Revisiting Wagner's Law in the South African Economy

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Abstract: As South Africa deals with the challenges associated with modelling and adopting the appropriate policy for its economic system, the underlying structural and institutional imbalances within the economy have continued to impede the effects of government expenditure on economic growth, thereby misdirecting the focus of the government. This study empirically revisits the validity of Wagner's law in the South African economy, as indicated by previous literature. The cointegration, Granger causality, impulse response function and threshold analysis were used as the estimation techniques, employing quarterly time series data for the period 1970Q1 to 2016Q4. While the cointegration results show the existence of long-run equilibrium relationship, Granger causality findings indicate a bi-directional causality between the two variables, supported by variance decomposition and impulse response analysis. The threshold regression lines conform to similar findings. This implies that in reality, Wagner's law does not apply to the South African economy, given other social factors existing in the economy. This study therefore suggests that in order to determine the real direction of causality between the two variables, there needs to be a balance in the allocation of government expenditure, especially for investment purposes, as well as to curtail the huge portion that goes towards consumption.

Keywords: Wagner's law; Keynesian hypothesis; Government expenditure; Economic growth; Granger causality

JEL Classification: H50; H53; H54; C32; C51

1. Introduction and Background

In recent years, the nature of economic research has shifted from determining the optimal size of government expenditure to examining the forces that drive the expansion of the size of public economy. As South Africa struggles with adopting the best economic approach in relation to its structure, in order to ensure improved productivity and growth, the question arises as to whether, in reality, Wagner's law applies to the country's economic situation. In other words, does economic growth

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as a result of increased industrialisation causes government expenditure to increase in South Africa, or is the reverse the case? Policy analysts believe that a good knowledge of which leads the other will be a determining factor in modelling and adjusting the macroeconomic framework, especially in developing economies. This implies that for South Africa to have an appropriate development strategy in place, the real direction of causality needs to be established between government expenditure and economic growth. Therefore, an analysis of the cause and effect relationship between the variables will be insightful in balancing policies, as well as maintaining an adequate allocation of government funds.

Keynes (1936) argued that increases in government spending help to boost growth by injecting purchasing power into the economy, which increases aggregate demand. Furthermore, government could reverse economic downturns by borrowing money from the private sector, and return it back through various spending programmes. Trotman (1997) believed that this theory promoted the failure of laissez-faire economic liberalism, which supports non-government intervention in the operations of the market and private sector.

Adolph Wagner (1958) proposed the theory of rising public expenditure, by analysing trends in the growth and size of government expenditure, which became known as Wagner's law. The ideology behind the law is that the expansion of government activities within an economy is endogenously determined by economic growth and development (Magableh, 2006). Therefore, increases in government activities respond positively to changes in economic growth, and as a country's income increases, the size of its public sector relative to the whole economy also increases. This implies that in the industrialisation phase, the share of government activities in the economy would increase at a greater rate than that of the national income.

Bearing the above in mind, the ideas contained in Wagner's theory, in this context, override the macroeconomic assumption that productive government expenditure will not only lead to increased output, but can substantially increase economic growth.

Several global studies have attempted to explain the causal relationship between the two variables. While some (Antonis, 2013; Kamasa & Abebrese, 2015; Masan, 2015) conclude that it is economic growth that causes an increase in government expenditure, in support of Wagner's law, others (Ebaidalla, 2013; Adil et al., 2017) indicate that the direction of causality runs from government expenditure to economic growth, in accordance with Keynesian theory. On the other hand, some studies (Tang, 2009; Magazzino, 2015) have concluded that there is a bi-directional causality between government expenditure and economic growth. However, other studies, such as Bagdigen and Centintas (2004), found no relationship at all between these variables.

