Fiscal decentralization and government size across Europe

Makreshanska, Suzana and Petrevski, Goran

Saints Cyril and Methodius University in Skopje, Faculty of Economics, Saints Cyril and Methodius University in Skopje, Faculty of Economics

2 December 2016

Suzana Makreshanska and Goran Petrevski

FISCAL DECENTRALIZATION AND GOVERNMENT SIZE ACROSS EUROPE

Abstract

The paper provides for an empirical study of the association between fiscal decentralization and government size on a panel of 28 European developed and former transition countries during 1991-2011, controlling for the effects of various demographic, institutional, and macroeconomic variables as well as for the effects of the Global Financial Crisis. The main findings from the empirical investigation are as follows: We provide evidence for non-negligible effects of expenditure decentralization on government size, especially in the former transition economies. However, when we employ the revenue decentralization as an explanatory variable we cannot provide support to the Leviathan hypothesis. We include two measures of the vertical fiscal imbalance and provide empirical support to the common-pool hypothesis only for the former transition countries. As for the effects of the control variables, our research results suggest that higher public debt leads to larger government, while trade openness is associated with smaller government size. Also, we find that the effects of population density and dependent population on government size differs between the developed and the former transition countries, while higher degree of urbanization reduces government size only in the developed countries sub-sample. Finally, we confirm that the Global Financial Crisis has strong effects on the level of government expenditure across Europe.

Keywords: Fiscal decentralization, Government size, Leviathan hypothesis, Common-pool hypothesis, Panel data models, Fixed-effects estimator

JEL Classification numbers: C33, H50, H71, H77.

1. Introduction

In the fiscal federalism literature there is a long standing debate on the expected effects of fiscal decentralization on the size of the government as well as its efficiency. According to the advocates of decentralization it should deliver both smaller and more efficient government because the local governments usually have a comparative advantage in the allocation of resources as compared to the central government (Oates, 1972). In other words, by bringing government "closer to the people", fiscal decentralization provides a better match between local preferences and local policies. Further on, decentralization could decrease government size by promoting the tax competition between the different levels of government. In a decentralized system, governments' revenue-maximizing behaviour is undermined by their need to compete with one another for mobile sources of revenues (Brennan and Buchanan, 1980). On the other hand, the opponents argue that the expected positive effects of decentralization on the size and efficiency of government need not materialize since often the central government and the local authorities engage in oligopolistic arrangements for financing from common pool of funds, thus attempting to maximize the public expenditure (Grossman, 1989; Grossman and West, 1994).

In this paper we provide empirical evidence on the effects of fiscal decentralization on government size for an unbalanced panel of 28 European countries during 1990-2011, estimated by the fixed-effects estimator. Our main research task is to test empirically the two standard hypotheses concerning the effects of fiscal decentralization: the Leviathan hypothesis and the common-pool hypothesis. To this end, we regress the government expenditure (as % in GDP) on several fiscal decentralization variables (local expenditure, local revenue, and vertical fiscal imbalance), controlling for the effects of various demographic, institutional, and macroeconomic variables, such as: the level of economic development, trade openness, population density, urbanization, dependent population, the level of public debt, and inflation. In addition, we take into account the effects of the Global Financial Crisis on government expenditure. In order to check for the robustness of the results, we run three separate regressions, covering the full sample as well as two sub-samples: one that includes the developed countries and another one consisting of the former transition economies from Central and Eastern Europe (CEE).

The main findings from our investigation are as follows: We provide evidence for non-negligible effects of expenditure decentralization on government size, especially in the former transition countries. However, when we employ the revenue decentralization as an explanatory variable we cannot provide support to the Leviathan hypothesis. In addition, we include two measures of the

vertical fiscal imbalance and provide empirical support to the common-pool hypothesis only for the CEE countries where the reliance on tax-sharing, central government grants and other forms of intergovernmental fiscal transfers indeed leads to larger government. As for the effects of the control variables, our research results suggest that higher public debt leads to larger government, while trade openness is associated with smaller government size. Also, we find that the effects of population density and dependent population on government size differs between the developed and the CEE countries, while higher degree of urbanization reduces government size only in the developed countries sub-sample. Finally, we confirm that the Global Financial Crisis has had strong effects on the level of government expenditure across Europe.

