



## Full length article

# Economic growth and government size in developed European countries: A panel threshold approach

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## ABSTRACT

Based on the literature on economic growth, there is a non-linear relationship between government size and economic growth, which is usually similar to an inverted U-shaped curve and is used to determine the optimum share of government expenditure. The present study aims to investigate the non-linear relationship among 14 developed European countries during 1995–2014. Final consumption expenditure to gross domestic product (FCE), current expenditure other than final consumption to gross domestic product (OCE), and government gross fixed capital formation to gross domestic product (GFCF) were considered for measuring government size. The results indicate an asymmetric effect of FCE and GFCF on economic growth when they are above and below the optimal level. The optimum values of FEC and GFCF were estimated to be 16.63 and 2.31%, respectively. However, it is noted that OCE always has a negative effect on economic growth. In terms of policy prescriptions, governments of developed countries should be aware that misallocation of public expenditure can occur given it may likely become unproductive after passing an optimal size.

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## 1. Introduction

Sustainable economic growth is regarded as a discovery process which is generally guaranteed by the market mechanism. However, the effect of government size on economic growth is a controversial issue. Obviously, government should play a role in different areas such as the security of property rights and providing the proper environment for private activities. Accordingly, a decrease in transaction costs leads to an increase in investment and production. Government can also provide infrastructure, public health, and education since the private sector cannot implement them sufficiently for the whole community. Hence, government efforts lead to higher economic growth through entering those sectors in which the market mechanism fails or are more efficient, compared to the private sector. In this regard, some empirical studies have indicated a positive effect of government size on economic growth (Ram, 1986; Bose et al., 2007; Romero-Ávila and Strauch, 2008; Ghose and Das, 2013).

Government, on the other hand, cannot allocate very large sums to expenditure given its corresponding need to finance expenditure by borrowing and taxes. However, borrowing may increase the financial costs of investment, displace private investment and increase taxes in the future. Taxes may distort resource allocation which results in discouraging economic agents. In addition, centralization and bureaucracy decrease creativity in both public and private sectors. Thus, the trend

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of growth is disturbed or lowered due to government interferences leading to a decrease in creativity and an increase in inefficiency simultaneously (Guseh, 1997; Gwartney et al., 1998; Fölster and Henrekson, 2001; Dar and Amir Khalkhali, 2002; Romero-Ávila and Strauch, 2008; Afonso and Furceri, 2010).

Therefore, government activities can play both a positive and negative role in economic growth. The final effect of government expenditure on economic growth depends on a number of factors such as the amount and types of expenditure. In fact, large increases in government expenditure typically lead to an increase in the negative effects which may create a non-linear relationship between government size and economic growth. In such cases, the positive effect of government expenditure may be ultimately reversed (Barro, 1990; Mourmouras and Lee, 1999; Kosempel, 2004; Agénor, 2010). This non-linear relationship is an inverted U-shaped curve known as the “Barro curve” in the growth literature, and is used to determine the optimum share for government expenditure.

The present study, considering the above literature, aims to investigate whether different types of government expenditure play a non-linear role on economic growth among 14 European Union countries. Therefore, the study differs from previous studies for the following reasons. First, we re-examines the relationship between government expenditure and economic growth using a more appropriate econometric approach. This includes a robustness check with different control variables and a methodology used for instrument variable. The previous empirical studies often estimated a linear effect among a large number of the developed countries. A few have applied various non-linear methods such as quadratic form, threshold autoregressive, and data envelopment analysis for calculating the optimum size of government (Ram, 1986; Barro, 1991; Vedder and Gallaway, 1998; Chiou-Wei et al., 2010; Christie, 2014; Asimakopoulous and Karavias, 2016). However, the data envelopment analysis is a mathematical programming method which may produce biased results due to the non-stochastic nature and its estimates cannot be easily validated using usual diagnostic tools. The quadratic form model cannot estimate the optimal size directly.

Second, a review of the previous studies indicates that the samples include a mixture of heterogeneous countries. In the present study, 14 more homogeneous developed countries in the European Union were selected in order to create a roughly equal optimum size. In addition, the above-mentioned methods failed to consider the heterogeneity of regional and time differences. This study seeks to evaluate these differences using the panel threshold model based on a two-way error component.

Finally, the previous studies applied a number of measures such as final consumption expenditure, investment expenditure, and taxation without examining the effect of current expenditure except that of final consumption. Hence, the present study uses government expenditure including final consumption expenditure, current expenditure rather than final consumption, and fixed investment expenditure in order to improve the budgetary policies in the European Union.

In sum, although the effect of final government expenditure on economic growth has been reported in a large number of studies, this study re-examines the relationship in more detail for different types of government expenditure among the countries included in the European Union. In this way, the present paper aims to provide empirical evidence for the non-linear effects of different types of government expenditure on economic growth.

Sections 2 and 3 give a brief overview of other theoretical and empirical studies. Section 4 describes the data and base model. Section 5 describes the panel threshold model. Section 6 reports the empirical results including robustness tests. Section 7 presents the conclusions.

## 2. Theoretical review of the literature

Barro (1990) first considered the public sector in an endogenous growth model. Based on this framework, Barro (1990, 1991) assumes that governments spend tax income on providing public services so that all producers have the same share without any congest effect. Hence, the following AK form represents a sample of firm production:

$$Y(t) = AK(t)^\alpha G(t)^{1-\alpha}, \quad 0 < \alpha < 1. \quad (1)$$

The utility function takes the constant intertemporal elasticity of substitution (CIES) form:

$$u[c(t)] = \begin{cases} \frac{c(t)^{1-\sigma}}{1-\sigma}, & \sigma \geq 0, \sigma \neq 1, \\ \ln c(t), & \sigma = 1. \end{cases} \quad (2)$$

The equilibrium condition is  $Y(t) \equiv C(t) + I(t) + G(t)$ . Based on the infinite horizon Ramsey model, the steady state growth rate is determined by:

$$\frac{\dot{Y}(t)}{Y(t)} = \sigma^{-1} \left[ \alpha (1 - \tau_G) A^{1/\alpha} \tau_G^{(1-\alpha)/\alpha} - \delta - \rho \right]. \quad (3)$$

Therefore, government size ( $\tau_G$ ) has both positive and negative effects on the growth rate. Since the capital share parameter ( $\alpha$ ) ranges between zero and one, a reduction takes place in the positive effect of government size on the growth rate by increasing the government size. Thus, according to Barro (1990), the economic growth rate first increases based on the ratio of productive government expenditure to GDP, then eventually reaches a peak and subsequently declines. This non-linear relationship, known as the “Barro curve”, can be used to determine the optimum share of government expenditure.

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