Government Spending and Economic Growth: Econometric Evidence from the South Eastern Europe (SEE)

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Abstract. This paper provides further evidence on the relationship between economic growth and government spending. For the first time two different panel data methodologies have been applied to seven transition economies in the South Eastern Europe (SEE), generating significant results which, if considered, may enhance the economic performance of the countries in the region. More specifically, the evidence generated indicate that four out of the five variables used in the estimation i.e. government spending on capital formation, development assistance, private investment and trade-openness all have positive and significant effect on economic growth. Population growth in contrast, is found to be statistically insignificant.

JEL Classification Codes: O10**,** O11.
Keywords: Government Spending, Economic Growth, Panel Data, SEE.

1. Introduction

Extensive research has been undertaken in an attempt to gauge the extent to which government spending (GS) affects economic growth (EG). Theoretically speaking, the pendulum appears to be swaying towards the conventional wisdom, i.e., GS is a source of economic instability. From an empirical perspective, however, the evidence generated points towards a more mixed picture.

In contrast to the multitude of previous studies conducted in this area, the originality of this study resides in three specific factors. Firstly, the treatment of GS in the distinction made between domestic GS on capital formation, and foreign receipts for development assistance. Secondly, the

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methodology adopted for the empirical investigation whereby two different econometric approaches are used. Thirdly, since the SEE economies share key economic and cultural characteristics they thus provide homogeneity in the group of countries selected for the study. In effect the resulting estimates are thought to contribute considerably to the understanding of the underlying relationship in the specific region.

The primary objective of this study is to empirically evaluate the impact of GS on EG for transition economies in the South Eastern Europe (SEE). The paper is organized as follows: Section two presents an extensive review of literature on the effect of GS on EG. Section three spells out the methodological approaches used in this study while section four elaborates on the estimates generated. Finally, section five suggests the significance of these findings for policy makers in the region.

2. Review of Empirical Findings

The question whether or not government expansion causes economic growth has divided policy makers into two distinctive theoretical camps, as proponents of either big government or small government. Economic theory would suggest that on some occasions lower levels of government spending would enhance economic growth while on other occasions higher levels of government spending would be more desirable. From an empirical perspective the evidence generated becomes more confusing as a number of studies favour one or the other approach. The main focus of this paper will be to concisely review the existing empirical literature rather than explicate the intricacies of theoretical issues.

Evidence pointing towards a negative relationship

Starting with the US economy, Knoop (1999) using time series data from 1970 to 1995 found that a reduction in the size of the government would have an adverse impact on economic growth and welfare. Estimates obtained by Fölster and Henrekson (1999, 2001) when conducting a panel study on a sample of rich countries over the period 1970-1995 lent support to the notion that large public expenditures affect growth negatively. In another empirical study, Ghura (1995), using pooled time-series and cross-section data for 33 countries in Sub-Saharan Africa for the period 1970-1990 produced evidence that points towards the existence of a negative relationship between government consumption and economic growth. In that study the sample countries were classified into four groups: high-growth countries with

growth rates above 2.0%; medium-to-low-growth countries, with growth between 0% and 1.9%; weak-growth countries, with growth between -1.0% and -0.01%; and very-weak-growth countries, with growth below -0.9%. During his investigation it transpired that, the fact that higher growth countries experienced higher investment ratios, higher export volume growth, higher life expectancy at birth, lower inflation rates, and lower standard deviations of inflation did not necessarily imply better terms of trade outcome.

Barro (1991) in a cross section study of 98 countries for a period spanning from 1960 to 1985, using average annual growth rates in real per capita GDP and the ratio of real government consumption to real GDP concluded that the relation between economic growth and government consumption is negative and significant. Additional evidence suggested that growth rates were positively related to measures of political stability and inversely related to a proxy for market distortions.

Jong-Wha Lee (1995) produced further evidence on the relationship between government consumption and economic growth. More specifically, by using an endogenous growth model of an open economy, it was found that government consumption of economic output was associated with slower growth. In addition, the composition of investment and the volume of total capital accumulation were also thought to significantly condition economic growth.

In an attempt to investigate the relationship between government size and the unemployment rate Burton (1999) using a structural error correction model for twenty OECD countries from 1970 to 1999, found that government size, measured as total government outlays as a percentage of GDP, played an instrumental role in affecting the steady-state unemployment rate, i.e. unemployment rises. Further evidence obtained using disaggregated government expenditure pointed towards a significant relationship between, transfers, subsidies and the steady-state unemployment rate while government expenditures on goods and services was found to be insignificant.

