

Effects of Government Consumption on Output in South Africa

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Abstract

In the literature there seems to be consensus that an increase in government consumption will negatively impact output. However, recent studies argue that the effects of government consumption, including government transfers, will depend on the relative productivity of resources (in the form of taxes) used to finance such expenditures. If these resources are more productive in the private sector, then government consumption will have a negative effect on steady state output but if they are more productive in the public sector then government consumption will have a positive effect on steady state output. To date, no definite conclusion has been reached on this matter and therefore this study intends to add to the debate with regard to South African. The results found here corroborate with studies showing that shocks in permanent government consumption have no effect on steady state output, while shocks in temporary government consumption (like wars or natural disasters) have positive effects on output in South Africa. We also find that if the share of government consumption to GDP is below its long run elasticity, an increase in government consumption will increase output.

1. Introduction

The effects of government consumption on output have been studied intensively in most recent years. However, the results of these studies are inconclusive with one school of

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thought finding that government consumption, which includes transfers to households, is unproductive and therefore constrains the overall economic performance by reallocating resources from its most productive use. This school advocates a small size government. Another school of thought finds that the effects of government consumption in the economy depend on the relative productivity of the resources (in the form of taxes) obtained from the private sector. Should these resources be more productive in the private sector than in the public sector, then government consumption impacts negatively on output. But if these resources are more productive in the public sector relative to the private sector, government consumption positively affects output.

Non-Ricardian households are those with lack of income or their income is below such that they cannot respond to market incentives to save. In other words, this type of households consume all their income with no provision for saving. Therefore, government transfers to this type of households tend to improve their purchasing power, which increases the demand of goods and services in the economy.

Davarajan, *et al.* (1996) outline the conditions under which the composition of the budget may lead to a higher steady-state output. However, government consumption may negatively affect output performance, since taxes used to finance government purchases are distortionary. Taxes lower private sector incentives to invest and reduce the returns from investments. They also lower the incentive to work and therefore reduce the number of hours worked per worker.

However, if government consumption is used to purchase goods from the domestic market there is a possibility that government consumption has a positive effect on output and that such a positive effect may also occur if government transfers are directed to the *rule-of-thumb* (or *non-Ricardian*) type of households (Gali, *et. al*, 2003). The question is, given the fact that the majority of the population living in developing countries is of this type, what could be the effects of government consumption on output? Are all developing countries responding according to the Davarajan, *et al.* (1996) findings or do they respond more generally as in the Barro (1981)? This study attempt to analyse the impact of government consumption according to the Barro (1981) approach, that is, whether permanent or temporary government consumption affects steady-state output positively.

The rest of this paper is organized as follows: section 2 discusses the theoretical framework emerging from the existing literature. Section 3 discusses the model to be tested for South Africa. Section 4 presents and discusses the results and section 5 draws conclusions emerging from the study.

2. Theoretical Framework.

We follow the Barro (1981) and Devereux and Love (1995) theoretical models and also assume that the consumption (or utility function) of a representative agent choosing consumption, c , and capital, k , is given by:

$$U = \int_0^{\infty} u(c)e^{-\rho t} dt \dots\dots\dots(1)$$

Subject to

$$\dot{k} = (1 - \tau)y - c \dots\dots\dots(2)$$

Where ρ is an intertemporal discount rate and y is an income. $u(c)$ can be considered an isoelastic consumption function type as in Barro (1981) and Davarajan, *et al.* (1996) or of the Devereux and Love (1995) type of consumption function. Assuming that the household is rational and in full control of the time available to it, the constraint in optimizing the utility function above can be expressed as in Devereux and Love (1995) as follows:

$$C_t + K_{t+1} = w_t H_t \ell_{1t} (1 - \tau) + r_t K_{1t} (1 - \tau_t) - T_t \dots(3)$$

Where C is a private consumption, K_{t+1} is investment, r_t is interest rate, w_t is the return of hours worked measured in efficient units, H_t is the stock of human capital, ℓ_{1t} hours

supplied to final goods, K_{1t} is the fraction of physical capital stock allocated to final goods, τ_t is the income tax rate and T_t is the lump-sum tax.