As for the organization of the paper, the next section presents the main theoretical concepts concerning the expected effects of decentralization on government size. Section 3 provides an overview of the empirical research in this field followed by Section covering methodological and data issues as well as providing discussion of the regression results. As usual, the last section concludes.

2. Fiscal decentralization and government size in theory

Since the 1950s a number of theoretical models have attempted to shed a light on the role of the government and the effects of fiscal decentralization on government size (For instance, see Buchanan and Wagner, 1977; Rodden, 2003). The classical approach to public finance views the government as a "benevolent despot", which are responsible for implementing the socially optimal public policies (Musgrave, 1959). According to this concept of the so-called „responsive governments", in performing its functions the government is guided solely by the citizens' preferences about the public goods. Therefore, in the decision-making process the government always attempts to maximize the social welfare function. In these regards, the government size reflects the citizens' demand for public goods, implying that both the decentralization of the government and tax competition between the different tiers of government could lower the quality of public goods and, ultimately, to reduce social welfare.

Yet, there is another, presumably more realistic theoretical model arguing that the government's decision-making process is not necessarily based on the citizens' preferences, but the politicians and bureaucrats follow their own interests and aim at maximizing their power and revenues. As

can be seen, the concept of the so-called "excessive governments" introduces the principal-agent and information asymmetry problems in the analysis of the supply of and demand for public goods. Within this framework, on the one hand, the government pursues its own interest (to be re-elected) so it's maximizes the public expenditure above the demand for public goods. On the other hand, facing the asymmetric information problem, the citizens always prefer public expenditure to taxation. As a result, the size of the public sector shows a tendency to increase over time (Buchanan and Wagner, 1977). The concept of "excessive governments" implies that the decentralization is expected to lead to both smaller government and higher efficiency. Indeed, that is the main prediction of the so-called Leviathan hypothesis, which argues that, ceteris paribus, the role of government in the economy will be lower the higher the degree of decentralization of government (Brennan and Buchanan, 1980). Specifically, under the assumption of mobility of capital and labor, fiscal decentralization constrains the government monopoly of taxation by introducing tax competition between the various tiers of government, which ultimately reduces government size.

Another theoretical model that suggests a negative association between decentralization and the size of government has been proposed by Oates (1972). Within this framework, under the assumptions that the citizens have heterogeneous preferences for the locally provided public goods and the marginal costs for providing public goods differ between the local governments, decentralization increases the efficiency in the allocation of resources. The rationale behind this proposition stems from the information advantage of local governments, which are capable of identifying the true preferences of the citizens and, accordingly, to match the supply of public goods to the demand. Consequently, the increased efficiency of public expenditure is the mechanism by which decentralization leads to smaller government. Yet, one might argue that, under the assumption of relatively high price elasticity of the demand for public goods, the lower marginal costs associated with the decentralization could lead to an increase in the demand for public goods and, accordingly, larger government.

Some authors (for instance, Grossman, 1989; Grossman and West, 1994) emphasize that the effects of decentralization on the size of the government depends on the way the decentralization is implemented, implying that decentralization need not result in smaller and more efficient government. This occurs when the local and central government, instead of competing for the scarce fiscal resources, engage in various (oligopolistic) arrangements for sharing the common

fiscal resources, such as the revenue sharing programs. In this case, the local governments accept to substitute their fiscal autonomy for sharing the revenues with the central government. Therefore, the tax competition among the local governments is replaced by the "race" for larger expenditure from the "common pool" of public revenues. This is the essence of the so-called "collusion" or "common pool" hypothesis, which claims that, when local expenditure is financed by fiscal transfers and tax sharing, decentralization results in larger government (Grossman, 1989).

Concerning the above mentioned issue, a number of papers deal with the relationship between intergovernmental transfers and the size of government (Ehdaie, 1994; Stein, 1998; Rodden, 2003). For instance, Rodden (2003) argues that relying on intergovernmental transfers and tax-sharing as sources of local government finance lowers the degree of tax competition between the different tiers of government, which undermines the strongest theoretical argument in favor of decentralization. According to this view, intergovernmental transfers increase both the supply of and demand for public goods through several channels. Specifically, when local public goods are financed by transfers from and tax-sharing with the central government the costs are borne not only by the local citizens (who benefits from the local public goods) but they are spread on the whole population. In that case, the demand for local public goods will be larger because part of the costs is transferred to the non-residents instead of being internalized. In the opposite case, when the local public goods are financed solely by local revenue the demand for them will be lower because all the costs are internalized (Rodden, 2003).