Using pooled cross-section/time-series data on 113 countries, Grier and Tullock (1989) investigated empirical regularities in post-war economic growth. Among other results, they found that government consumption is negatively associated with economic growth. From the same study it also

emerged that political repression is negatively correlated with growth in Africa and Central and South America.

Guseh (1997) in a study on the effects of government size on the rate of economic growth conducted OLS estimation, using time-series data over the period 1960 –1985 for 59 middle-income developing countries. The yielding evidence suggested that growth in government size has negative effects on economic growth, but the negative effects are three times as great in non-democratic socialist systems as in democratic market systems. Further estimates provided by Engen and Skinner (1992) for 107 countries over the period 1970-1985, suggested that a balanced-budget increase in government spending and taxation is predicted to reduce output growth, whilst Carlstrom and Gokhale (1991) reported simulation results according to which government expenditures increases caused a long-run decline in output.

Adopting a Granger causality approach, Conte and Darrat (1988), investigated the causal dimension between public sector growth and real economic growth rates for the OECD countries. Special emphasis was put on the feedback effects from economic growth to government growth that resulted from macroeconomic policy. On the basis of the yielding evidence, government growth has had mixed effects on economic growth rates, positive for some countries and negative for others. For the bulk of the OECD economies however, no discernable impact of government growth on the rate of real economic growth was perceived.

Evidence pointing towards a positive relationship

Contrary to the negative association between government spending and economic growth established by the aforementioned studies a growing body of literature attempts to redress the balance by suggesting that the state can actually, through implementing appropriate policies, nurture productive activities and reduce unproductive ones (see for instance Amsden, 1989; Epstein and Gintis 1995, Burton 1991). More specifically, Kelly (1997) by exploring the effects of public expenditures on growth among 73 countries over the period 1970-1989 found that the crowding-out and rent-seeking concerns might have been overstated in the literature. According to the evidence obtained the contributions of public investment and social expenditures to growth is rather significant. Further more, Alexiou (2007) in a study for the Greek economy, after disaggregating government spending, reported evidence on the basis of which there is a positive association

between the growth in the components of government spending and GDP growth. Aschauer (1990) also documented a positive and significant relationship between government spending and the level of output.

Despite the fact that even the crowding-out literature, has recognized a limited but significant effect of public investment on growth, social programmes have been rendered unproductive, with the exception of education. Thereby, most of the studies conducted have exclusively focused on education as a significant factor which impacts growth through its effect on human capital (Barro, 1991; Roubini and Sala-I-Martin, 1991; Birdsall, Ross and Sabot 1995).

In sketch of the preceding exposition it becomes apparent that the relationship between government spending and economic growth is far from clear[1]. Two key points however can be made when reviewing the empirical studies: empirical results are specification sensitive and the relationship between government spending and economic growth is generally negative when the former is expressed as percent of GDP and is generally positive when expressed as an annual percentage change.

Table 1. Summary of empirical studies conducted

Author(s)	Type of study (period)	Sample country/ies)	Findings
Conte and Darrat (1988)	Granger causality approach	OECD countries	For the majority of the OECD countries, there was no discernable impact of government growth on the rate of real economic growth.
Engen and Skinner (1992)	Pooled cross section/time series data (period 1970-85)	107 countries	Found that a balanced-budget increase in government spending and taxation is predicted to reduce output growth.

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[1] Nelson and Singh (1994), when they examined the relationship between the overall government size, the proxy by the central government revenue as a percent of GDP, and the average growth rate of GDP arrived at inconclusive evidence as no significant relationship was established, whilst Lindauer and Velenchik's (1992) emerging evidence suggested that the influence on the efficiency of the private sector allocation of inputs might be a potential channel through which government spending might affect economic growth in a positive way.