In South Africa, although government has identified the shifting of the majority of its expenditure towards bridging the economic gap as one of its main targets, a significant proportion of this expenditure goes towards consumption. This is in marked contrast to the initial plan after democracy, namely that a large portion of the budget would be directed towards investments, and used for productive purposes. Government consumption expenditure as a percentage of GDP in South Africa has increased from 13% in 1970 to 14% in 1980 and 20% in 1990, with an all-time high of 21% in 2009, since 1960 (National Treasury, 2016). Within the fiscal years of 2013 and 2014, the overall budget rose to R1.15 trillion, and then to R1.25 trillion in 2014/2015, with about R682 billion being allocated to social spending, such as transferred payments, housing and free education for the poor, amongst others (Budget speech, 2013, cited in Odhiambo, 2015). Leshoro (2017) maintained that while it was stated that a huge proportion of the budget was to be earmarked for productive expenses, such as education, health and improving the country's rail infrastructure, very little has been achieved - therefore, there has been little or no significant effect on the economic growth of the country. This implies that excessive consumption expenditure, combined with other social factors in the economy, could reduce the impact of government expenditure on economic growth.

The existing South African literature (Ziramba, 2008; Odhiambo, 2015; Odo et al., 2016; Leshoro, 2017; Molefe, 2017) has provided an extensive empirical analysis of the direction of causality between government expenditure and economic growth, and validates the applicability of Wagner's law to the economy. However, none of the literature employed the impulse response function in their analysis, since the Granger causality test may not provide complete information on the interactions between the variables of a system (Algaeed, 2017). Molefe (2017) applied the impulse response technique, but it was between the GDP and other variables, including government expenditure, which might not show the real response, because shocks from other variables might have affected the outcome. Therefore, in the midst of constant GDP growth decline in the South African economy, it will be useful to determine the response of gross government expenditure to an impulse from real economic growth or vice versa. Since it is assumed that if one variable reacts to an impulse in another variable, this will mean that the latter causes the former. Furthermore, much attention has been given to other factors dampening the impact of government expenditure on economic growth in the country, without necessarily determining the sustainable level of government expenditure required for growth. Against this background, this study is different from others because, apart from using the Granger (1981) causality test, it measures the response of one variable to an impulse in another, using the impulse response technique developed by Sims (1980), and applies the threshold of the natural logarithm of government expenditure to measure the size of government required for the needed economic growth.

The remainder of the study is structured as follows: section 2 presents the theoretical framework, methodology and estimation techniques used in the study, as well as the data analysis. The estimation results are discussed in section 3, and section 4 concludes the study with policy recommendations.

2. Theoretical Framework, Methodology and Data Analysis

2.1. Theoretical Framework

Since the objective of this study is to determine the validity of Wagner's law or Keynesian theory in the South African economy, the theoretical framework adopted is Wagner's law and the Keynesian hypothesis. The benefit of this approach is that whichever theory is validated, effective economic planning and forecasting will be possible, considering the current economic situation in South Africa. The two theories have been adopted in studying various countries' economic positions, both developed and developing, as contained in the stylised facts in section one. However, results still remain inconclusive. With the above in mind, the Granger causality test is based on the assumptions that: the future cannot cause the past, but the past causes the present or future, and a cause contains unique information about an effect not available elsewhere (Lin, 2008:1). Therefore, for the purpose of this study, the test for the two stationary variables x and y can be written as follows:

$$Y_t = \alpha 0 + \alpha 1\, Y_t - 1 \;....+ \alpha i\, Y_t - i + \beta 1\, X_t - 1 + \cdots .... \beta i X_t - i + \mu 1_t \quad (2.1)$$

$$Xt = \lambda\, 0 + \alpha 1 X_t - 1 \;....+ \alpha i X_t - i + \delta 1 Y_t - 1 + \cdots .... \beta i Y_t - i + \mu 2_t \quad (2.2)$$

