth.

3.2 Estimation techniques

The model and the variables as earlier defined are shown below as:

$$Y = f(GC_t, GI_t, INV_t, POPG_t, PR_t, CPI_t, HC_SE_t) \quad \dots \{1\}$$

The variables are further written in their linear form as follows:

$$Y_t = GC_t + GI_t + INV_t + POPG_t + PR_t + CPI_t + HC_SE_t + \varepsilon_t \quad \dots \{2\}$$

By converting all the variables to logarithms, the equation to be estimated is thus:

$$\ln Y_t = \beta_0 + \beta_1 \ln GC_t + \beta_2 \ln GI_t + \beta_3 \ln INV_t + \beta_4 \ln POPG_t + \beta_5 \ln PR_t + \dots \{3\} \\ \beta_6 \ln CPI_t + \beta_7 \ln HC_SE_t + \varepsilon_t$$

The popular Autoregressive Distributed Lag (ARDL) Bounds testing approach developed by Pesaran et al (2001) will be used to determine the short-run and long-run relationships between the variables of interest and economic growth. One of the many advantages of the Bounds testing method of cointegration and the ARDL approach is that it is not compulsory to perform a stationarity test; it is nevertheless required that the variables should not be of order two, I(2). This technique is applicable whether variables are purely I(1) or a combination of I(0) and I(1).

Thus, the study will first test all the variables for stationarity, in order to determine the orders of integration of each variable, using the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests of stationarity, since ARDL is sensitive to variables that are I(2). Apart from the statistical properties of the ARDL technique, another advantage is that estimations can be carried out even in the presence of endogeneity of the explanatory variables, which is common in growth models. This is because the model includes the lags of both the dependent and explanatory variables (Pesaran & Shin, 1999). Finally, this technique is efficient even for small samples.

The conditional ARDL economic growth model is therefore expressed by transforming equation 3 as follows:

$$\begin{aligned}
\Delta \ln Y_t = & \alpha_0 + \sum_{i=1}^n \alpha_1 \Delta \ln Y_{t-i} + \sum_{i=0}^n \alpha_2 \Delta \ln GC_{t-i} + \sum_{i=0}^n \alpha_3 \Delta \ln GI_{t-i} + \sum_{i=0}^n \alpha_4 \Delta \ln INV_{t-i} + \\
& \sum_{i=0}^n \alpha_5 \Delta \ln POPG_{t-i} + \sum_{i=0}^n \alpha_6 \Delta \ln PR_{t-i} + \sum_{i=0}^n \alpha_7 \Delta \ln CPI_{t-i} + \sum_{i=0}^n \alpha_8 \Delta \ln HC_SE_{t-i} + \\
& \beta_1 \ln Y_{t-1} + \beta_2 \ln GC_{t-1} + \beta_3 \ln GI_{t-1} + \beta_4 \ln INV_{t-1} + \beta_5 \ln POPG_{t-1} + \beta_6 \ln PR_{t-1} + \\
& \beta_7 \ln CPI_{t-1} + \beta_8 \ln HC_SE_{t-1} + \varepsilon_t
\end{aligned}
\tag{4}$$

$$H_0: \beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = \beta_6 = \beta_7 = \beta_8 = 0$$

$$H_1: \beta_1 \neq \beta_2 \neq \beta_3 \neq \beta_4 \neq \beta_5 \neq \beta_6 \neq \beta_7 \neq \beta_8 \neq 0$$

In equation 4, Δ represents the first difference, the short run and long run elasticities are $\alpha_1, \dots, \alpha_8$ and β_1, \dots, β_8 respectively, and ε_t is the error term.

The null hypothesis, which indicates no existence of long run relationship, is $H_0: \beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = \beta_6 = \beta_7 = \beta_8 = 0$ against the alternative hypothesis of the existence of a long run relationship $H_1: \beta_1 \neq \beta_2 \neq \beta_3 \neq \beta_4 \neq \beta_5 \neq \beta_6 \neq \beta_7 \neq \beta_8 \neq 0$. The F-test is used to determine whether there exists cointegration among the variables. The interpretation of the cointegration test is as follows: if the computed F-statistic lies between the upper bound and the lower bound at a chosen significant level, there is no decision on whether there is cointegration. If F-statistic exceeds the upper bound, the null hypothesis of “no co-integration” is rejected, and if it lies below the lower bound, the null hypothesis cannot be rejected. Critical values for lower bound or stationary variables, $I(0)$, and the critical values for upper bound or variables integrated of order one, $I(1)$, were developed by Pesaran et al (2001).

