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The Nexus between Public Expenditure and Economic Growth

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Abstract: Research on the nexus between government expenditure and economic growth produces mixed results from different countries. The objective of this paper is to test if a causal relationship exists between government expenditure and economic growth in South Africa. the paper relied on testing the applicability of Wagner's and Keynesian theories on public expenditure and economic growth with data from South Africa. Data on South Africa's government expenditure and economic growth for 1961 – 2018 were used and the Granger causality Wald test was used to analyse the causality. Neither Wager's nor Keynesian hypothesis was proven within the limit of the fifty-eight years' data used. This is because the results show no significant causal relationship from either side of economic growth and public expenditure. Policy makers should pay attention on how to channel government expenditure and the gains from economic growth to improve citizens' ability to increase their productive capital. Further researchers should expand the time series coverage to go beyond 1961 to check for new results; a regional panel data for Southern Africa is also recommended for further research. This paper produces a new test of Wagner's and Keynesian hypothesis by merging data from the pre-democratic with the democratic period of South Africa and applied a combination of ADF, co-integration, VAR and Granger Causality analysis.

Keywords: Economic growth; public expenditure; Wagner's Law; Keynesian Hypothesis; GDP

JEL Classification: P42

1. Introduction

The link between economic growth and government expenditure has continued to attract the attention of researchers and economic policy makers. The most popular amongst the diverse hypotheses that links economic growth with government expenditure are the Wagner's theory and the Keynesian hypothesis (Oz-Yalaman et al, 2019). The two hypotheses, Wagner and Keynes present opposite views. On the one hand, Wagner's theory maintains that economic growth causes the movement in government expenditure; on the other hand, Keynes hypothesis postulates the contrary, which is that government expenditure drives economic growth (Mazorodze, 2018). The importance of continuous analysis of this relationship rests on the fact that understanding of economic development models and/or indicators is very vital for improving economic development planning and for determining equilibrium levels of economic growth indicators (Ioan & Ioan, 2018, 2020). In addition, experts argue that public expenditure is vital for developing physical and human capital configurations of a nation, which in turn

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play important role in general public sector outputs and increase in economic growth potential (Gangal & Gupta, 2013).

This paper contributes to the growing literature on the relationship between economic growth and government expenditure by using a unique South African data which combines data from the pre-democratic period with data from the current democratic period to test for the applicability of Wagner's theory and Keynesian hypothesis in South Africa for the period 1961 to 2018. This approach is unique as no existing literature from South Africa has formed such an amalgam of data to examine this phenomenon with the South African context. This analysis is germane at this point in time as public expenditure has generally been rising, yet economic welfare has not been impressive (Gibson & Van Seventer, 1997); this paper provides results that can help economic policy makers to look inwards for alternative effective and efficient approaches.

The subsequent sections continue as follows: the next section after this introduction presents the problem statement and the objective of paper. Thereafter the subsequent section presents the theoretical framework and the literature review. The rest of the sections presents the methodology and the results. The closing sections highlight the implication of the paper, the contribution and conclusion.

2. Problem Statement

The problem of this paper hinges on the continuous oscillation of economic growth in South Africa albeit national expenditure increases over the years (see Figure 1). Public policy makers on management of public expenditure, distribution of public good and economic growth planning need more information to achieve these arduous tasks. The problem of this paper is that reliance on economic results from other countries may not reliably offer similar results for local economic planning. For instance, a review of previous research on public spending and economic growth nexus finds that results vary; 29% of previous analysis find negative association between public spending and economic growth; 17% finding positive relationship, but 54% find no significant relationship between the two. Results vary according to country, period of study and empirical approach. This paper's problem is further inclined on the dearth of prior research which has combined a good number of years of non-democratic government economic data and democratic era economic data to arrive at a current result for South Africa. This paper bridges this gap in South African research on government spending versus economic growth nexus.