In addition, intergovernmental transfers lead to larger government by creating the so-called "soft budget constraints" at the local government level. In these regards, Stein (1998) argues that, when faced with various fiscal shocks (higher interest rates on the debt, lower local tax revenue etc.), local governments that rely on intergovernmental transfers as a source of finance feel lesser pressure for adjustment and could afford a higher level of local expenditure for a longer time period (by increasing their debt). The reason for this type of behavior is that both the politicians and the voters expect that the central government, which has already finances the current expenditure of the local governments, would finance their debt, too, especially when the allocation of the intergovernmental transfers is based on discretion instead of legally-binding rules (Stein, 1998). The above arguments could be illustrated by the Italian experience with financing public health services, which are one of the most important responsibilities of the

regional governments (Bordingnon and Turati, 2009; Josselin et al., 2012). By the early 1990s, the public health expenditures in Italy were financed predominantly by the fiscal transfers from the central government. As a result, these expenditures saw a significant expansion throughout all the regions. However, following the introduction of the specific regional tax for financing the public health services (IRAP) in 1996 both the intergovernmental transfers for this purpose and the regional public health expenditures have declined considerably.

As can be seen, decentralization could produce both positive and adverse effects on the size of government depending on the mode of financing the local expenditures. In other words, in order to affect the size of government, the decentralization of expenditures needs to be accompanied by decentralization of revenues. In these regards, there are strong theoretical arguments suggesting that the decentralization that is based on fiscal transfers from and tax-sharing with the central government, instead of fiscal autonomy of the local governments, does not lead to tax competition and smaller government.

3. An overview of the empirical literature

Given the existence of competing theoretical models of fiscal federalism a large number of empirical studies have attempted to disentangle the relationship between fiscal decentralization and the size of government. The empirical research in this field has been pioneered by Oates (1972, 1985). Since the 1980s, most of the empirical research within this strand of the literature has focused on testing the Leviathan hypothesis proposed by Brennan and Buchanan (1980). The long-lasting research interest in this filed probably reflects the controversial views of Brennan and Buchanan (1980) about the role of government with its tendency to maximize its power, thus, drawing the analogy with the biblical monster of gigantic size. In addition, Brennan and Buchanan (1980) themselves have invited the researchers to test their hypothesis, thus triggering an array of empirical studies. In which follows we provide a brief overview of the empirical research on the relationship between fiscal decentralization and the size of government.

In his cross-section study on 57 countries, Oates (1972) found that decentralization and government size may not be related. Similarly, Oates (1985), and Wallis and Oates (1988) also did not find a significant relationship between decentralization and government size both in the sample of 48 US states and in the sample of 43 developed and developing countries. Later on,

Oates's empirical studies were replicated by many authors in different national or international studies, covering different samples and time periods, using different measures for decentralization and government size and different estimation techniques. For instance, focusing on the US experience, Nelson (1986) provided some evidence that the less fragmented countries (those with smaller number of sub-state government units) have larger state government sectors while Forbes and Zampelli (1989) were not able to provide support to the Leviathan hypothesis.

Although there is no firm consensus about the single best measure of government size, expenditure-based measures may be considered superior versus revenue-based measures, since government expenditures could be financed not only by the regular sources (taxes and non-tax revenues) but also by other sources, such as debt creation, money creation and inflation, etc. Therefore, unlike the previous empirical studies, Marlow (1988) and Joulfaian and Marlow (1991) used the expenditure-based measure of decentralization and government size and provided evidence that the higher level of decentralization leads to smaller general government.

The earlier studies that empirically tested the relationship between fiscal decentralization and government size relied on local government revenue and expenditure measures regardless whether local governments have discretion over their revenues or expenditures. On the other hand, as suggested by Rodden (2003), in most countries fiscal decentralization seems to have occurred almost exclusively through increased intergovernmental grants and shared revenues rather than through the devolution of expenditure and tax authority. Therefore, in the empirical studies that followed, many authors started to make a distinction between expenditure and revenue based decentralization and the size of vertical fiscal imbalance, measured by intergovernmental grants. Grossman (1989) underlined the role of intergovernmental grants in increasing government size, through concentrating taxing power at the central level of government and weakening the tax competition and fiscal discipline of local governments for financing their expenditures. Working with the same sample as Marlow (1988), Grossman (1989) empirically confirmed that the higher federal grants to state and local government the larger the size of the government. Similarly, Shadbegian (1999), too, supported the Leviathan hypothesis.