Guseh (1997)	OLS – method, using time-series data (period 1960–85)	Middle income developing countries / 59	Growth in government size has negative effects on economic growth, but the negative effects are three times as great in non-democratic socialist systems as in democratic market systems.
Barro (1991)	Pooled cross section/time series data (period 1960-85)	98 countries	GDP is positively related to human capital and negatively related to the level of real per capita GDP.
Ghura (1995)	Pooled cross section/time series data (period 1970-90)	Sub Saharan Africa /33 countries	Negative relationship between government consumption and economic growth
Fölster and Henrekson (1999)	Panel study (period 1970 - 1995)	Rich countries	Report a tendency towards a more robust negative growth effect of large public expenditures
Knoop (1999)	OLS – method, time-series data (period 1970–95)	USA	Finds that a reduction in the size of the government will have an adverse impact on economic growth and welfare
Jong-Wha Lee (1995)	Pooled cross section/time series data (period 1960-85)	Developing countries	Found that government consumption of economic output was associated with slower growth.
Burton (1999)	Pooled cross section/time series data (period 1970-99)	OECD countries	Government outlays as a percentage of GDP, plays a significant role in raising the unemployment rate
Nelson and Singh (1994)	Pooled cross-section/time-series data	70 countries	Their findings were rather inconclusive as no significant relationship was established.
Grier and Tullock (1989)	Pooled cross-section/time-series data (1950-1981)	113 countries	Growth of government consumption negatively correlated with the economic growth.
Carlstrom and Gokhale (1991)	Performed simulations	USA	Government expenditures increased permanents caused a long-run decline in output.
Kelly (1997)	Pooled cross-section/time-series data (period 1970-89)	73 countries	The article highlights the contributions that public investment and social expenditures may make to growth.

Alexiou (2007)	OLS method , time series data (period 1970-2001	Greece	Evidence is reported on the basis of which there is a positive association between the growth in government spending and GDP growth

3. Empirical Investigation

For the empirical investigation the neoclassical aggregate production function serves as the platform on which the empirical model is formulated as follows:

$$Y = f(K, L) \qquad (1)$$

where, Y denotes the level of output, K denotes the stock of domestic physical capital, and L is the labor force. Following Feder (1982), Ram (1986), and Grossman (1988), government expenditure for capital formation (G) can be incorporated in (1) as an independent variable and formulated as:

$$Y = f(K, L, G) \qquad (2)$$

Government expenditure on capital formation can be split into a domestic component (D^G) and a foreign component (F^G), reflecting receipts for development assistance. Taking stock of the latter as well as introducing a measure of openness (H), (2) is specified as:

$$Y = g(K, L, D^G, F^G, H) \qquad (3)$$

To obtain the marginal products of capital, labour, government expenditure of capital formation and trade openness we take the total derivatives and normalize using the gross domestic product (Y) as follows[2]:

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[2] The labour force was left out of the process.

$$\underbrace{dY/Y}_{} = \underbrace{(\partial Y/\partial K)}_{\beta_1}\overbrace{dK/Y}^{K} + \underbrace{(\partial Y/\partial L)}_{\beta_2}\overbrace{dL/Y}^{L} + \underbrace{(\partial Y/\partial D^G)}_{\beta_3}\overbrace{dD^G/Y}^{D^G} +$$

$$\underbrace{(\partial Y/\partial F^G)}_{\beta_4}\overbrace{dF^G/Y}^{F^G} + \underbrace{(\partial Y/\partial H)}_{\beta_5}\overbrace{dH/Y}^{H}$$

(4)

        On the basis of equation (4) the signs of all partial derivatives with respect to output are expected to be positive. In particular, private investment, the labour force, government spending for capital formation and trade-openness are all envisaged to exert a positive impact on economic growth.
Equation (4) assumes the following regression form:

$$y_{it} = \beta_0 + \beta_1 k_{it} + \beta_2 l_{it} + \beta_3 d_{it}^G + \beta_4 f_{it}^G + \beta_5 h_{it} + \varepsilon_{it}$$

(5)

$$\varepsilon_{it} \sim iid(0,\sigma_i^2)$$

Estimation

In spite of the growing concern of potential heterogeneity among the cross-sectional units when performing pooled data analysis, proponents of the homogeneous panel sustain that gains from pooling outweigh any costs. In contrast, a number of scholars, for example, Robertson and Symons (1992), Pesaran and Smith (1995), and Pesaran, Smith and Im (1996)) dismiss pooling the data across heterogeneous units on the grounds that heterogeneous estimates can be combined to obtain homogeneous estimates. More specifically, Pesaran and Smith (1995) argue that the inherent parameter heterogeneity of panels makes the homogeneous assumption redundant and therefore the average from individual regressions should be used instead. Maddala, Srivastava and Li (1994) and Maddala et al. (1997) on the other hand, are very much in favor of estimators that shrink the heterogeneous estimators towards the pooled homogeneous estimator. It is

worth noting that relatively little is known as to how effective are recent development in the number of heterogeneous estimators.[3]