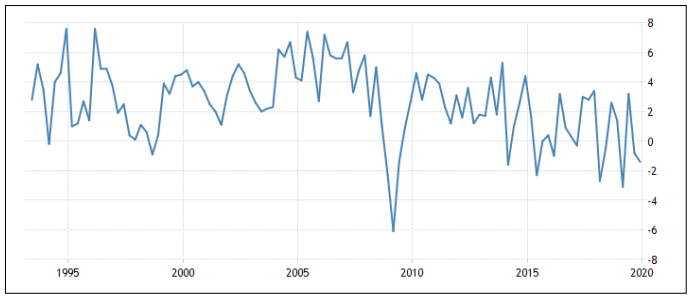

Figure 1. Economic Growth Fluctuations in South Africa
Source: Tradingeconomics (2020)

2.1. Objective of Paper

Drawing from the foregoing problem statement, the objective of this paper is to analyse the relationship between government spending and economic growth, it also evaluates if a causal relationship exists (and the direction) between government expenditure and economic growth in South Africa.

3. Theoretical Framework: Wagner's and Keynesian Hypothesis

The Wagner's law is referred by economists as the law of snowballing country expenditure. The law is credited to Adolph Wagner – a German economist who lived between 1835 and 1917 (Ighodaro & Oriakhi, 2010). He was the main protagonist of the state socialism school of thought during his time. Wagner's thoughts and economic law laid the foundation for the advancement of credit and monetary system in Germany; he also inspired finance and central bank policies in Germany before the advent of First World War. Wagner postulated (using Germany as first case study) that economic growth of a country can trigger an upsurge in public expenditure (Ighodaro & Oriakhi, 2010). This was expanded to indicate that the growth of nations into industrialised states would orchestrate a spike for social progress from state and business. This is actually happening now in the modern world where states and businesses are being pressured toward increased social welfare and social responsibility respectively.

The Wagner's law and Keynesian hypothesis have been a subject of public economic study in many previous researches over the years with attendance opposing debates by scholars (Antonis et al. 2013). Wagner's law postulates that economic performance and/or growth can dictate the size of government (represented by expenditure size) (Jobarteh, 2020). On the opposite, the Keynesian hypothesis posit a contrary view of the relationship, which is that government expenditure may cause economic growth (Antonis et al. 2013; Jobarteh, 2020). There has been numerous research that have tested both theories with diverse findings that either corroborate, refute and/or find no relationship as postulated. Recently, Jobarteh (2020) tested the applicability of Wagner's law in Sub-Saharan Africa by applying a panel cointegration approach with additional causality analysis. Findings from Jobartech (2020) confirm Wagner's law if government expenditure is disaggregated to use only the portion of productive government expenditure. However, if total government expenditure is used, a very weak relationship emerges, which does not support Wagner's law. He thus recommends the need for sub-Saharan African countries to focus their expenditure on the aspect of productive expenditures to take a long run advantage of economic growth.

Therefore, the difference between Wagner's and Keynesian theories lie in the direction of causality between economic growth and public spending. Theoretically therefore, the differences can simply be put as follows (Abbasov & Aliyev, 2018): Wagner theorises that economic growth cause increase in government spending, but Keynesian hypothesis maintains that government spending cause increase in economic growth:

Wagner's theory: $(Y \rightarrow X)$, or $X = f(Y)$

Keynesian hypothesis: $(X \rightarrow Y)$, or $Y = f(X)$

Where: Y = economic growth and X = government spending.