Apart from the US experience, the relationship between fiscal decentralization and government size has been tested in other intra-national studies, such as Canada and Switzerland. For instance, Grossman and West (1994) found inverse correlation between fiscal decentralization and the

general government in Canada. Yet, on a disaggregated level, they provide evidence that the shares of the provincial and local governments actually increase with decentralization and that the intergovernmental grants tend to increase the size of each level of government. As for the Swiss experience, Feld et al. (2010) found a negative relationship between fiscal decentralization and the size of cantons.

Further on, the relationship between fiscal decentralization and government size has been investigated in a number of multi-country studies. For instance, Ehdaie (1994) showed that simultaneous decentralization of the central government's taxing and spending power has negative effect on the government size. On the other hand, revenue sharing with taxing decisions concentrated at the central governments eliminates the negative influence of decentralization on the government size. Hence, the countries pursuing the objective of a smaller governments, should decentralize not only the national government spending power, but the taxing power as well. Jin and Zou (2002) found that: both expenditure and revenue decentralization leads to smaller government at aggregate level; and vertical fiscal imbalance increases the government size at all levels of government. On the other hand, working with both the revenue and expenditure-based measures, Heil (1991) rejected the Leviathan hypothesis.

Stein (1998) introduced another dimension in this subject matter by arguing that decentralization leads to higher government spending if it is accompanied by higher local borrowing autonomy and soft budget constraints in local financing. He tested this proposition empirically on Latin America cross-country data, averaged for the 1990-1995 period, and found a positive relationship between expenditure decentralization and government size. According to him, in order to offset the positive effect of decentralization on government size, the governments should reduce the vertical fiscal imbalance i.e. local government spending should be financed by own local sources of revenues instead of central government grants, shared revenues and local government borrowing.

Traditionally, the IMF's Government Finance Statistics (GFS) has served as a data source in most of the empirical studies on fiscal decentralization because until 1999 the GFS was the only available international dataset on local government finance. But, although GFS provides consistent and operational data of fiscal decentralization measures across countries and over time, it fails to provide a full picture of fiscal decentralization (Ebel and Yilmaz, 2002). In fact, GFS tends to overestimate the true nature of local government revenue autonomy by ignoring the

difference between local taxes upon which local governments have full tax discretion, and other local revenues upon which central government retain control over tax rates and tax bases. On the other hand, as pointed out by Stegarescu (2005), a decentralized system where local governments have real autonomy to determine the allocation of their expenditures or to raise their own revenue is more decentralized than a system in which local government expenditures and revenues are determined by the central government, regardless of the size of local government expenditures or revenues. OECD (1999) made an effort to improve the revenue decentralization measure by classifying taxes by the degree of local government autonomy. Using the OECD improved measures, Ebel and Yilmaz (2002) replicated the study of Oates (1985) and found that local tax autonomy has a negative and significant impact on government size. Rodden (2003), too, showed that fiscal decentralization may have a different impact on government size, depending on whether local expenditures are funded by "own" local revenue sources or intergovernmental grants and shared revenues from the central government. Stegarescu (2005) went a step further, expanding the OECD data set of local government revenue autonomy to cover 23 OECD countries over the period 1965-2001. Using Stegarescu's improved data on tax revenue decentralization for the OECD sample, Fiva (2006) re-examined the relationship between fiscal decentralization and government size and concluded that tax revenue decentralization is associated with smaller government size. On the other hand, the expenditure decentralization for given tax revenue decentralization, is associated with a larger public sector.

