GOVERNMENT SPENDING AND ECONOMIC GROWTH IN THE EUROPEAN UNION COUNTRIES: AN EMPIRICAL APPROACH

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Abstract

The relationship between government spending and economic growth is an important and controversial issue in modern societies. In this paper, the correlation between economic growth and government expenditure is studied. The analysis is based on data for the European Union countries and panel data techniques are used.

KEY WORDS: Government spending, social protection and economic growth.

JEL classification: H20, E62, O40.

1. INTRODUCTION

Since the seminal papers of Solow (1956) and Romer (1986), economists have become progressively more interested in cross-country comparisons of short-term and long-term growth (Lucas 1988) and in those factors which are correlated with growth (Katz *et al*. 1983, Saunders 1985, Barro 1991, Agell *et al*. 1997). Thus, the effects of government spending on economic growth continue being an active field of awareness.

Theoretically, a larger government size is more likely to reduce economic growth (Ram 1986). Firstly, because government activity is carried out inefficiently. Secondly, due to excessive burdens and finally because it can reduce the productivity of the system. On the other hand, government spending could upgrade the relationship between private and social interests and improve commercial openness. Also, public investment can favor economic growth[1].

Thus, the relationship between government size and economic growth is not clear (see Table I). Lin (1994) points out different ways in which government can increase growth (through provision of public goods and infrastructure, social services and targeted intervention). On the other hand, government taxation can lead to misallocation of resources and unproductive and inefficient expenditures. Fölster and Henrekson (1997) defend the theory that at low levels of government spending and taxation, the productive effects of public goods are likely to exceed the social cost of raising funds. However, growth is likely to be negatively affected after a certain point by further increases in public expenditure (Tanzi and Zee 1997). Also, Sheehey (1993) finds that while government size (government consumption expenditure/GDP) is smaller than 15%, government size and economic growth have a positive relationship, but when government size is larger than 15%, the relationship is negative. In this sense, Cheng and Lee (2005) find that, in Taiwan, over-expanding government expenditure does not promote economic growth, but may cause damage to an economy, because of crowding effects or the increasing of taxes.

The objective of this paper is to study the relationship between government expenditure and economic growth in the European Union countries. In particular, we will test the

[1] The impact of public investment on regional performance depends on region-specific characteristics such as technical efficiency, organizational capacity and productive specialization (Gonzalez-Paramo and Martinez, 2003).

hypothesis that countries with a large public sector grow faster than the other ones. The analysis is based on historical series for the EU-15 countries. The paper is organized as follows. Section two describes data sources we have used and characteristics of the variables involved in our analysis. Also, in this section, we examine the empirical evidence based on the relationship between economic growth and government spending. Section three gives a summary and conclusion.

2. DATA AND METHODOLOGICAL DECISIONS

This paper is focused on cross-country comparisons, in particular, on European Union countries which politically are stable democracies. So, international comparability of the data is very important. We have used economic indicators taken from the Organisation for Economic Development and Cooperation (OECD) and the European Commission (Economic databases).

Following the theoretical framework proposed by Ram (1986), we assume the economy consists of two broad sectors: one is the government sector (*G*) and the other one is the non-government sector (*C*). Production functions for the two sectors could be written as:

$$C = C(L_C, K_C, G) \tag{1}$$
$$G = G(L_G, K_G) \tag{2}$$

Thus, output in each sector depends on the inputs of labor (*L*) and capital (*K*) and also, output of the government sector (*G*) exercises an externality effect on output of non-government sector (*C*). The total inputs are given by,

$$L_C + L_G = L \tag{3}$$
$$K_C + K_G = K$$

and the total output (*Y*) is the sum of outputs in the two sectors:

$$Y = C + G \tag{4}$$

Let us suppose the relative factor productivity in the two sectors differ. In particular:

$$\frac{G_L}{C_L} = \frac{G_K}{C_K} = 1 + \delta\,, \tag{5}$$

where $G_L = \partial G / \partial L$ denotes the marginal production of labor input in the government sector (or its discrete analog $\Delta G / \Delta L$), $C_L = \partial C / \partial L$ denotes the marginal production of labor input to the non-government sector, $G_K = \partial G / \partial K$ is the marginal productivity of capital input in the government sector and $C_K = \partial C / \partial K$ is the marginal productivity of capital input in the non-government sector.

Therefore, the sign of δ indicates which sector has higher marginal factor productivity. A positive δ implies higher input productivity in the government sector and a negative δ indicates the opposite result.