If cointegration is found, the long run and the short run model of equation 4 will be estimated using the standard OLS in order to obtain the speed of adjustment of economic growth back to equilibrium as well as the short run and long run coefficients. Thus the Error Correction Model (ECM) is expressed by re-parametering equation 4 as follows:

$$\Delta \ln Y = \alpha_0 + \sum_{i=1}^n \alpha_1 \Delta \ln Y_{t-i} + \sum_{i=0}^n \alpha_2 \Delta \ln GC_{t-i} + \sum_{i=0}^n \alpha_3 \Delta \ln GI_{t-i} + \sum_{i=0}^n \alpha_4 \Delta \ln INV_{t-i} +$$

$$\sum_{i=0}^n \alpha_5 \Delta \ln POPG_{t-i} + \sum_{i=0}^n \alpha_6 \Delta \ln PR_{t-i} + \sum_{i=0}^n \alpha_7 \Delta \ln CPI_{t-i} + \sum_{i=0}^n \alpha_8 \Delta \ln HC_SE_{t-i} + \dots \{5\}$$

$$\gamma ECT_{t-1} + \varepsilon_t$$

The coefficient of the error correction term (ECT), γ , measures the short run speed of adjustment back to the long run equilibrium. It shows how the economic growth deviates from the long run equilibrium, but gradually returns to its long run equilibrium path. Therefore, in order for the economy to adjust to equilibrium, the coefficient of the ECT must be less than one, negative and must be statistically significant (Chirwa & Odhiambo, 2016). The ECT has a lag of one, which shows the percentage of speed of adjustment from a shock in the previous period to the present period equilibrium (Mpatane & Eita, 2016).

4. Discussion of results

4.1 Stationarity test results

It is important to first determine the order of integration of all the variables, since the ARDL technique is sensitive to I(2) variables. The stationarity tests are therefore carried out using the ADF and PP and the results are presented in table 1. All the variables are integrated of order one, I(1); they become stationary after the first difference. Since all the variables are purely I(1), ARDL is still applicable.

Table 1: Stationarity test results

Variables	Model	ADF Test		Phillips-Perron Test		Decision
		Levels	1 st Diff.	Levels	1 st Diff.	
<i>lnY</i>	Intercept	-0.11	-4.30***	0.43	-4.31***	I(1)
	Trend & Intercept	-1.64	-4.22***	-1.18	-4.23***	
<i>lnGC</i>	Intercept	-0.62	-4.74***	-0.65	-4.99***	I(1)
	Trend & Intercept	-3.04	-4.68***	-1.75	-4.95***	
<i>lnGI</i>	Intercept	-0.72	-3.59**	-0.99	-3.43**	I(1)
	Trend & Intercept	-0.46	-4.96***	-1.09	-3.78**	
<i>lnINV</i>	Intercept	-2.25	-6.21***	-2.17	-6.49***	I(1)
	Trend & Intercept	-1.99	-6.25***	-1.89	-7.96***	
<i>lnPOPG</i>	Intercept	-1.64	-4.15***	-1.27	-4.08***	I(1)
	Trend & Intercept	-3.14	-4.10***	-2.01	-3.98***	
<i>lnPR</i>	Intercept	-1.07	-5.48***	-0.99	-5.49***	I(1)
	Trend & Intercept	-1.86	-5.41***	-1.66	-5.42***	
<i>lnCPI</i>	Intercept	-3.63***	-1.45	-5.03***	-3.40**	I(1)
	Trend & Intercept	-2.84	-3.02	-0.49	-3.87**	
<i>HC_SE</i>	Intercept	-1.44	-5.91***	-1.55	-5.96***	I(1)
	Trend & Intercept	-1.26	-5.82***	-1.47	-5.86***	

Test critical values: Intercept [1% -3.61; 5% -2.94; 10% -2.61]; Trend & Intercept [1% -4.21; 5% -3.53; 10% -3.20].
 ***1%, **5%, *10%

4.2 Optimal Lag Selection and Cointegration test results

Before estimating the ARDL, determination of optimal lag is essential. The maximum lag length chosen by Akaike information criterion (AIC), based on the number of regressors included in the growth model, is 3. The ARDL growth model therefore obtained is ARDL(1,1,0,0,0,2,0). The next step is to observe whether cointegration exists among the variables. The cointegration test reported in table 2 shows that the null hypothesis of “no cointegration” can be rejected because the F-stat, 4.490, lies above the upper bound, I(1), at all levels of significance. This shows that there exists a long run relationship between economic growth and all the explanatory variables.

Table 2: ARDL Bounds test results

Test Statistic	Value	k
F-statistic	4.490***	7
Critical Value Bounds		
Significance	I(0) Bound	I(1) Bound
10%	1.92	2.89
5%	2.17	3.21
2.5%	2.43	3.51
1%	2.73	3.9

Null Hypothesis: No long run relationships exist

k is the number of explanatory variables

Analysis: By author

Table 3 shows the long run and short run elasticities of the growth model for South Africa. While panel 1 reports the short run coefficients along with the error correction coefficients, panel 2 reports the long run coefficients.