Among the recent studies, Prohl and Schneider (2009) conclude that there is substantially lower growth of public expenditure and tax burden in the countries where revenues and expenditure responsibilities are decentralized to a large extent. They also re-examined the relationship between decentralization and government size by introducing additional proxy variable, which incorporates the fiscal and administrative autonomy of local governments, and showed that higher fiscal and administrative autonomy of local governments is associated with a slower growth of the government. Working with a large sample of 74 countries over the period 1985-2000, Martinez-Vazquez and Yao (2009) show that government size, measured by the number of employees in public sector, increases with the level of fiscal decentralization. Cassette and Paty (2010) analyze the effect of decentralization on central and local government sizes by separating the long-run effects of decentralization from its short-run dynamics. In the long run, tax autonomy reduces central expenditure but increases to a greater extent local expenditure, leading

to higher general public expenditure. They also show that vertical imbalances tend to increase the size of both the local and central government. Baskaran (2011) explores the impact of fiscal decentralization on the size of the public sector in 18 OECD countries over the 1980-2000, depending on the government ideology. The main message of his study is that decentralization leads to a smaller government size under a right- than under left-wing parties.

As can be seen, the empirical literature has not reached a consensus on the between decentralization and government size. Nevertheless, we are able to extract several general conclusions:

1) *National versus multi-country studies*. It seems that the national studies provide stronger support to the Leviathan hypothesis than the cross-country studies. Indeed, most of the national studies reviewed in this Section provide evidence for the Leviathan hypothesis (Nelson, 1986; Marlow, 1988; Grossman, 1989; Joulfaian and Marlow, 1991; Shadbegian, 1999; Grossman and West, 1994; Feld et al., 2010). In contrast, a small portion of the international studies is able to this hypothesis (Ehdaie, 1994; Jin and Zou, 2002; Rodden, 2003; Fiva, 2006).

2) *Different measures of the public sector*. Initially, the government size had been expressed in terms of the public revenues and these studies typically failed to provide empirical support to the Leviathan hypothesis (Oates, 1972 and 1985; Nelson, 1986; Oates и Wallis, 1988; Forbes and Zampelli, 1989). The recent, expenditure-based studies provide a stronger support to the hypothesis (Marlow, 1988; Grossman, 1989; Joulfaian and Marlow, 1991; Ehdaie, 1994; Shadbegian, 1999).

3) *Alternative measures of fiscal decentralization*. Recently, an increasing fraction of the studies emphasize the composition of local revenues. As a result, the studies that measure decentralization in terms of the local governments' "own" revenues are more able to provide support to the Leviathan hypothesis (Jin and Zou, 2002; Rodden, 2003; Fiva, 2006).

4. Fiscal decentralization and government size: Industrialized European countries versus Central and East European countries

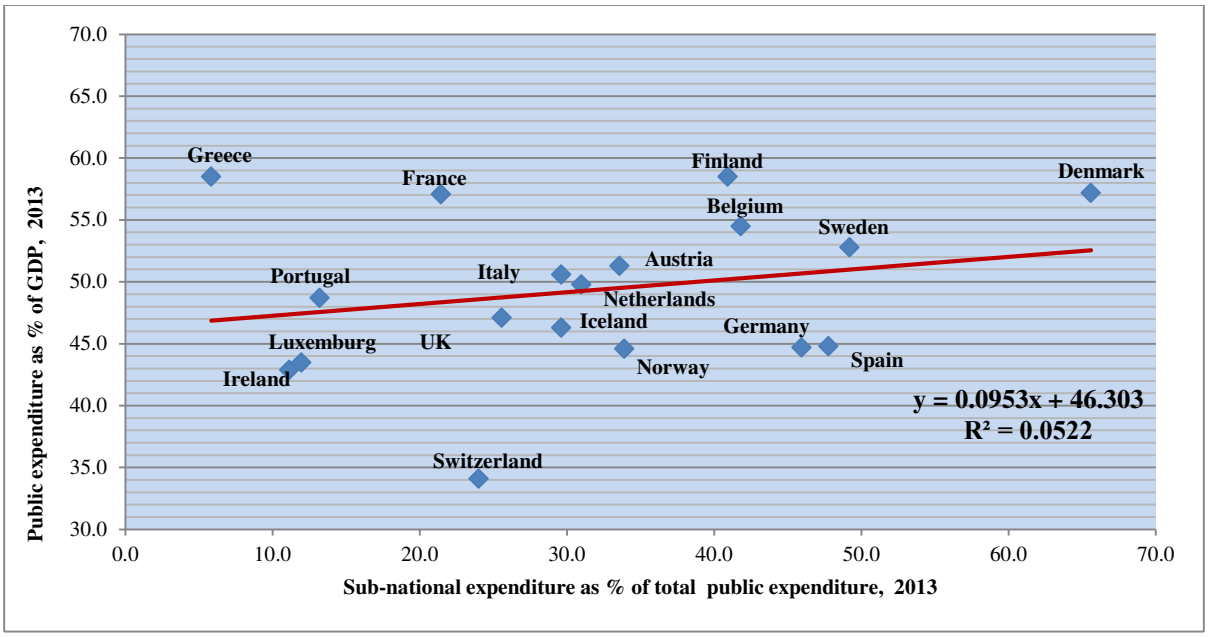
The above review of theoretical models and empirical studies suggests that the relationship between fiscal decentralization and government size is ambiguous. In principle, the simple transfer of public expenditures from the central government to the sub-national governments,