The government budget is balanced³ and financed by taxes only:

$$G_t = T_t \dots\dots\dots(4)$$

Given equation (4) and the anticipated present value of taxes net of transfers of a representative agent, the expected present value of government consumption is:

$$G = \sum_{t=1}^{\infty} \frac{G_t}{(1+r)^t} \dots\dots\dots(5)$$

The permanent government consumption that yields the same present value of government consumption is given by:

$$\bar{G} = r \sum_{t=1}^{\infty} \frac{G_t}{(1+r)^t} \dots\dots\dots(6)$$

Barro (1981) argues that an increase in permanent government consumption⁴, other things kept constant, leads to a decrease in household consumption, which is equivalent to households' decrease in permanent income. He also argues that under plausible conditions a rise in the interest rate implies a decrease in households' consumption and producers' output on a one-to-one basis, given the intertemporal budget constraints of household and producers.

³ For Devereux and Love (1995) a government balanced budget is given by the following equation: $G_t = \tau_t w_t H_t \ell_{1t} + \tau_t r_t K_{1t} + T_t$ and if government spending policies variable is θ , government spending (consumption in this case) is given by: $G_t = \theta_t Y_t$ where θ represents the rate at which government consumption substitute private consumption.

⁴ Permanent government consumption corresponds to the steady state government consumption. In other word that consumption that grows at annual constant rate.

In this analysis government consumption is considered a close substitute to private consumption. In this case contemporaneous individual consumption expenditure is given by:

$$C_t^c = C_t + \delta G_t \dots\dots\dots(7)$$

Where C^c is contemporaneous individual consumption expenditure and $0 \leq \delta \leq 1$, and the δG_t is the transfer by the government to households.

This formulation was also used by Devereux and Love (1995) and they argue that a higher δ may imply negative private consumption which is impossible. This study also supports the Devereux and Love view and argues that a higher δ may have a different impact on developing countries like South Africa since some of the government consumption categories may have growth enhancing properties depending on the marginal productivity of taxes in the public relative to the private sector. For example, government transfers to *non-Ricardian* household have more positive productive effects on the economy compared to the private sector, because this type of household uses these transfers to finance their consumption, school, health treatment, etc., which increase output from the demand side of the economy. On equation (7) Barro argues that if permanent government consumption and other determinants of permanent income like interest rates are constant, an increase in government consumption crowds-out private consumption⁵. The final conclusion of Barro's analysis is that a permanent increase in government spending has no effect on the steady-state output while a temporary increase in government spending has a positive effect on it. The extent of steady state output increase depends on whether the increase is on inputs to private sector production, for example education, defence, fire protection, regulatory activities, etc., or such increase is on expenditure that are direct conveyer of utility to households, for example parks, libraries, school lunch program, etc.