By totally differentiating and manipulating production functions, and using (3) and (5), we can conclude that:

$$dY = C_L dL + C_K dK + C_G dG + \frac{\delta}{1+\delta} dG . \tag{6}$$

Dividing by *Y*, we obtain:

$$\dot{Y} = \alpha (I / Y) + \beta \dot{L} + \left[(\delta / (1+\delta)) - \theta \right] \dot{G} (G / Y) + \theta \, \dot{G} , \tag{7}$$

where the variable *I* is investment which is assumed to equal *dK*, α is the marginal product of *K* in the *C* sector, β is the elasticity of non-government output *C* with respect to *L* and θ equals $C_G (G / C)$[2].

Equation (7) shows that the variables which affect economic growth $(\dot{Y})$ include the investment rate (I / Y), labor force growth $(\dot{L})$, government expenditure growth $(\dot{G})$ and government size (G / Y).

The objective of this paper is to study at least the direction of the government size on growth. In this empirical analysis, rate of increase of GDP is taken as a proxy for economic growth and GDP per capita in US$ purchasing power parity is used for the aggregate output measure *Y*. Firstly, we will focus on time series analysis in order to show different

[2] See Feder (1983) for further information about the parameters and the models.

relationships between variables. Thus, in order to explain cross-country growth rates, regression analysis has been carried out.

GDP per capita in the European Union countries has increased since 1970 (see Figure 1). Also, Figure 2 which uses the data from OECD (2005), shows the relationship for European Union countries between economic growth rate and GDP per capita. This correlation is 0.31 in 2000. However, by countries and considering the period 1994-2000, this value varies from 0.01 in Italy to 0.90 in Greece (see Table II). Furthermore, this relationship is not significant for most of the European Union countries. Thus, we will consider the growth rate of per capita product is independent of the starting level of per capita product (see Barro, 1991; Lucas, 1988 and Rebelo, 1990).

So, we have considered an easy approximation for the growth equation:

$$\dot{Y} = \alpha + \beta\, \dot{G}(G/Y), \tag{8}$$

where a dot over the variable denotes its rate of growth, $\dot{Y}$ denotes dY/Y or its discrete equivalent $\Delta Y/Y$, G represents government spending and $\dot{G}(G/Y)$ equals $\Delta G/Y$. A constant term and a random stochastic disturbance term with the usual properties have been included.

Table III shows the results from cross-section data. The estimates are given for each country from 1980 to 2002. In all the countries, except Luxembourg and United Kingdom, this relationship is significant, at least at the 7 percent level.

In order to deep in these relationships, the standard panel techniques for the econometric estimation have also been used (see Greene, 2003). The fundamental advantage of this panel data set over a cross section is that it allows us great flexibility in modelling differences across European countries. The basic framework is a regression model of the form:

$$\dot{Y}_{it} = \alpha_i + \beta X_{it} + \varepsilon_{it} \tag{9}$$

where i refers to the country (i=1,..., 15 member states), t is the year, $\dot{Y}$ denotes Economic Growth for each country and X is a vector of variables. As explanatory variables we have

included the size of the public sector (growth rate). The results of the estimation are given in Table IV.

First of all, we test the significance of the group effects with an *F*-test. In our models we reject the hypothesis that the country effects are the same. Secondly, we can use the fixed-effects approach or the random-effects approach. The Hausman test value shows that random effects should be used. Total government spending (growth rate) is significant and the level of explanation, as measured by R^2, is acceptable ($R^2 = 0.3840$). Also, sign of variable indicates that government spending is positively related with economic growth in the European Union.

3. CONCLUSIONS

Governments can adjust their level of spending in order to influence their economy. However, the relationship between economic growth and government spending continues being controversial and in some cases ambiguous. However, the relationship between government spending and economic growth can be positive or negative depending on the countries included in the sample, the period of estimation and the variables which reflect the size of the public sector. Thus, some of the problems are based on the measurement of the size of the public sector and the available statistics. This paper provides new evidence of the impact of government spending on economic growth in the European Union countries. The results obtained based on regressions and panel techniques suggest that government spending is positively related with economic growth in the European Union countries.

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FIGURE 1

Evolution of GDP per capita (US$ purchasing power parity).
European Union countries (1970-2002)