which occurs if sub-national governments perform the same functions previously done by the central government, need not affect the size of the public sector. Yet, if sub-national governments are indeed more allocative efficient, in that case decentralization should lead to smaller government as suggested by Oates (1972). Under the third scenario, in case of a weak fiscal discipline of sub-national governments due to the soft budget constraints and the common pool problems, decentralization inevitably results in larger government.

Therefore, the answer to our principal research question should be sought in the empirical investigation. Before turning to the discussion of the methodological issues as well as the estimation results we present some general facts on the relationship between fiscal decentralization and government size for two sub-samples.

Figure 1 plots the relationship between decentralization and the size of the public sector in the industrialized European countries, consisting of the "old" EU members plus some other developed countries, such as Switzerland, Iceland and Norway. As shown, the degree of fiscal decentralization is measured by the share of sub-national expenditures in the total public expenditures. The vertical axis depicts the size of the public sector as measured by the share of the total public expenditures (the expenditures of the general government) in the Gross Domestic Product (GDP). One can observe a weak positive correlation between decentralization and the size of government, i.e. the more decentralized countries have larger public sector. Some authors interpret the observed positive relationship as evidence that decentralization results in overlapping functions of the central and sub-national governments, which eventually leads to a larger public sector (Joumard and Kongsrud, 2003). An alternative explanation is that the voters in the developed European countries simply prefer higher taxes accompanied by higher quantity and quality of public goods. In these regards, decentralization leads to larger government by matching the supply of public goods to the demand (Eyraud and Badia, 2013). This explanation is probably more relevant for the Scandinavian countries, which are the most decentralized countries and, at the same time, they are known to have the largest public sector among the European countries (53.3% versus 48.1% in the rest of the sub-sample).

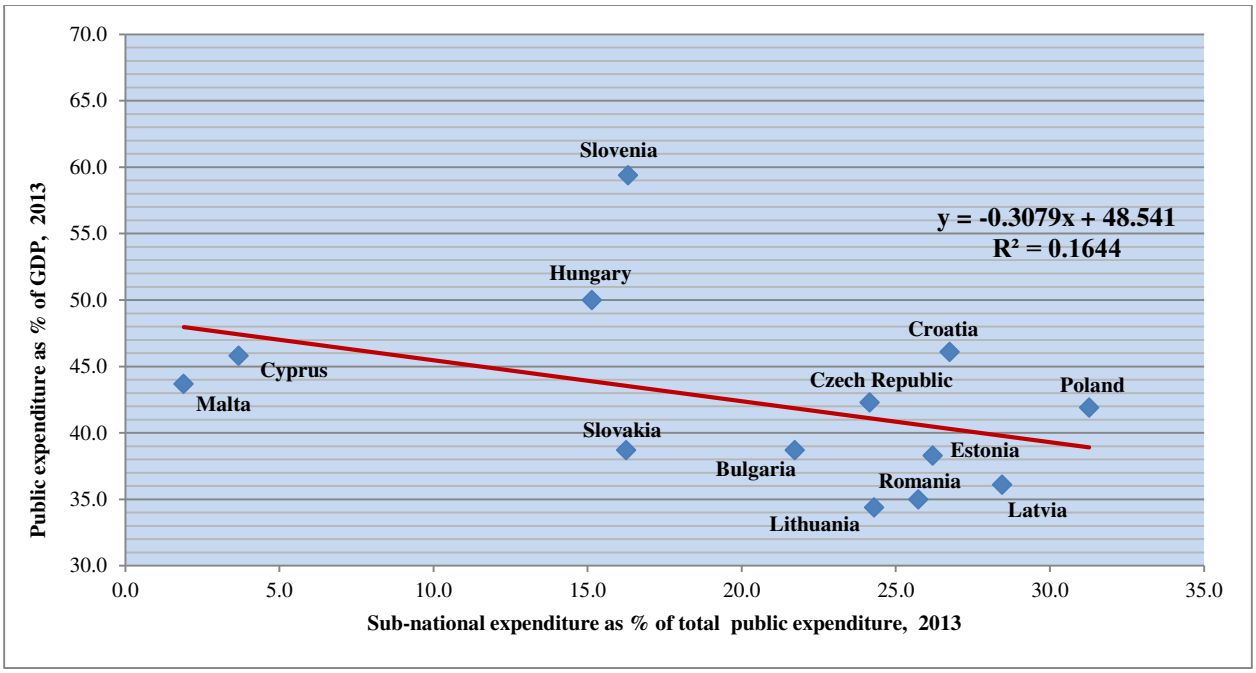
Figure 1: Fiscal decentralization and public expenditure in the developed European countries, 2013