Where the subscript t denotes time periods $\mu 1_t$ and $\mu 2_t$ in equations 2.1 and 2.2, and the error terms are assumed to be uncorrelated. The constant parameter 0 represents the constant growth rate of Y in equation 2.1 and X in equation 2.2. The trend in the variables can be interpreted as general movements of cointegration between X and Y. While equation 2.1 shows that current Y is related to past values of itself and that of X, equation 2.2 postulates that current X is related to past values of itself and that of Y. The four possible causal directions between x and y are: bilateral, independent, unidirectional from $x\ to\ y$, and unidirectional from $y\ to\ x$. The equation for orthogonalised impulse responses can be formulated as follows:

$$y_t = B\varepsilon_t + \sum_{i=1}^{\infty} \theta_i\, \varepsilon_t - i \quad (2.3)$$

Where $\theta_i = \emptyset_i B, i = 1,2, ...$. The ε_t has a diagonal or even unit covariance matrix, and is contemporaneously uncorrelated, that is, orthogonal. Moreover, the shocks from ε_t may give a clear understanding of the reactions in the system (Durlauf et al., 2010:146).

2.2. Methodology

The method of estimation employed in this study is the Granger causality test and impulse response function. The estimate involves the impulse response analysis of restricted VAR (VECM), in accordance with Johansen's (1995) estimation process, using the orthogonalised cholesky ordering technique. The procedure for conducting the Granger causality test starts with analysing the time series properties of the data, using the Augmented Dickey Fuller (ADF) (1971, 1981) and Philips-Perron (PP) (1988) unit root tests. The cointegration analysis introduced by Granger (1981), Engle and Granger (1987), and Johansen and Juselius (1990), was also employed to establish whether there is a long-run equilibrium relationship among the variables. Thereafter, since it is assumed that the cause cannot come after the effect, the Granger causality test was applied to analyse the causal relationship between the variables under consideration, and a further analysis of the variance decomposition was done, in order to confirm the results. To determine the response of one variable to an impulse in another, the impulse response function introduced by Sims (1980) was further employed. This approach has been used by other researchers, such as Glass (2009), Algaeed (2017) and Molefe (2017), amongst others, to examine the response to shocks between variables. Lastly, a relationship line was fitted between gross government expenditure and real economic growth, in order to determine the level of government expenditure required for sustainable economic growth.

From the assumptions contained in the theoretical framework chosen for this study, namely Wagner's law and the Keynesian hypothesis, the models to be estimated in this study were specified as follows:

$$GE_t = \propto_0 + \propto_{1t} \Delta GDP_t + \varepsilon_t \quad (2.4)$$

$$GDP_t = \propto_0 + \propto_{2t} \Delta GE_t + \varepsilon_t \quad (2.5)$$

Where GE_t represents government expenditure as a percentage of GDP at time t, GDP_t is the real gross domestic product at time t as a measure of economic growth. ΔGDP_t describes changes in the real gross domestic product as a result of changes in increases in government expenditure at time t, and ΔGE_t describes changes in government expenditure as a percentage of GDP as a result of increases in GDP at time t. ε_t is the error term of the stochastic variable, which considers inexact relationships between economic variables. $\propto_{0,}\ \propto_{1,}\ and\ \propto_2$ are the unknown parameters to be estimated.

The log-linear form of the model to be estimated is written thus:

$$GE_t = \propto_0 + \propto_{1t} LN\_\Delta GDP_t + \varepsilon_t \quad (2.6)$$

$$GDP_t = \propto_0 + \propto_{2t} LN\_\Delta GE_t + \varepsilon_t \quad (2.7)$$

Based on the models specified above, the variables employed in this study are the real domestic product (GDP) and gross government expenditure (GEXP) recurrent and capital proxy for total government expenditure.

2.3. Data Analysis

The data employed in this study consist of quarterly time series data sourced from the South African Reserve Bank (SARB). The data covered the period 1970Q1 to 2016Q4, based on the availability of data. All data were expressed in natural logarithm form, and were accessed in 2017.