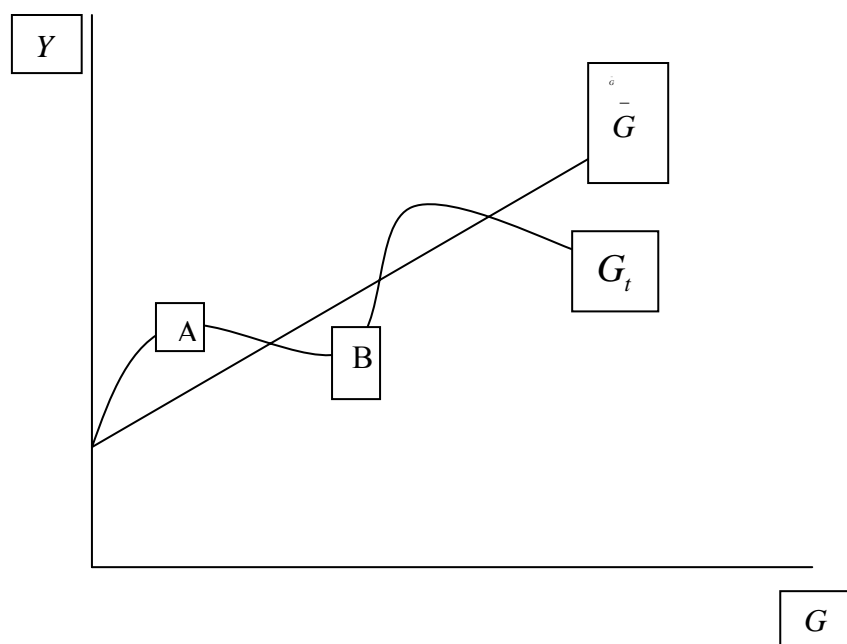
Other studies that have investigated the effects of government purchases on output find a positive relationship. Blanchard and Perroti (1999) using a VAR procedure found that

⁵ For more detailed discussion on this see Barro (1981, 1990), Devereux and Love (1995) and also Davarajan, *et al.* (1996)

positive government shocks have a positive effect on output. The reason of this argument is based on the fact that positive government shocks increase the demand of goods and services, which requires the response from the supply side of the economy. As indicated earlier Davarajan *et al.* (1996) also find positive effects of government budget components on steady state output if the relative share of public expenditure is below their relative output elasticity. Gali *et al.* (2003) find that government transfers to *non-Ricardian* consumers may have positive effects on output. While Barro (1981, 1990) show that, given certain conditions, only a temporary increase in government consumption has positive effects on economic performance.

These results are also supported by Devereux and Love (1995) who found positive effects of permanent increase in government spending financed by lump-sum taxes on output but negative effects if government spending is financed by income tax. Devereux and Love also find, as in Barro (1981, 1990), that a temporary increase in government spending raises output however output may be greater or less than that of a permanent increase. Gali *et al.* (2003) find that government transfers in the presence of Ricardian consumption have negative effects on output. Gwartney, *et al.* (1998) argue that large governments reduce the growth in output and suggest that an ideal size of government should be compatible with the need to supply individuals with basic services that are purely public goods, because private sector is not willing to provide such goods or it could provide them inefficiently. Gwartney and his co-authors support that the productivity of government consumption increases the steady-state output only if its spending exceeds the loss associated with taxes necessary for their financing. Waber (2000) argues that since theory predicts that permanent increase in government purchases implies large decrease in private wealth, large increase in the supply of labour will imply large increase in output. These results have a role to play for policy analysis especially with regard to government budget allocation and levels of such budget.

Figure 1



Where \bar{G} and G_t represent the permanent and temporary government consumptions. Following the previous discussion, Figure 1 suggests that when current government consumption is above the permanent government consumption (point A in the Figure), output will be negatively affected if government increases its consumption since government policy parameter (δ) is high, that is the share of output that goes to government spending is higher and therefore crowds-out private sector. This case seems to represent the situation where government productivity is lower compared to the taxes required to finance government consumption because the tax revenue tend to reduce output more than it adds.

When the current government consumption is below the permanent government consumption (point B in the Figure) output will be positively affected if government increases consumption since δ is small. This is the case where the government consumption spending is more productive than the taxes required to financing an increase in the government consumption. This justifies the findings by Davarajan, *et al.* (1995) regarding the point at which government consumption effects on output. Even Barro (1981) recognizes the importance of productivity of government purchases on the output relative to private productivity.

In this study we test the hypothesis that government consumption is expected to have positive effects on output growth. Because South Africa is a developing country with the majority of the population being of *non-Ricardian* (or *rule-of-thumb*) type of consumers transfers to this type of household increase output from the demand side of the economy. However, it is believed that this only works under Davarajan *et al.* (1996) conditions as illustrated in Figure 1.