Source: Own estimates based on the EUROSTAT database.

Figure 2 plots the relationship between decentralization and the size of the public sector in the "new" EU members, consisting mostly of the CEE countries plus Malta and Cyprus. The extent of fiscal decentralization as well as the size of the public sector is measured in the same manner as in Figure 1. As can be seen, the direction of the relationship between decentralization and government size in the CEE countries slopes in the opposite direction as compared to the developed European countries. For these countries the regression coefficient is much bigger (-0.31) than in Figure 1, it has the negative sign predicted by Oates (1972) and, at the same time, the association between decentralization and the government size is much stronger as revealed by the coefficient of determination (0.16). This finding may be related to the massive political, economic and institutional reforms implemented in these countries during the transition from centrally-planed to market economies, which included the decentralization process aimed at increasing the allocative efficiency of the government. In these regards, some argue that former transition economies may gain larger benefits from the decentralization compared to the industrialized countries due to the high degree of political and fiscal centralization as well as the great inefficiency of the public sector (Shah, 2004).

Figure 2: Fiscal decentralization and public expenditure in the "new" EU members, 2013



Source: Own estimates based on the EUROSTAT database.

The above plots of the decentralization-government size relationship are given for illustrative purpose only and need not be interpreted as implying causality from decentralization to the government size. For instance, one may argue that the observed positive correlation between decentralization and government size may reflect the reverse causality, i.e. the countries with larger government are probably better candidates for decentralizing expenditures than the countries in which the public sector is small. In addition to decentralization, it is reasonable to assume that government size depends on various other determinants, which have been omitted in the above figures, such as: the demographic characteristics of the population, the level of economic development etc. Therefore, we now turn to a more elaborate treatment of the association between decentralization and government size.

5. Methodology and discussion

5.1. Data description

Our empirical investigation of the relationship between fiscal decentralization and government size is based on annual data for a panel of 28 European countries during the period of 1990-2011.

Due to the data availability problems we work with an unbalanced panel, i.e. the time dimension is not equal for all the cross-sections. Specifically, the panel consists of the following countries with the respective time periods given in the parentheses: Austria (1991-2011), Belgium (1991-2011), Bulgaria (1995-2011), Croatia (2002-2011), Czech Republic (1995-2011), Denmark (1991-2011), Estonia (1995-2011), Finland (1991-2011), France (1991-2011), Germany (1991-2011), Hungary (1995-2011), Iceland (1991-2011), Ireland (1995-2011), Italy (1995-2011), Luxemburg (1991-2011), Latvia (1994-2011), Lithuania (1995-2011), Netherlands (1991-2011), Norway (1991-2011), Poland (1995-2011), Portugal (1995-2011), Romania (1995-2011), Slovakia (1996-2011), Slovenia (1995-2011), Spain (1995-2011), Sweden (1991-2011), Switzerland (1991-2011), and United Kingdom (1991-2011). In order to discover whether there are any differences in the fiscal decentralization-government size link between the industrialized European countries and the "new" EU member states (the former communist economies from CEE) we divide the whole sample into two sub-samples.[1]

