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Government expenditure and economic growth in the European Union countries: New evidence

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Abstract. This paper provides new evidence of the impact of government spending on economic growth in the European Union countries. Governments can adjust their levels of spending in order to influence their economies, although the relationship between these variables 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. The results obtained based on regression and panel techniques suggest that government expenditure is not clearly related with economic growth in the European Union countries over the period 1994–2012.

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1. Introduction

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 because it can reduce the productivity of the system. Also,

government spending could improve the relationship between private and social interests and commercial openness. Moreover, public investment can favour economic growth. In fact, the impact of public investment on regional performance depends on region-specific characteristics such as technical efficiency, organizational capacity and productive specialization (Gonzalez-Páramo, Martinez, 2003).

Thus, the relationship between government size and economic growth is not clear (Table 1). Lin (1994) points out different ways in which government can increase growth (through provision of public goods and infrastructure, social services and targeted intervention). 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, 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 the economy, because of crowding effects or the increasing of taxes.

Table 1. Literature Review on 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 (1989)	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 a positive impact on economic growth in the short-run but not in the intermediate run.
Basil Dalamagas (2000)	Greek data for the period from 1948 to 1994.	There exists a negative relationship between government size and economic growth.
Afonso and Tovar (2011)	A panel of 108 countries from 1970-2008	A negative effect of the size of government on growth

Source: Authors' elaboration

Obviously, if changes in the share of government spending could modify the output growth rate, the size of government could be a potentially important factor explaining long-term growth rates (Hsieh, Kon, 1994).

However, more recent results continue to be inconclusive. Loizides and Vamvoukas (2005) applied trivariate causality tests using time series data drawn from three European countries over the period from early 1950s to mid-1990s. One developed country, the United Kingdom, and two developing countries; namely, Ireland and Greece. In fact, they concluded that government size Granger causes economic growth in all countries of the sample in the short run but not in the long run. Arpaia and Turrini (2008) analysed both the long and the short-run relation between government expenditure and potential output in EU countries by means of pooled mean group estimation and they concluded that, over the 1970–2003 period, the hypothesis of a common long-term elasticity cannot be rejected.

More recently, and from a fiscal point of view, Zimcík (2016) showed that an increase in social contributions, property, production and personal income tax quotas has an adverse effect of economic growth. Nevertheless, there is no clear consensus as to the influence of the fiscal policy on economic growth. In fact, Irmen and Kuehnel (2008) studied the link between productive government expenditure and economic growth and they focused on endogenous growth models where variations in fiscal policy parameters may have an effect on long-run growth.

As a result, policymakers are divided as to whether government expenditure helps or hinders economic growth. The objective of this paper is to study this relationship in the European Union countries (EU-15) over the period 1994–2012. Thus, data analysis within this period could be considered as a *novum* for a literature objective. In particular, we will test the hypothesis that countries with a large public sector grow faster than others. The analysis is based on historical series for the EU-15 countries. The paper is organized as follows. Section 2 describes data sources we have used and characteristics of the variables involved in our analysis. In Section 3, we examine the empirical evidence based on the relationship between economic growth and government spending. Finally, Section 4 gives a summary and conclusion.

2. Data and methodological decisions

This study is focused on cross-country comparisons, in particular, on European Union countries which are stable democracies in political terms. 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). Based on OECD indications "General government spending", as a share of GDP and per person, provides an indication of the size of the government across countries. General government spending generally consists of central, state and local governments, and social security funds. Obviously, there exists a large variation between countries because of the different way to delivering public goods and services and providing social protection.

Following the theoretical framework proposed by Ram (1986), we assume that 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:

$$C = C(L_C, K_C, G) \quad (1)$$

$$G = G(L_G, K_G) \quad (2)$$

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

$$\begin{aligned} L_C + L_G &= L \\ K_C + K_G &= K \end{aligned} \quad (3)$$

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

$$Y = C + G \quad (4)$$

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

$$\frac{G_L}{C_L} = \frac{G_K}{C_K} = 1 + \delta, \quad (5)$$

where $G_L = \partial G / \partial L$ denotes the marginal production of labour input in the government sector (or its discrete analog $\Delta G / \Delta L$), $C_L = \partial C / \partial L$ denotes the marginal production of labour input in 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 $C_G(G/C)$. (See Feder (1983) for further information about the parameters and the models).
Equation (7) shows that the variables which affect economic growth $(\dot{Y})$ include the investment rate (I/Y), labour force growth $(\dot{L})$, government expenditure growth $(\dot{G})$ and government size (G/Y).