Even though the scope of this study is far from elaborating on the very sophisticated theoretical arguments as to which is the most plausible estimator, two different approaches have been used to gauge the robustness of our results. We set off with the standard pooled estimators i.e. OLS, which ignores the country effects; the within estimator where heterogeneity between cross-section units or time periods is captured by individual or time specific intercepts and GLS, which assumes that country effects are random; we then proceed with the random coefficient (RC) regression estimator (i.e. a weighted average of the least squares estimates where the weights are inversely proportional to their variance-covariance matrices) proposed by Swamy (1970).

The data set used for the estimation of the model consists of N cross-sectional units, denoted $i = l, ... N$, observed at each of T time periods, denoted $t = 1...T$. In this context, we used annual data for seven countries from 1995 to 2005 *(so N =7; T =11)*. The main data providers were the World Bank and the respective statistical offices and Central Banks of the countries in the sample. The date-set comprises the following countries: Bulgaria, Serbia, FYROM, Croatia, Bosnia, Albania, and Romania.

In an attempt to model annual growth, as a function of private investment, the labour force, the two components of government spending and a proxy of trade openness, several specifications were estimated[4].

On the basis of the selection criteria (Schwarz *(S.I.C)* and Akaike *(A.I.C)* Information criteria[5]) as well as the tests (*F-test, Hausman-test*[6]) that

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[3] For an extensive analysis on applications of random coefficient models see Swamy and Tavlas, (1995).

[4] Panel unit roots test proposed by Maddala and Wu (1999) were used to check for stationarity, i.e

$$\zeta = -2\sum_{i=1}^{N} \ln \pi_i, \sim x^2(2N)$$

where π_i is the p-value of the ADF unit root test for the country. Further testing for heteroscedasticity (White Test) and pair-wise correlation (correlation matrix) were also conducted. The variance inflation factor (VIF) was used to check for multicollinearity. Given that the latter was found to be less than 10 in all cases no evidence of multicollinearity is indicated.

were conducted to determine the most coherent model, the fixed effects model is preferred to both the pooled model as well as to the random effects one (see appendix).

What follows, is the presentation of the standard pool estimates, and the random coefficients estimates.

Table 2. Dependent variable is y_{it}

Models \ Variables	FEM	RCM
kit	0.112 (2.32)*	0.165(3.56)*
l_{it}	0.367(0.56)	0.178(1.01)
d_{it}^{G}	0.191(4.85)*	2.45(5.26)*
f_{it}^{G}	0.02(3.87)*	0.109(3.65)*
h_{it}	0.07(2.34)*	0.142(2.77)*

Note: FEM stands for Fixed Effects Model; RCM stands for Random Coefficient Model; *t*-statistics are given in parentheses; (*) denotes significance the 5 percent level.

4. Findings

In an attempt to capture possible heterogeneity effects inherent within the studied region two different econometric methodologies were used. Although the random coefficients model proved to be the preferable[1] of the two, to a great extent both models appear to be providing similar estimates. In view of the results obtained from all estimation techniques government spending on capital formation appears to be in line with Aschauer's (1990) and Ram's (1986) estimates, i.e. bearing the expected sign exerting a highly significant positive impact on economic growth. Such a result supports the view of those (i.e. mainly those who subscribe to the Keynesian tradition), who look upon the state as an instrumental factor in conditioning economic

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[5] Pooled model: AIC –2.43; SIC –2.34, Fixed effects model: AIC –2.65; SIC –2.64, Random effects model: AIC –2.55, SIC –2.39.
[6] F-test: 25.13 p-values: [0.00], Hausman-test: 16.46   p-value: [0.00].

activity. According to this tradition other social expenditures such as health, housing and transfers contribute towards productivity as well as play an important role in stabilizing aggregate demand which is one of the key variables in promoting economic growth.