4. Literature Review

Al-Faris (2002) applied a dynamic model approach with data from the Gulf countries to analyse the relationship between government expenditure and economic growth. Their result find that national income predicts government expenditure as indicated by Wagner. However, their further analysis disproves the Keynsian theory that national income is driven by public expenditure. Furthermore, Bose, Haque and Osborn (2007) examined the growth impacts of government expenditure on 30 countries over the 1970s and 1980s, with a specific spotlight on disaggregated government expenditures. Results are twofold, the portion of government capital expenditure in GDP is fundamentally associated with economic growth. However current expenditure was found to be immaterial. Second, at the disaggregated level, government expenditure in education are the main costs that are altogether connected with economic growth. Related to the foregoing, Bagdigen and Cetintas (2004) analysed the effect of public expenditure on economic growth in Turkey; they applied the Granger causality and cointegration approaches to analyse empirical data. Their findings show no evidence that government expenditure can Granger cause economic growth, and no evidence that economic growth can Granger cause government expenditure within the Turkey case studied. With these findings, Bagdigen and Cetintas (2004) were unable to establish the applicability of Wanger's law using Turkey's data.

Other researchers have also tested the relationship between government capital expenditure and economic growth in Nigeria. They applied the ADF test and The Johansson co-integration approach to find that government capital expenditure is positively related to economic growth in Nigeria (Abomaye-Nimenibo & Samuel, 2020). This finding is somewhat related with Olisakwe (2019) who found a relationship between public health expenditure and economic growth in Nigeria.

In another related research, the relationship between various types of government expenditure and economic growth was examined by other group of researchers with data from Ghana. They applied the Stock-Watson Dynamic ordinary least square and Granger Causality test. Their findings show that capital expenditure drives economic growth in Ghana, on the contrary, they find that recurrent expenditures have a harmful effect on economic growth in Ghana (yarko-Asomani, Bhasin & Aglobitse, 2019). In the same line of inquiry, a contrasting finding was made in another research conducted in Kenya; Mose (2020) applied the ARDL model and found that recurrent expenditure has a significant positive effect on economic growth in Kenya but capital expenditure proved insignificant on growth in their study. These contradictory findings suggest the need for more country specific research using each country's data – this may because pooling country's data in a panel may yield to unreliable results as the true nature of some country's specific situation may be beclouded in a pool (see example: Bussiere & Fratzscher, 2006).

(Dimitraki & Win, 2020) inspects and reveals further insight into the connection between Jordan's military consumption and its economic development during the period 1970–2015. Utilizing the Gregory - Hansen co-integration strategy considering auxiliary breaks, and the ARDL technique this paper tests the short – and long-run connection between military spending and economic development in Jordan. Besides, they also applied the Error Correction Model (ECM) and the CUSUM and CUSUMSQ tests, they looked at the dependability of the above relationship. The outcomes uncover positive short – and long-run connections between military spending and economic development in Jordan, during the period under investigation. In a related study, Yildirim, Sezgin and Öcal (2005) examines the impacts of

military consumptions on economic development for Middle Eastern nations and Turkey, for the time-period 1989–1999. The connection between military consumption and monetary development is researched by utilizing cross-section and dynamic panel estimation procedures. Experimental examination demonstrates that military consumption improves economic development in the Middle Eastern nations and Turkey.

Sedrakyan and Varela-Candamio (2019) examined the macroeconomic size of government expenditures in Armenia and Spain and assesses whether there exists a causal connection between government expenditures and economic growth, with regards to Keynes' theory and Wagner's law. The investigation utilizes the VAR approach to break down yearly information for the years 1996–2014. By using Granger causality tests, their analysis uncovers whether government expenditures are a noteworthy factor in economic growth in short-run point of view. Finally, in their analysis, IRF and FEVD tests were applied to appraise the impacts of specific government expenditures on GDP for a multi-year time skyline. This examination approves the theory that independent of size and nature of the economy (Armenia versus Spain), some government expenditures (for example health services) decidedly add to the growth of the economy, while social insurance in the two nations is adversely identified with GDP (Sedrakyan and Varela-Candamio, 2019). Whether research is to prove Wagner or Keynesian hypothesis, results have remained diverse depending on place of research, timing and empirical approach employed (Abbasov & Aliyev, 2018). This paper contributes to the foregoing research by looking a single emerging country case (South Africa). The method and results proceed in the following section.