3. Empirical Analysis

3.1. Unit Root Test

Based on the methodology adopted in this study, the stationarity of the variables was tested using the ADF and PP unit root tests. The findings, as shown in table 3.1 revealed that GDP and GEXP were not stationary at level, which implies the

Table 3.1. Unit root test results

Series	Model	ADF			PP		Order of integration I(d)
		Level	First difference		Level	First difference	
GDP	None	4.314276 (1.0000)	- 4.997578*** (0.0000)		4.355800 (1.0000)	-8.672438*** (0.0000)	I(1)
	Constant	-0.412420 (0.9033)	- 10.35813*** (0.0000)		-0.592723 (0.8681)	-10.61092*** (0.0000)	I(1)
	Constant and trend	-1.553294 (0.8075)	- 10.33125*** (0.0000)		-1.734960 (0.7319)	-10.58704*** (0.0000)	I(1)
GEXP	None	- 3.962626*** (0.0001)	-2.290501** (0.0216)		- 9.916996*** (0.0000)	-11.19561*** (0.0000)	I(1)
	Constant	- 4.476359*** (0.0003)	- 5.223749*** (0.0000)		- 4.150595*** (0.0010)	-15.16693*** (0.0000)	I(1)
	Constant and trend	0.496655 (0.9993)	- 13.03684*** (0.0000)		0.159997 (0.9976)	-16.53575*** (0.0000)	I(1)

Notes: Null: Unit root (Automatic - based on SIC, maxlag=14): ADF (t-statistic)
Null: Unit root (Newey-West automatic using Bartlett kernel): PP (adjusted t-statistic)
***, ** and * are 1%, 5% and 10% significance levels respectively

Source: Author's calculation from Eviews 7 presence of random walk stochastic components in the variables, and if used for estimation, this would lead to a spurious regression. Further tests at first difference showed that the series is stationary at first difference, with a 99% confidence level. This means that the variables are integrated of order [1(1)].

3.2. Cointegration test

Since part of the objectives of this study includes determining whether there is a relationship between the variables under consideration.

Table 3.2. Cointegration test results

Trace test					**Maximum Eigen value test**			
H_0	**H_1**	**λ-trace statistic**	**p-value**		**H_0**	**H_1**	**λ-max statistic**	**p-value**
GDP and GEXP								
r=0	$r \geq 1$	202.9419	0.0000*		r=0	$r \geq 1$	68.39722	0.0000*
$r \leq 1$	$r \geq 2$	70.19847	0.0014*		$r \leq 1$	$r \geq 2$	37.83343	0.0059*

Notes: *Rejection of the null hypothesis of no cointegration at least at 10% level of significance.

Source: Author's calculation from Eviews 7

The cointegration analysis was used in this regard, and the results from the cointegrating vectors in Table 3.2 show the presence of cointegration. The trace-statistic and the maximum Eigen statistics show that the equations are statistically significant at the 10% significance level. Therefore, this study does not accept the null hypothesis that there is no cointegration and, allowing for a linear trend, there is a long-run equilibrium relationship among the variables. This implies that the variables have the ability to assert either negative or positive effects on each other in the long-run.

3.3. Granger Causality Test

The Granger causality test was carried out using the F-statistics at 1%, 5% and 10% significance levels, as shown in Table 3.3, in order to validate the applicability of Wagner's law or the Keynesian hypothesis to the South African economy. This study

Table 3.3. Granger causality test results

Null hypothesis	**Observations**	**F-statistic**	**p-value**	**Direction of relationship observed**
GDP does not Granger cause GEXP	174	2.67111	0.0017***	GDP ⇔ GEXP
GEXP does not Granger cause GDP		1.80668	0.0426**	

Notes: ***, ** and * are 1%, 5% and 10% significance level respectively

Source: Author's calculation from Eviews 7 adopted the approach as its main objective, in that it will help the country to formulate a policy plan that will be directed towards eliminating the mismatch in the economy. The results revealed that there is a bi-directional causality between GDP and GEXP in South Africa within the period under investigation. Considering the percentage, more causality runs from GDP to GEXP at 99% confidence level, and less causality runs from GEXP to GDP at 95% confidence level. This does not conform to previous conclusions drawn by Odhiambo (2015); Odo, et al. (2016); Leshoro (2017) and Molefe (2017) in relation to the South African economy.