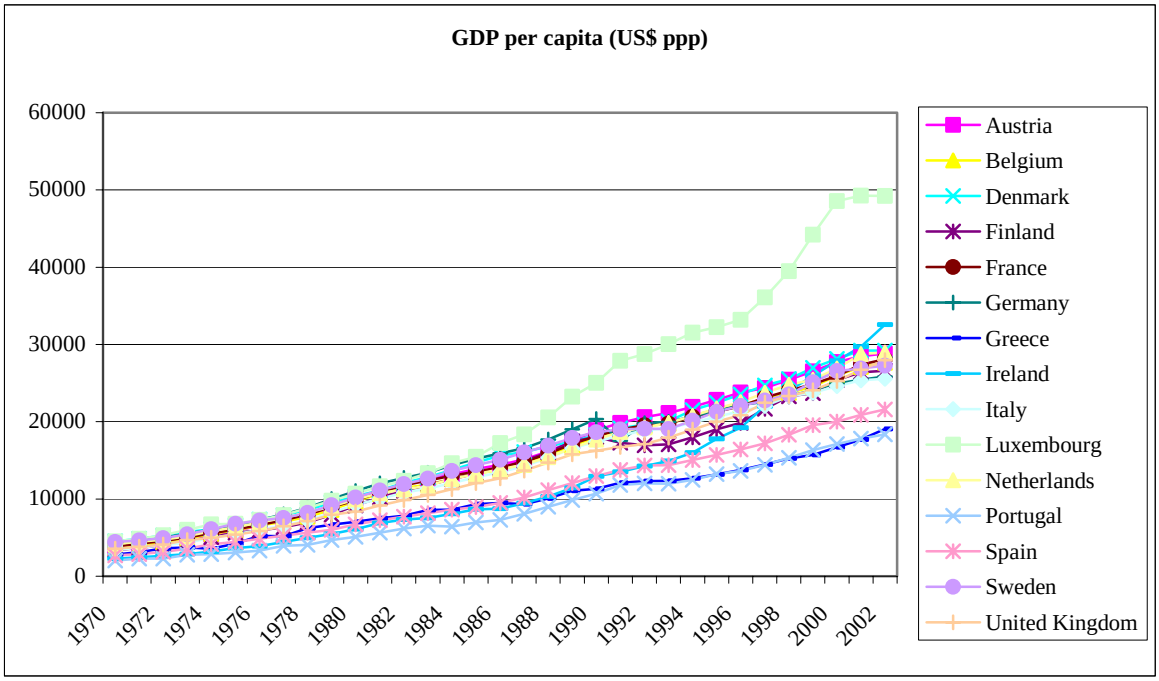

FIGURE 2

Per capita growth rate *versus* GDP per capita. European Union countries. Year 2000.

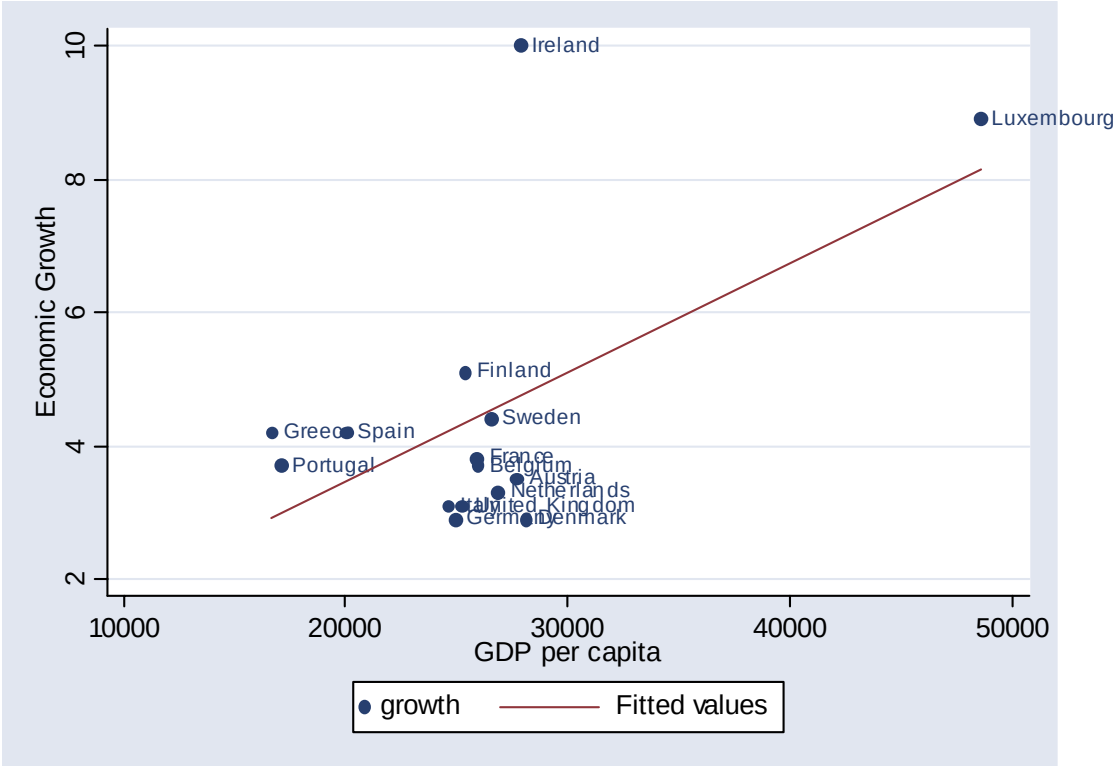

TABLE I

Empirical papers discussing the relationship between growth and the size of the public sector.