3. The Model

The approaches used by Barro's (1981) and Devereux and Love (1995) for testing for the effects of government consumption on output are adopted in this study to test for such effects in South Africa. For simplicity the model does not take into account capital expenditure. It assumes that capital expenditure by government is fixed and thus does not influence economic growth in South Africa. The model assumes that the government runs a balanced budget as it also assume that all government expenditures are financed by taxes (lump sum and income) and the economy operate at its steady-state output⁶.

This study uses a version of equation (4) of Barro (1981) to test the effects of government consumption in South Africa.

$$\ln(GDP_t) = \beta_0 + \beta_1 time + \beta_2 \ln Mr_t + \beta_3 \ln Mr_t(-1) + \beta_3 (RGg_t) + \beta_4 \ln(RLG_t) + \beta_5 \ln(GAP_t)$$

Where GDP is the real gross domestic product; Mr is the real money supply; RGg is the real temporary government expenditure; RLG is the real permanent government expenditure and GAP is the gap of government expenditure on consumption. The real permanent and temporary government consumption are calculated using the Hodrick-Prescott filter methodology.

The main feature is that all current government expenditures are lumped together. The analysis of the effects on output and possibly on other markets, for example labour market,

⁶ By doing so we ignore all problems of unemployment facing South African economy, which may not be realistic but the main conclusions regarding the effects of government consumption remain unchanged.

is done as in Devereux and Love (1995) and Davarajan, *et al.* (1996). Another important feature is that defence and education are not considered separately as done in many other studies.

All data used in this study are taken from South Africa Reserve Bank Quarterly Bulletin and cover annual data for the period 1965 to 2005.

4. Empirical results

All variables used in estimations are in natural logarithm except the time and consumption GAP. The results of estimations presented in Table 1 show that shocks in temporary and permanent government consumption have positive effects on output, implying that government transfer to households, especially to those households of *non-Ricardian* (or *rule-of-thumb*) type, may increase output. In South Africa where significant portion of the population still lives below the poverty line, the provision of income in the form of government transfers to this portion of the population may increase real gross domestic product. The supply of real money with lag entered the equation to capture the fact that money supply is generally captured with delay in the gross domestic product through inflationary responses.

These results are supported by findings of earlier studies in that temporary government purchases have positive effects on output. However, the results of the effects of shocks on permanent government consumption on output⁷ contrast the Barro's results who finds that shocks in permanent government purchases have no effects on steady-state output. The significance of the effects of shocks in the permanent government purchases on output can be justified by the fact that many developing countries are still building up the foundations for economic development and therefore, the majority of government transfers may have permanent characteristics, such as school grants that contribute to an increase in human capital. In this regard permanent and temporary government transfers to household may have positive effects on output in developing countries, and South Africa in particular.

⁷ Before taking into account possible changes in mean as done by Weber (2000) for the US.

Table 1

Dependent Variable: LN(GDPreal)	
Variables	Coefficients
<i>LN(Mr)</i>	0.2318 (0.0998)
<i>LN(Mr(-1))</i>	-0.1481 (0.0995)
<i>GAP</i>	0.3317 (0.1562)
<i>LN(RLG)</i>	0.4137 (0.0760)
<i>LN(RGg)</i>	0.2474 (0.0300)
<i>Time</i>	0.0234 (0.0042)
<i>Const</i>	13.3882 (1.1046)
R-Square = 0.9906	D-Watson stat = 1.14
Adjusted R-Square = 0.9889	

Standard errors in parenthesis

In addition, although not subject of the present study, the structure of the government transfers have important effects on how government transfers to households effects on output. The structure of government consumption has dynamic effects on private production if the substitutability between public and private consumptions is higher. In other words if taxes used to finance government consumption are more productive in public sector than they are in private sector then government consumption financed by taxes will have positive effects on output (see Devereux and Love, 1995).