3.4. Variance Decomposition

To further analyse the pass-through of external shocks in each economic variable under study, variance decomposition was used, and the findings, as presented in Table 3.4, revealed that for the 22 periods tested between GDP and GEXP.

Table 3.4. Variance decomposition results

	Variables		
Period	**SE**	**GDP**	**GEXP**
Panel A: Variance Decomposition of GDP			
1	0.008868	100.0000	0.000000
2	0.014318	99.98004	0.019955
3	0.018589	99.97286	0.027144
4	0.022121	99.96783	0.032170
5	0.025165	99.96403	0.035970
6	0.027866	99.96078	0.039222
7	0.030313	99.95781	0.042190
8	0.032562	99.95499	0.045009
9	0.034651	99.95225	0.047751
10	0.036609	99.94954	0.050458
15	0.044983	99.93590	0.064100
16	0.046448	99.93309	0.066908
17	0.047858	99.93025	0.069752
18	0.049219	99.92737	0.072634
19	0.050534	99.92445	0.075554
20	0.051807	99.92149	0.078513
21	0.053042	99.91849	0.081513
22	0.054240	99.91545	0.084553
Panel B: Variance Decomposition of GEXP			
1	0.034183	1.114707	98.88529
2	0.044233	1.883203	98.11680
3	0.052950	2.304714	97.69529
4	0.060263	2.601541	97.39846
5	0.066735	2.824754	97.17525
6	0.072573	3.008202	96.99180
7	0.077925	3.167746	96.83225
8	0.082883	3.312296	96.68770
9	0.087517	3.446999	96.55300
10	0.091875	3.575032	96.42497
15	0.110629	4.168158	95.83184
16	0.113916	4.282726	95.71727
17	0.117081	4.396884	95.60312
18	0.120135	4.510853	95.48915

19	0.123086	4.624806	95.37519
20	0.125942	4.738875	95.26112
21	0.128709	4.853169	95.14683
22	0.131394	4.967772	95.03223

Note: Orthogonalised Cholesky ordering technique was used

Source: Author's calculation from Eviews 7

One tenth of the periods is assumed to be the short-run period, and the remainder is the long-run period. In panel A of the table, the response of GDP to shocks shows that at period 10, in the short-run, own shocks cause 99.949% fluctuations and 99.915% fluctuations in the long-run. In the short-run, shocks in GEXP cause 0.050% fluctuations in GDP, while in the long-run, shocks in GEXP causes 0.085% variations in GDP. These results imply that own shocks of GDP contributed a larger portion of variations in GDP in both short-run and long-run periods. Panel B of Table 3.4 shows the fluctuations in GEXP, and the empirical results revealed that in the short-run, own shocks contributes 96.425% variations in GEXP, and 95.032% in the long run.

The innovations in GDP cause 3.575% fluctuations in GEXP and 4.968% fluctuations in the long run. The results show that own shocks of GEXP contributes a higher proportion of variations in GEXP in the short-run, as well as in the long-run.

The implication of these findings is that shocks in GDP to variations in GEXP are larger than shocks in GEXP to variations in GDP in the years under consideration. This validates the findings from the Granger causality test that GDP has a higher impact on GEXP than otherwise.

3.5. Impulse Response Function Results

To ensure that shock in one variable is uncorrelated with other variables, the cholesky transformation was employed to orthogonalise the impulses. Table 3.4 presents the degree of reaction of the endogenous variables in the restricted VAR system to standard deviation shocks or innovations, that is, the stochastic components.