Authors	**Data**	**Conclusion**
Rubinson (1977)	Cross country sample.	A larger government size promotes economic growth by reducing the "dependence" especially in the poorer, less developed contexts.
Landau (1983)	Cross-sectional study of over 100 countries in the period 1961-76	Negative relationship between the growth rate of real per capita GDP and the share of government consumption expenditure in GDP.
Kormendi and Meguire (1985)	Study based on post-war data from 47 countries	No significant cross-sectional relationship between the growth rate of real GDP and the growth rate or the level of the share of government consumption spending.
Grier and Tullock (1987)	Study of 115 countries	Negative relationship between the growth rate of real GDP and the growth rate of the government share in GDP.
Ram (1986)	Study based on information of 115 countries from 1960 through 1980.	The overall impact of government size on growth is positive in almost all cases.
Barro (1991)	Study of 98 countries for the period 1970-1985.	Negative relationship between the output growth rate and the share of government consumption expenditure.
Hsieh and Kon (1994)	Study based on historical data for the Group of Seven countries.	The relationship between government spending and growth can vary significantly across time and across the major industrialized countries that presumably belong to the same growth club.
Lin (1994)	Cross-country study over 25 years	Government size has positive impact on economic growth in the short-run but not in the intermediate run.

Source: Authors' elaboration.

TABLE II

Estimated linear relationships between per capita growth rate and GDP per capita. European Union countries (1994-2000). Dependent variable: Economic Growth

Country	***Coef.***	***Std. Err.***	***t***	***P>t***	***R-square***
Austria	0,0030	0,0020	1,6674	0,1563	0,3573
Belgium	0,0020	0,0020	0,8873	0,4156	0,1360
Denmark	-0,0003	0,0002	-1,5251	0,1877	0,3175
Finland	0,0002	0,0002	0,9704	0,3764	0,1584
France	0,0004	0,0001	3,3531	0,0202	0,6922
Germany	0,0002	0,0002	1,0554	0,3395	0,1822
Greece	0,0006	0,0001	6,7522	0,0011	0,9012
Ireland	0,0003	0,0001	1,9453	0,1093	0,4308
Italy	0,0001	0,0002	0,2629	0,8030	0,0136
Luxembourg	0,0003	0,0001	3,3009	0,0214	0,6854
Netherlands	0,0001	0,0001	1,9773	0,1049	0,4388
Portugal	0,0003	0,0003	1,2466	0,2677	0,2371
Spain	0,0004	0,0001	3,9405	0,0109	0,7564
Sweden	0,0002	0,0002	0,7473	0,4885	0,1005
United Kingdom	-0,0002	0,0001	-1,3809	0,2258	0,2761

Source: Authors´ calculations from OECD Data.

TABLE III

Estimated linear relationships between per capita growth rate $(\dot{Y})$ and government spending $(\dot{G})$. European Union countries (1980-2002). Dependent variable: Economic Growth

Country	***Coef.***	***Std. Err.***	***t***	***P>t***	***R-square***
Austria	0,6397	0,1013	6,32	0,000	0,6551
Belgium	0,5017	0,1316	3,81	0,001	0,4090
Denmark	0,2385	0,1246	1,91	0,069	0,1485
Finland	0,4481	0,1655	2,71	0,013	0,2588
France	0,5027	0,1012	4,97	0,000	0,5404
Germany	0,6138	0,0647	9,48	0,000	0,8107
Greece	0,2541	0,0885	2,87	0,009	0,2818
Ireland	0,2492	0,1157	2,15	0,043	0,1810
Italy	0,4205	0,0847	4,97	0,000	0,5402
Luxembourg	0,2594	0,2055	1,26	0,221	0,0705
Netherlands	0,3218	0,1561	2,06	0,052	0,1683
Portugal	0,5497	0,0708	7,76	0,000	0,7415
Spain	0,4477	0,0879	5,09	0,000	0,5526
Sweden	0,5047	0,1707	2,96	0,008	0,2939
United Kingdom	0,1469	0,1353	1,09	0,290	0,2898

Source: Authors´ calculations from OECD Data.

TABLE IV

Estimates of the determinants of Economic Growth in the European Union countries.
Dependent variable: Economic Growth

	Random Effects				**Fixed Effects**			
	Coef.	***Std. Err.***	***t***	***P>t***	***Coef.***	***Std. Err.***	***t***	***P>t***
Total Government Spending $(\dot{G})$	0,4271	0,0293	14,56	0,0000	0,4224	0,0297	14,20	0,0000
R-square	0,3840				0,3840			
Wald Statist. and Prob(Wald)	211,88(0.000)							
Hausman Statistic and Prob(Hausman)	0,94(0.3322)							
F Statistic and Prob(F)					27.88(0.0000)			

Source: Authors´ calculations from OECD Data.