Table 3: Long run and short run results

Dependent variable: $\Delta \ln Y_t$

Panel 1: Short run and Error Correction Coefficients			
<i>Variable</i>	<i>Coefficient</i>	<i>Std. Error</i>	<i>t-Statistic</i>
$\Delta \ln GC_t$	0.269***	0.084	3.212
$\Delta \ln GI_t$	0.079***	0.026	3.053
$\Delta \ln INV_t$	0.133***	0.022	6.068
$\Delta \ln POPG_t$	-0.037*	0.021	-1.787
$\Delta \ln PR_t$	0.017	0.011	1.533
$\Delta \ln CPI_t$	0.029	0.101	0.288
$\Delta \ln CPI_{t-1}$	-0.442***	0.129	-3.417
$\Delta \ln HC_SE_t$	-0.147***	0.042	-3.487
ECM_{t-1}	-0.612***	0.100	-6.117
Panel 2: Long run Coefficients			
<i>Variable</i>	<i>Coefficient</i>	<i>Std. Error</i>	<i>t-Statistic</i>
$\ln GC_t$	0.120	0.125	0.956
$\ln GI_t$	0.120**	0.052	2.310
$\ln INV_t$	0.215***	0.075	2.856
$\ln POPG_t$	-0.054**	0.025	-2.134
$\ln PR_t$	0.023	0.020	1.169
$\ln CPI_t$	0.230***	0.050	4.549
$\ln HC_SE_t$	-0.243***	0.079	-3.093

<i>C</i>	24.88***	1.568	15.866
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***1%, **5%, *10%

Analysis: By author

The results, reported in Table 3 Panel 2, show that the variables of interest, namely, government consumption and government investment expenditures, positively affect economic growth in the long run. However, while government investment expenditure is statistically significant, government consumption expenditure is not statistically significant. This implies that if government continues spending judiciously on investment, it will be beneficial to economic growth in the long run. If government investment expenditure increases by one per cent, economic growth will increase by 0.12 per cent. However, these two variables are statistically significant in the short run (panel 1); while government consumption expenditure does not have the expected negative sign, government investment expenditure carries the expected positive sign. Thus, a one per cent increase in consumption and investment expenditures will cause economic growth to increase by 0.27 per cent and 0.08 per cent respectively in the short run.

The control variables are all statistically significant in the long run, except political rights (PR), although it has the expected sign (panel 2). PR and CPI are not statistically significant in the short run (panel 1). Investment is both economically and statistically significant in the long run and the short run. While a per cent increase in investment will cause economic growth to increase by 0.13 per cent in the short run (panel 1), economic growth will increase by 0.22 per cent in the long run (panel 2). On the other hand, POPG is inversely related to economic growth in the short run and the long run. Negative and statistically significant population growth in the long run implies that South African economic growth will decline by 0.05 per cent given a one per cent increase in population growth. The negative relationship was also found by Chirwa and Odhiambo (2016) for South Africa.

While CPI is positively related to economic growth both in the short run and the long run, it is statistically significant only in the long run. A per cent increase in inflation will lead to 0.23 per cent in economic growth in the long run. Given that the a priori expectation of inflation is either positive or negative based on the threshold effects, the positive impact of inflation on economic growth shows that inflation is not high enough to be detrimental to economic growth in South Africa (Phiri, 2010;

Leshoro and Kollamparambil, forthcoming). Hence, weak economic growth cannot be attributed to high inflation in South Africa, based on the results of this study.

Not surprising is that human capital is negatively and statistically significantly related to economic growth both in the long run and the short run. This is consistent with earlier studies that found a negative relationship between human capital and economic growth, where they used total school enrolment (Hamilton & Monteagudo, 1998; Oluwatobi & Ogunrinola, 2011). However, the result is in line with the study by Bittencourt et al (2014) who used the number of teachers per 100 pupils and found a negative relationship between education and economic growth, although not significant.

Thus, a one per cent increase in primary school enrolment will cause economic growth to decline by 0.15 per cent and 0.24 per cent in the short run and the long run respectively. There is a greater impact of school enrolment on economic growth in the long run than in the short run. The possible reason for the negative effect of primary school enrolment on economic growth is the measurement used, which is the gross enrolment ratio of primary schools. Primary school enrolment is not the highest level of educational attainment, and hence might not have a big enough impact in order to positively affect economic growth. Besides, many primary school learners do not complete their education to the point where their skills could be beneficial to the economy, and assist in avoiding the structural problem with which South Africa is faced (Setiloane, 2017).