Table 3.5. Impulse response function results

	Variables	
Period	**GDP**	**GEXP**
Panel A: Response of GDP		
1	0.008868	0.000000
2	0.011240	0.000202
3	0.011853	0.000230
4	0.011988	0.000252
5	0.011994	0.000265
6	0.011966	0.000277
7	0.011928	0.000288
8	0.011888	0.000299
9	0.011847	0.000310
10	0.011806	0.000321
15	0.011605	0.000373
16	0.011565	0.000383
17	0.011525	0.000393
18	0.011486	0.000402
19	0.011447	0.000412
20	0.011408	0.000422
21	0.011369	0.000431
22	0.011330	0.000441
Panel B: Response of GEXP		
1	0.003609	0.033992
2	0.004881	0.027645
3	0.005270	0.028625
4	0.005464	0.028249
5	0.005597	0.028118
6	0.005713	0.027942
7	0.005824	0.027775
8	0.005932	0.027608
9	0.006039	0.027442
10	0.006145	0.027278
15	0.006656	0.026472
16	0.006755	0.026314
17	0.006853	0.026158
18	0.006950	0.026002
19	0.007046	0.025847
20	0.007140	0.025694
21	0.007234	0.025541
22	0.007326	0.025390

Note: Orthogonalised Cholesky ordering technique was used

Source: Author's calculation from Eviews 7

The empirical findings in panel A revealed that GDP reacted to own one standard shock positively in the short-run, but negatively in the long-run, and declined steadily from period 6 to period 22. The results also showed that GDP is positive throughout, as shown in Panel A and Figure 3.1(a) respectively. GDP reacted positively to one standard deviation shock in GEXP from period 1 to period 22 in the short-run and long-run periods. Panel B of Table 3.4 shows the reaction of GEXP to one standard deviation shock in own shocks and GDP. The findings further revealed that GEXP reacted negatively to one own standard deviation shock in both the short-run and long-run periods, as shown in Figure 3.1(d). The one standard deviation shock in GDP in the short-run and long-run causes positive reactions to

GEXP in the short-run and long-run, as shown in Panel B of Table 3.4 and Figure 3.1(c).

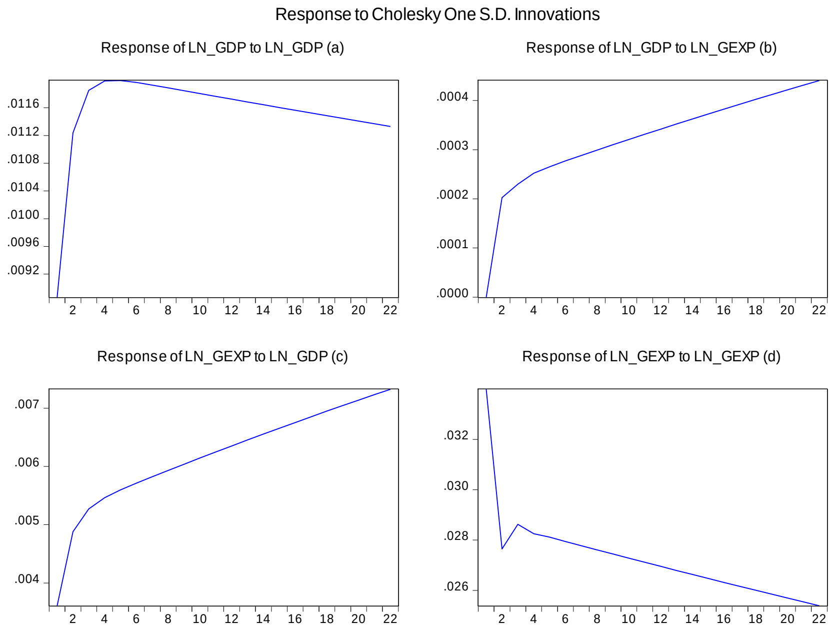

Figure 3.1. Impulse response function

Source: Author's calculation from Eviews 7

3.6. Threshold Analysis Results

From the Granger causality test results, it has been determined that there is a bi-directional causality between GDP and GEXP in South Africa within the period investigation. Although the findings indicate that GDP causes GEXP, this under study considers GEXP as the key determinant of economic activities, since budgets of Ministries, Departments and Agencies (MDAs) play key roles in socioeconomic activities in South Africa. Therefore, it will be imperative to measure the sustainable level of GEXP required for GDP growth in South Africa. This was estimated from the long-run regression estimates of the GDP model, by fitting a relationship line between GDP and GEXP.