3. Empirical results

The objective of this paper is to study the direction of the government size's impact on growth. In this empirical analysis, the rate of GDP increase 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 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 increased since 1990 (Fig.1). Note that Luxembourg is the European Union country with the largest GDP per capita since 1990 (in U.S. dollars). As usual, GDP per capita is based on Purchasing Power Parity (PPP). GDP is gross domestic product converted to international dollars using purchasing power parity rates. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources. Data are in constant 2011 international dollars.

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.

Except for France, Greece, Luxemburg, Portugal and UK, the relationship between both variables is negative (Table 2). However, in these countries, R-square is not acceptable. The best result is found for Sweden where the estimated coefficient is 2.57, the variable is significant at 1% and *R*-square is equal to 0.9162.

In order to go deep into these relationships, the standard panel techniques for the econometric estimation have also been used (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:

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

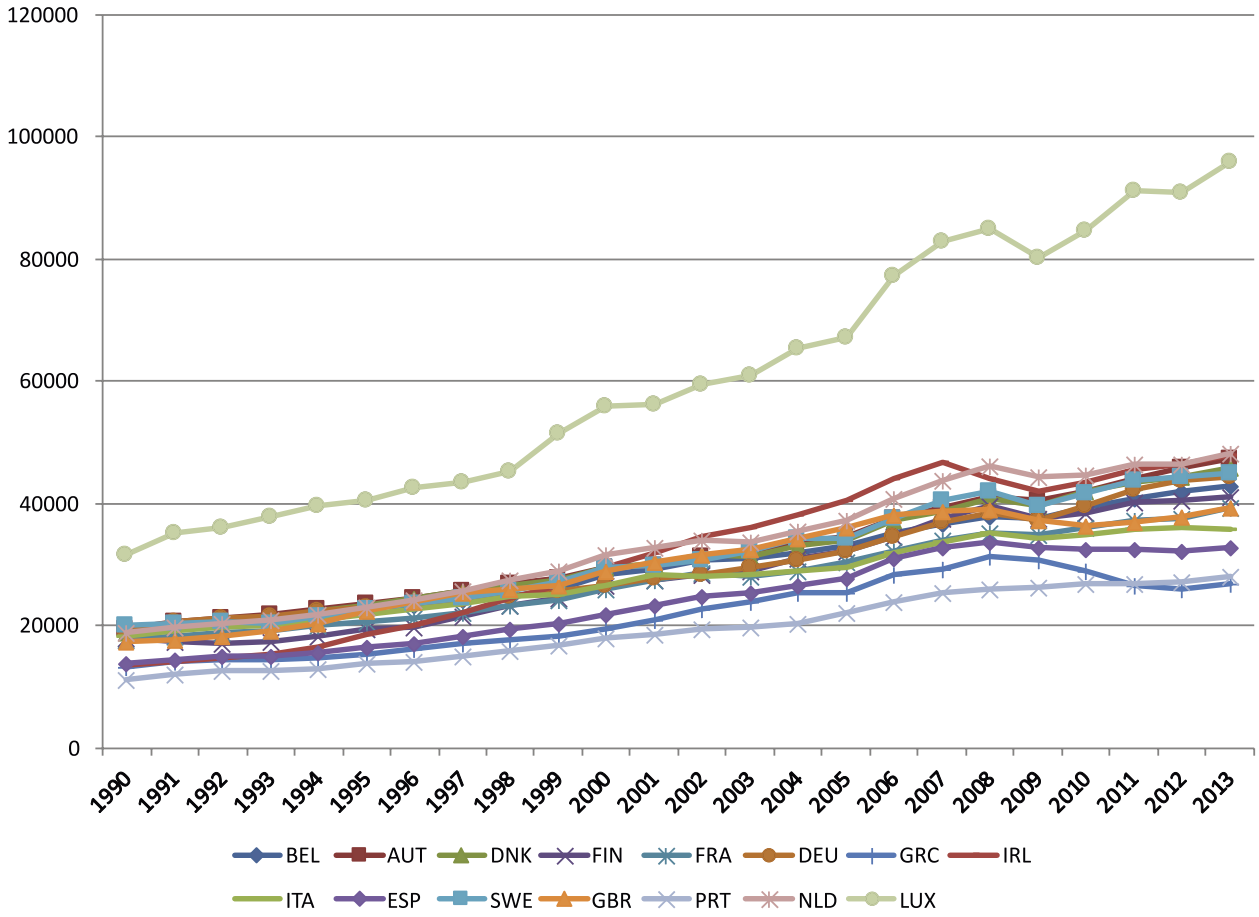

Fig.1 Evolution of GDP per capita (US$ purchasing power parity). European Union countries (1990-2013)

Explanations: AUT- Austria, BEL-Belgium, DNK- Denmark, FIN-Finland, FR-France, DEU-Germany, GRC-Greece, IRL-Ireland, ITA-Italy, NLD-Netherlands, PRT-Portugal, ESP-Spain, SWE- Sweden, GBR-Great Britain, LUX- Luxembourg.

Source: OECD

Table 2. Estimated linear relationships between per capita growth rate ($\dot{Y}$) and government spending ($\dot{G}$). European Union countries (1994-2012). Dependent variable: Economic Growth

Country	Coef.	Std. Err.	t	P>t	R-square
Austria	-2.9469	0.5896	-5.0000	0.0000	0.6248
Belgium	-0.3181	0.9967	-0.3200	0.7540	0.0060
Denmark	-1.6475	0.3824	-4.3100	0.0000	0.5219
Finland	-1.8332	0.4704	-3.9000	0.0010	0.4870
France	0.2644	1.0438	0.2500	0.8030	0.0043
Germany	-1.9337	0.5149	-3.7600	0.0020	0.4685
Greece	0.5019	0.8182	0.6100	0.5530	0.0363