Both private investment spending and trade openness are statistically significant having the expected sign. The development assistance is also significant; reflecting thus the positive impact that targeted financial assistance can have on the economic growth in this region. Finally, the labour force is found to be statistically insignificant in all estimated models. Such a finding can be possibly attributed to the fact that population growth has been used as a proxy. It is also worth stressing that labour mobility in transition economies remains extremely low due in the main to the distortions in the housing market (Boeri and Flinn, 1999).

To some extent, the somewhat unconventional, however interesting results, i.e. given the bulk of the existing ones, might also be due to structure of the emerging economies or the idiosyncratic nature of the economies in transition. It is worth pointing out that transition entails a simultaneous change in economic structures and institutions the final outcome of which is contingent upon the coherence between economic reform, macroeconomic policies and institutional development.

Observation of the scrutinized region suggests that economic policy for most SEE economies has relied for a number of years on the exchange rate as the core nominal anchor. However, according to Alexiou and Anastasiadis (2008) very high external deficits averaging around 9% of GDP and credit booms in conjunction with fixed exchange rates, with respect to the Euro, constitute a key risk factor for the macroeconomic outlook. Similarly, credit risk from potential exchange rate volatility constitutes the key systemic risk factor for the financial sector due to high foreign currency exposures.

A significant problem for policy makers has been the inability to finance budget deficits, in non-inflationary ways, due to the limited presence of domestic long-term financial instruments. Although outright monetisation of deficits has been largely eliminated, even comparatively small deficits resulted in the swelling of foreign debt which in most cases accounts for over 60% of total public debt (Alexiou and Anastasiadis 2008). Furthermore, high unemployment rates, the legacies of transitional economic displacement and the weak tax base tied to the presence of sizeable unofficial economies

do not allow significant degrees of freedom for fiscal policy. Although the situation has improved in relation to soft budgets, the continuous lack of financial instruments and the fixed exchange rate regimes render both fiscal and monetary policy significantly constrained. We could also note in passing that curbing public spending to meet the fiscal targets, irrespective of the economic trajectories of the economies of the countries in the region, has been a paramount practice in the SEE.

On the whole, what has emerged from this investigation is significant insofar as the new evidence suggests that public spending (i.e. in whatever form this is envisaged) can also be thought of as a mechanism for the promotion of growth as well as a mechanism for the resolution of social and economic issues such as social cohesion, poverty reduction, social conflicts, income disparities between various groups, regions etc. Creating thus a stable environment fuelled by government spending might be an option should economic systems experience high levels of economic growth.

5. Concluding Remarks

The present study explored the impact of a string of variables thought to condition economic growth using two different econometric approaches for seven countries in the SEE region spanning from 1995 to 2005. The evidence yielded indicates that out of the five variables used in the estimation, government spending on capital formation, development assistance, private investment and a proxy for trade-openness all have positive and significant effect on economic growth, whereas the remaining one, population growth, is found to be statistically insignificant.

The direct policy implications of the aforementioned results are of significant importance especially for the particular region, as policy makers through economic polices can create an appropriate environment conducive to nurturing government spending on capital formation, private investment spending, and trade. It should be stressed however, that given the limited data availability in the specific region as well as the peculiarities surrounding the economies in transition, further research in the future when more refined country data are available should target the underlying relationships.

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Appendix

Definitions of variables

Y = percentage change in real gross domestic product
K = percentage change in private investment.
L = population growth, (proxy for the labour force)
D^G = percentage change in government expenditure for capital formation
D^F = percentage change in net official development assistance
H = percentage change in net exports, (proxy for trade openness)

Table 1. Dependent Variable is Y_{it}

	Pooled	Fixed Effects	Random Effects
c	2.234(*1.87*)	-	3.15(*1.76*)
K_{it}	0.261(*3.61*)*	0.112 (*2.32*)*	0.167(*2.18*)*
L_{it}	0.178(*0.54*)	0.367(*0.56*)	0.359(*0.98*)*
D_{it}^G	0.241(*2.78*)*	0.191(*4.85*)*	0.267(*3.87*)*
F_{it}^G	0.162(*1.98*)*	0.02(*3.87*)*	0.03(*3.19*)*
H_{it}	0.02(*2.19*)*	0.07(*2.34*)*	0.10(*1.82*)
R^2	0.45	0.64	0.63
DW	1.84	1.89	1.92

Notes: t-statistics are given in parenthesis; (*) denotes significance
at the 5 percent level.