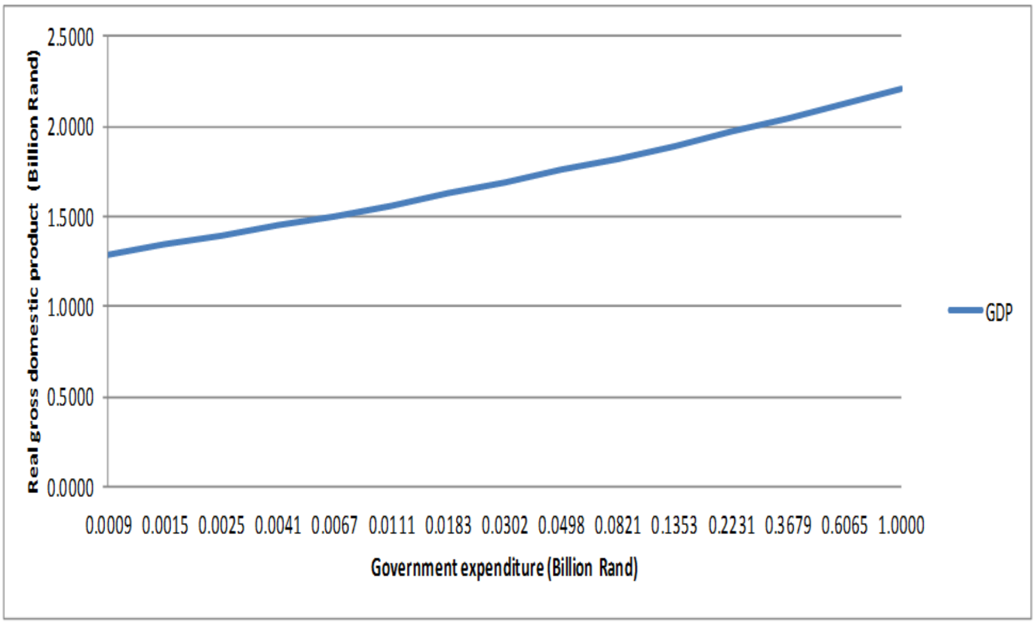

Figure 3.2. Relationship line between GDP and GEXP

Source: South African Reserve Bank Database (2017)

The threshold of the natural logarithm of GEXP ranges from -7 to 0 in South Africa, with -7 to -4 representing low GEXP, -3.5 to -0.5 representing moderate GEXP, and 0 and above representing high GEXP in South Africa.

The empirical results show that when GEXP stood at R0.0009 trillion, South Africa recorded R1.2901 trillion of GDP, and when GEXP rose to R0.0183 trillion on the trend line, the GDP increased to R1.6247 trillion in South Africa. The results further show that when GEXP reaches R0.6065 trillion, a GDP of R2.1262 trillion is attainable. For the South African economy to attain the maximum GDP of R2.2095 trillion, a GEXP of about R1.0000 trillion needs to be maintained.

From the threshold results, for an annual GDP of at least 4% to be achieved in South Africa, more than 64% of GEXP must be maintained annually. This implies that all the income streams in the economy need to be maximised. Moreover, government needs to be more efficient in generating revenue for the federation account, which can be spent on development.