Ireland	-0.1078	0.4827	-0.2200	0.8260	0.0031
Italy	-1.8498	0.3529	-5.2400	0.0000	0.6319
Luxembourg	0.4469	1.3449	0.3300	0.7440	0.0069
Netherlands	-0.7665	0.6714	-1.1400	0.2710	0.0800
Portugal	1.4363	0.4997	2.8700	0.0110	0.3405
Spain	-0.6378	0.7427	-0.8600	0.4040	0.0469
Sweden	-2.5757	0.1947	-13.2300	0.0000	0.9162
United Kingdom	1.2562	0.4036	3.1100	0.0080	0.4089

Source: Authors' elaboration

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 3.

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 fixed effects should be used. Total government spending (growth rate) is significant and the level of explanation. Also, sign of variable indicates that government spending is negatively related to economic growth in the European Union.

Table 3. Estimates of the determinants of Economic Growth in the European Union countries (1994-2012). Dependent variable: Economic Growth

		Random Effects		
Random Effects	**Coef.**	**Std. Err.**	**t**	**P > t**
Total Government Spending	-0.1441	0.1117	-1.2900	0.1970
Fixed Effects	Coef.	Std. Err.	t	P > t
Total Government Spending	-0.6061	0.1602	-3.7800	0.0000
R-square	0.0554			
Wald Statist. And Prob (Wald)	1.66 (0.1970)			
Hausman Statistic and Prob (Hausman)	16.18 (0.0001)			
F Statistic and Prob (F)	35.34 (0.000)			

Source: Authors' elaboration

4. Conclusions

The relationship between economic growth and government expenditure continues being an unending story. It 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 for the period 1994–2012. As a result, we have found a positive relationship for some EU countries (Portugal and United Kingdom) whereas it is negative for others (Austria, Finland, Italy and Sweden) or even not significant (Belgium, France, Greece, Ireland, Luxembourg, the Netherlands and Spain). However, considering the European countries as a whole and using panel techniques, this relationship is negative over the period 1994–2012. Obviously, further research about this topic during the next years is required taking into account that during the economic crisis, growth promotion could be subordinate to other objectives, such as social policy concerns, or protection of employment.

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