The coefficient of the ECT is negative as expected and it is statistically significant, implying the adjustment back to the long run equilibrium. The ECT value shows that about 61 per cent of disequilibrium is corrected annually. Lastly, the ARDL model passed all the diagnostic tests as reported in Table 4 and Figure 2. These tests show that the model is correctly specified and parameter estimates are not biased. The CUSUM and CUSUMQ statistics lie within the 5 per cent confidence interval, which suggests that the model parameter and variance are stable.

Table 4: Diagnostic tests

Test	Null Hypothesis	P-value
Normality Test: Jarque-Bera	Error term is normally distributed	3.398 (0.183)
Serial Correlation LM Tests: Breusch-Godfrey, F(2,24)	No serial correlation	0.949 (0.401)
Heteroskedasticity Test: Breusch-Pagan-Godfrey, F(11,26)	Homoskedasticity	1.453 (0.209)
Ramsey RESET Test: Functional Form (1,25)	Stable model	1.057 (0.301)

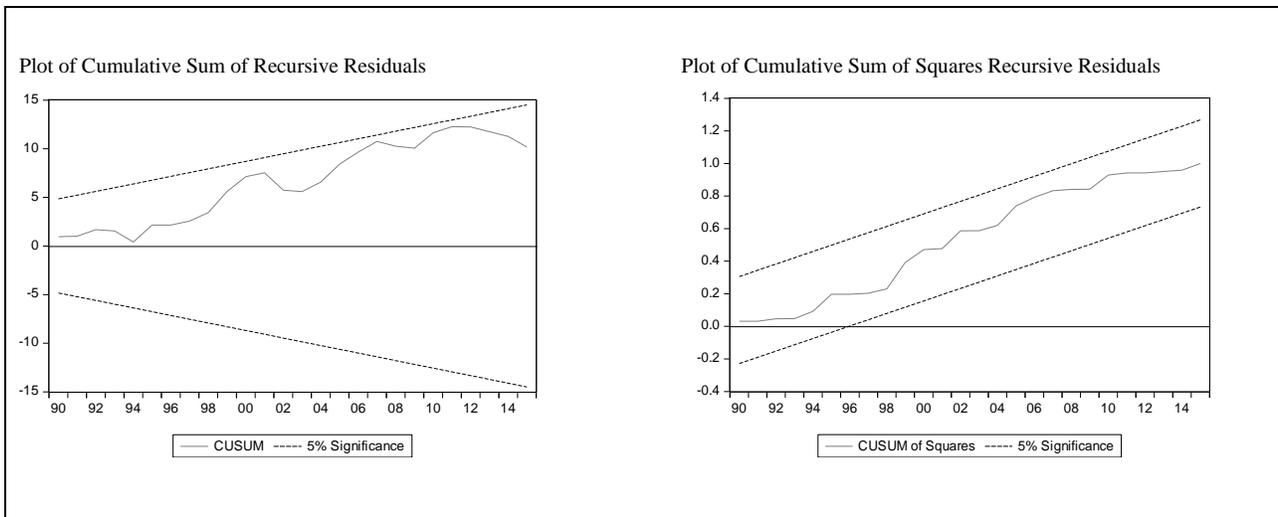


Figure 2: Stability Test: CUSUM and CUSUMQ

5. Conclusion and recommendations

The objective of this study was to examine the effects of disaggregated government expenditure, namely, government consumption and government investment on economic growth in South Africa from 1975 to 2015. While there is no study that has considered this type of disaggregated government spending in South Africa, earlier studies have come to varying conclusions for different countries,

using different techniques. This study uses annual data spanning over 40 years and the Autoregressive Distributed Lag technique was adopted.

The result shows that in the short run, all the variables are statistically significant in determining economic growth except political right and inflation. An interesting control variable is the human capital, which tends to be statistically significantly negatively related to economic growth in the short run and the long run. The possible reason for the negative effect of primary school enrolment on economic growth could be the variable measurement used. Primary school enrolment is not the highest level of educational attainment, and hence might not have a huge impact, given the possibility of dropouts before reaching secondary or tertiary levels. A possible solution could be through on-the-job training, education reforms which help to increase adult education, and provision of vocational training, which provides the required skills needed for small and medium enterprises.

The two components of government spending are not only statistically significant, but they also contribute positively to economic growth in the short run. This shows that government has been appropriating its resources correctly in order to positively affect economic growth in the short run. However, in the long run, only government investment is positively and statistically significantly related to economic growth, while government consumption is statistically insignificant. If government continues to judiciously spend on investment, it will benefit the economy, both in the short run and the long run. In order for policies to have the intended impact on economic growth, policy makers should target increasing government consumption spending in the short-run.

Further research could examine the effects of further disaggregated government spending in different sectors on economic growth, in order to observe the extent of the effect of each on economic growth.

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