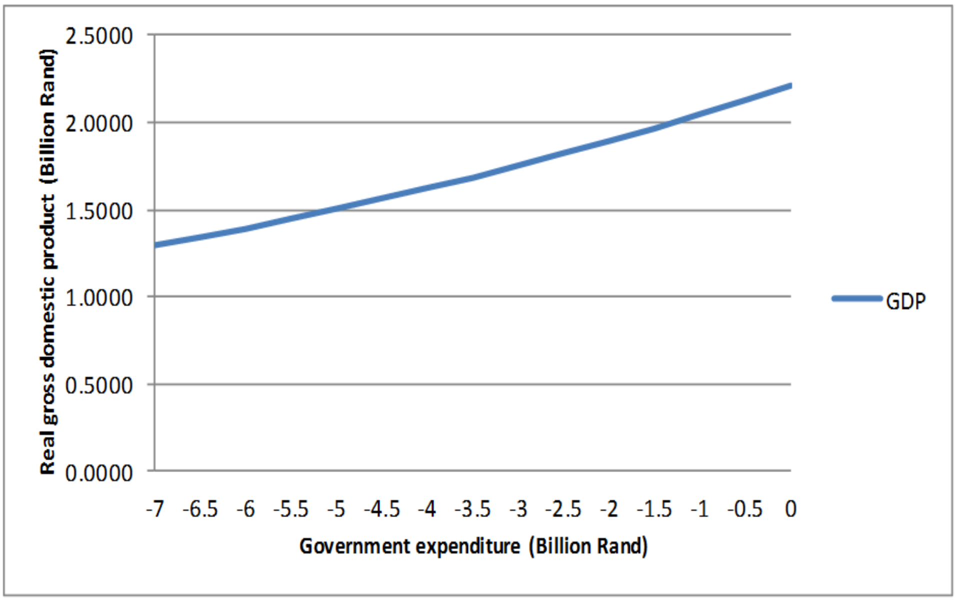

Figure 3.3. Threshold of natural logarithm of GEXP

Source: South African Reserve Bank Database (2017)

4. Conclusion and Recommendation

We revisit the belief that Wagner's law applies to the South African economy. Although previous studies have validated the law, none have considered that the economy's underlying social factors might have been limiting the impact of government expenditure on economic growth. This is particularly important because the budgets of Ministries, Departments and Agencies (MDAs) play key roles in socioeconomic activities in the economy.

In this study, cointegration analysis, the Granger causality test, impulse response and threshold analysis were used to determine the causal relationship between government expenditure and economic growth in South Africa. The analysis was carried out using quarterly time series data from 1970Q1 to 2016Q4. The estimation that was performed portrayed a bi-directional causal relationship between gross GEXP and real GDP. However, the stylised facts contained in section 1 showed that structural and institutional factors hindered the positive effect of GEXP on GDP.

The main findings of this study revealed the following:

Firstly, there is a long-run equilibrium relationship between GDP and GEXP. This implies that within the South African economic environment, gross government expenditure and real economic growth have the ability to impact each other negatively or positively in the long-run. Therefore, the conclusion drawn in previous studies that it is only GDP that can assert pressure on GEXP is countered by this analysis.

Furthermore, the findings from the Granger causality test, variance decomposition, and impulse response function confirmed that a bi-directional causality exists between GDP and GEXP. However, in the long-run, GDP causes GEXP by a small margin of 99% to 95% confidence level. This small margin between GDP and GEXP can be attributed to other structural and institutional factors inhibiting the effects of GEXP on GDP in South Africa. For example, there is excessive government consumption expenditure, whereby a huge portion of this consumption expenditure is directed towards transferred payments, instead of investments. This has allowed individuals to continue to make themselves eligible for such payments, without necessarily contributing to increased productivity and economic growth. This explains why, despite the increase in government spending, there is no significant effect on economic growth. As noted earlier in the stylised facts, with evidence from previous studies, increasing government consumption expenditure can be detrimental to the growth of any economy. This study concludes that gross government expenditure is the key determinant of economic activities. Therefore, in reality, it is the Keynesian hypothesis that holds in the South African economy, not Wagner's law. This is partly in contrast to the results of Ziramba (2008), using the ARDL bounds testing and annual data, suggesting that both the Keynesian hypothesis and Wagner's law are not applicable in the South African economy

This study therefore highlights the need for the South African government to balance the allocation of its expenditure, especially for investment purposes, as well as to curtail the huge portion that goes towards consumption. In addition, functionality and various individual contributions need to be encouraged more, by checking various forms of transferred payments in the economy.

Further studies can break the data into different periods to allow for changes to allow for different economic periods in South Africa.

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