Davarajan, *et al* (1996) argue that if the relative share of public expenditure is below its long run elasticity, the shift in the mix towards one of the components will increase the long-run growth rate. This argument is also valid for the aggregate government consumption. If the share of government consumption to GDP is below its long run elasticity then an increase in government consumption will increase the steady state output. This seems to be the case in South Africa where the average long-run share of government consumption between 1965 and 2005 is about 0.1748, which is equal to its long-run elasticity (after controlling for mean change); while the average temporary share of government consumption during the same period is almost zero which is far below the temporary elasticity of the share of temporary government consumption, suggesting that an increase in government consumption in South Africa will increase the steady-state

output. However, in a democratic and peaceful world temporary government consumption can only be achieved through continuous re-allocation of government consumption to those consumption expenditures that may have positive impact on output, such as transfers to needy households, training course that enable individuals to get, skills and tax concession for starting small businesses, etc.

The results presented in Table 1 above are obtained without taking into account the possibility of a one-time change in mean as done by Waber (2000) for the United States data. Weber (2000) find that “jointly, the changes in the mean growth rate of permanent government purchases and the mean government purchases ratio... dramatically *overpredict[ed]* the decline in the mean real GNP growth occurred around 1970”. Following Waber’s methodology for testing for changing mean in the government consumption, the year 1994 was identified as the break point. The results flowing from this methodology are presented in Table 2. These results show that shocks in permanent government consumption have no effects on output while shocks in temporary government consumption have positive effects. This result can be justified by the fact that the longest period covered by the data used here is that of the Apartheid era, where huge investments in temporary expenditures like war equipment to defence, and for economic development given the isolation from the international community were made. These circumstances are similar to those analysed by Barro (1981) and many other studies. For example, wars, natural disasters and some political instability can spark temporary government consumption.

This is true for the case of South Africa which experienced a regime change in 1994. Peace and consequent integration of South Africa into the international community, especially in the SADC region, may have reduced significantly the fate of government consumption that goes to temporary expenditures of the type mentioned above and with significant effects on output in South Africa.

Money supply that entered with lag has negative effects on output but it is not significant. The negative relationship is due to the inflationary effects caused by unexpected money supply and, therefore, affecting the plans of economic agents (including government as a purchaser of goods and services in the market) by reducing their purchasing power.

Table 2

Dependent Variable: LN(GDPreal)	
Variables	Coefficients
<i>LN(Mr)</i>	0.195334 (0.0919)
<i>LN(Mr(-1))</i>	-0.132647 (0.0908)
<i>GAP</i>	0.440636 (0.1477)
<i>LN(RLG)</i>	0.177790 (0.1095)
<i>LN(RGg)</i>	0.252482 (0.0274)
<i>Time</i>	0.028948 (0.0043)
<i>Dummy</i>	0.075054 (0.0270)
<i>Const</i>	13.09687 (1.0124)
R-Square = 0.9924	D-Watson stat = 1.3072
Adjusted R-Square = 0.9908	

Standard errors in parenthesis

Examining the two models and by using the model selection criteria we conclude that the second model describes better the South African case compared to the first model. This result implies that the methodology used by Weber (2000) for the United States where point changes in the mean are identified and consequent introduction of the necessary dummies leads to the better results.

5. Conclusion

This study investigated effects of shocks in the temporary and permanent government consumption on output in South Africa. The results show that without controlling for mean changes in the data both temporary and permanent shocks in the government consumption have positive effects on output. But controlling for changes in the mean (break) only temporary shocks on government consumption may have positive effects on output. The average share of permanent government consumption is equal to its elasticity suggesting that shocks in permanent government consumption have no effects on output. While the average share of temporary government consumption is far below its elasticity,

suggesting that an increase in temporary government consumption may have positive effects in the steady state output in South Africa. Therefore, the results we find in this study are consistent with Barro's (1981) findings.

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