5. Methodology

Data on government expenditure and gross domestic product (GDP) were collected from the World Economic Indicators for South Africa for fifty-eight (58) years (1961-2018). The unit root tests were analysed using the Augmented Dickey-Fuller test (ADF); further to this, the analysis of relationship was conducted through the usage of co-integration OLS and the Vector autoregression (VAR) models; finally, the Grander Causality test was applied to determine the degree and direction of causality between government expenditure and economic growth for South Africa.

This paper makes a methodological contribution to existing methods in the following manner. South Africa is a unique country with regards to governance; it is only twenty-four years into a democratic governance, which affects the structure of government expenditure into the society. Therefore, this paper covers over thirty years back into the apartheid government and twenty-four years (up to 2018) into the democratic governance in South Africa. No previous research has as yet covered a unique period for South Africa, hence the unique period approach and the attendant results from the following analysis present a new method and findings to the literature.

5.1. Results

Table 1 presents the Augmented Dickey-Fuller test for Unit Root result. Given that the ADF null hypothesis is usually that a unit root exists (which is variables are non-stationary), this is therefore rejected as the p-values for government expenditure and GDP are below 0. 05 alpha level. This therefore means that the variables are stationary. The co-integration analysis in Table 2 provides evidence of relationship between expenditure and economic growth. However, this paper's objective is to determine if a causal nexus exists between the two variables. Accordingly, Tables 3 to Table 4 present the Vector Autoregression result and the Granger Causality test result respectively. From Table 3, it can be seen that none of the variables proved to be significant as their p-values for both lag 1 and lag 2 are above the alpha level of 0. 05. Accordingly, the VAR model shows that within the limits of the data used in this analysis, there is no significant relationship between government expenditure and economic growth for the South African data using the VAR model at lag 1 and lag 2. Extending the analysis further, Table 4 presents the Grander Causality test, which also shows that there is no significant causal relationship between government expenditure and economic for South Africa from 1961 to 2018.

Table 1. Augmented Dickey-Fuller test for Unit Root

Variable	estimated value	test statistic	p-value
GovExp	-1,34516	-6,95666	4,331e-010
GDP	-0,856361	-5,71723	5,565e-007

Table 2. Cointegrating Regression

Cointegrating regression -
OLS, using observations 1961-2018 (T = 58)
Dependent variable: GDP
coefficient std. error t-ratio p-value
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const -3,06915e+011 4,36713e+010 -7,028 3,11e-09
GovtCExp 2,72985e+010 2,60884e+09 10,46 8,62e-015
Mean dependent var 1,39e+11 S. D. dependent var 1,22e+11
Sum squared resid 2,89e+23 S. E. of regression 7,19e+10
R-squared 0,661616 Adjusted R-squared 0,655574
Log-likelihood -1531,174 Akaike criterion 3066,348
Schwarz criterion 3070,469 Hannan-Quinn 3067,953
rho 0,923422 Durbin-Watson 0,169202

Table 3. Vector Autoregression Model (var) gdp govexp, lags (1/2) small dfk

Sample:		1963 - 2018	Number of obs		56
Log likelihood		-2677. 201	AIC		95. 97147
FPE		1. 64e+39	HQIC		96. 11168
Det (Sigma_ml)		1. 15e+39	SBIC		96. 33314
Equation	Parms	RMSE	R-sq	F	P > F
gdp	5	2. 0e+10	0. 9751	499. 7036	0. 0000
govexp	5	5 1. 6e+10	0. 9767	533. 7355	0. 0000

		Coef	Std. Err	t	P>|t|	[95% Conf.	Interval]
gdp							
	gdp L1.	2. 046853	1. 167928	1. 75	0. 086	-0. 297861	4. 391566
	L2.	-0. 94279	1. 151926	-0. 82	0. 417	-3. 255373	1. 369803
	govexp L1.	-0. 85274	1. 469174	-0. 58	0. 564	-3. 802228	2. 096752
	L2.	0. 718204	1. 431289	0. 5	0. 618	-2. 155229	3. 591637
	Cons	4. 49E+09	4. 86E+09	0. 92	0. 36	-5. 28E+09	1. 43E+10
govexp							
	gdp L1.	0. 880787	0. 920417	0. 96	0. 343	-0. 967028	2. 728601
	L2.	-0. 63666	0. 907806	-0. 7	0. 486	-2. 459155	1. 18584
	govexp L1.	0. 298109	1. 157822	0. 26	0. 798	-2. 026316	2. 622534
	L2.	0. 397931	1. 127966	0. 35	0. 726	-1. 866556	2. 662417
	Cons	2. 74E+09	3. 83E+09	0. 71	0. 479	-4. 96E+09	1. 04E+10

Table 4. VAR Granger Causality Wald tests

Equation	Excluded	F		df	df_r	Prob > F
gdp	govexp	. 16955		2	51	0. 8445
gdp	ALL	. 16955		2	51	0. 8445
govexp	gdp	. 46611		2	51	0. 6301
govexp	ALL	. 46611		2	51	0. 6301

5.2. Implication for Policy and Academia

The ensuing inference from this paper's results is that policy makers should pay more attention on effective and efficient approach of channelling government expenditure to improve citizens' ability to increase their productive capital, which can consequently increase municipal growth in the long-run. This means therefore that government should monitor, control and ensure accountability to be sure that public expenditure gets to the grass root to empower those at the grass root of the pyramid in the local communities, who need the government expenditure to effectively enhance their productive ability. This paper is useful for the academia in post-graduate classes for studying economic policy implications of government expenditure and budgeting. Further researchers should expand the time series coverage to go beyond 1961 data for South Africa to evaluate if the result of this paper will differ if more time series data for South Africa are included.

5.3. Value (Contribution)

This paper deviates from the approach in existing papers to study a single country case using South Africa; this paper contributes a novelty by merging data from the pre-democratic period of South Africa with the democratic period of South Africa covering a total 58 years data. This is the first kind of data combination with the total number of time series examined using a joint analytical tool of VAR co-integration and Granger Causality test. The no-relationship result on either side of the variables is the first result for the country's case – hence the unique contrition.

6. Conclusion

This paper aimed to analyse the possible causal relationship between public expenditure and economic growth represented by (GDP). This relationship has from the times of Wagner and Keynes been a subject of intense debate given the hypothetical role and/or influence of government on social welfare and economic growth of nations. Given that diverse conclusions had been reached in the previous research literature and since these varied findings are based on different country/multi-country cases and divergent methods; it becomes somewhat unreliable to use findings that are based on other nations' study to make effective economic decisions for other nations. Hence this paper focussed on a single country study of South Africa to check if government expenditure has had any causal relationship with economic growth in South Africa. This study is unique given South Africa's history of undemocratic regime with a renewed democracy in place. The paper therefore covered many years of undemocratic period combined with the current period of democracy, which is one of the unique approach that makes this paper to stand out from previous. Another unique approach is that the paper applied a combination of VAR co-integration analysis with the Granger causality analysis to determine if any causality exists and the direction. Findings show lack of significant causal relationship from either side of government expenditure and economic growth. This finding thus show that within the period of study, the Wagner and Keynesian hypothesis did not hold for this study. This finding has important economic growth implication for policy makers, which is that government expenditure should be properly monitored to ensure that it reaches the bottom of the pyramid to ensure that it really provides for all citizens to enhance citizens' capacity to build individual productive capital. It also points to the need for government expenditure to be monitored for productivity and not to be merely regarded as perfunctory wherein budgets are approved and allocated without monitoring, controlling and ensuring accountability therefrom. Further research is recommended to move the time series further backward beyond 1961 where this paper stopped, to see if such expanded time series can yield similar or different result. It is also recommended that further study should involve a panel of Southern African countries in order to have a glimpse of what the regional data and results could look like, which can inform regional economic policy enhancement.

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