Our principal research goal is to provide an empirical test of the Leviathan hypothesis, i.e. to find out whether fiscal decentralization is associated with small government size across the European countries. As for the dependent variable, the government size (*size*), we measure it by the share of total public expenditure (general government) in GDP. We employ two measures of the extent of fiscal decentralization: expenditure decentralization (*locexp*), i.e. the share of sub-national government expenditure in total government expenditure (general government), and revenue decentralization (*locrev*), i.e. the share of sub-national government revenue in total government revenue. In addition, we like to test the relevance of the common pool hypothesis, i.e. to investigate whether intergovernmental grants lead to a larger government. Here, we measure the fiscal decentralization by the size of the vertical fiscal imbalance as proxied by two indicators: first, a variable (*grant*) measuring the importance of central government grants as a source of financing local government, i.e. the share of intergovernmental transfers in total sub-national government revenues; second, a variable (*autonom*) representing the extent of the local-government tax autonomy, i.e. the ratio of sub-national tax revenues to total sub-national expenditure. The data for the public expenditure/GDP ratio were extracted from the EUROSTAT

[1] The CEE sub-sample consists of the following 11 countries: Bulgaria, Croatia, The Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia, and Slovenia. The other 17 countries form the developed countries sub-sample.

database, while all the fiscal decentralization data were taken from the March 2014 issue of the World Bank's Fiscal Decentralization Indicators Database, which draws on the International Monetary Fund's Government Finance Statistics. Further on, we use several variables in the empirical model, which serve to control for various demographic, geographic, institutional, political, and economic factors that exert influence on the government size, such as: the level of development, population density, urbanization, dependent population, trade openness, public debt, and inflation. Additionally, we have constructed a dummy variable for the effects of the Global Financial Crisis on government expenditure. In what follows we explain the rationale for the inclusion of these variables in the regression:

According to the so-called Wagner law, government size is associated with the degree of economic development (Peacock and Wiseman, 1961). The Wagner law implies that the income elasticity of the demand for public goods is greater than unity, which means that the higher level of income leads to a larger public sector. Therefore, in order to test for the Wagner law we include the GDP per capita (*gdp*) as a proxy for the degree of economic development with a positive regression coefficient. There is an obvious relationship between government size and population density (the number of inhabitants per one square kilometer) as the latter determines the marginal costs for providing the public goods. Consequently, we expect a negative association between this variable (*dens*) and government size. Similarly, the dependency ratio (the share of the population aged less than 14 and over 65 in the total population) influences the demand for various fiscal transfers, such as: pensions, health care, social welfare etc. Therefore, we include this variable (*depend*) in the empirical model with an expected positive sign of the regression coefficient. The degree of urbanization (*urban*), measured as the share of urban population in total population affects both the demand for public goods and the costs of their supply. On the one hand, both the quantity and the quality of public goods increase with urbanization while, on the other hand, urbanization reduces the costs of supplying public goods through the effects on population density. Hence, the a priori sign of this variable is ambiguous. Further on, Rodrick (1998) suggests that higher trade openness leads to a greater uncertainty, thus increasing the demand for public goods because of the need for the government to offset the effects of various external shocks. Consequently, small open economies characterized by high trade/GDP ratios are expected to have larger government. On the other hand, international competition and globalization puts a pressure for increased efficiency of the public sector, too,

thus, leading to small government size. As a result, the overall effect of the trade openness variable (*open*) on government size is ambiguous. Also, we include two macroeconomic variables in the empirical model, the public debt (*debt*) as well as the inflation rate (*infl*). As for the former, the expected regression coefficient is positive due as the larger public debt is associated with higher expenditures related with debt servicing. As for the latter, the relationship between inflation and government size is ambiguous due to the following two opposite effects: on the one hand, high inflation may erode tax revenues (in the case of a delay in revenue collections or the absence of indexation mechanism) thus restraining government size; on the other hand, in the presence of progressive taxation higher inflation leads to a drift in the tax base, thus increasing tax revenues. Finally, in order to capture the effects of the Global Financial Crisis on government expenditure (for instance, due to the massive costs associated with the rehabilitation of the banking sector) we construct a slope dummy variable (*crisis*), which takes the value of one during 2009-2011 and the value of zero otherwise. The expected regression coefficient of the dummy is positive.

5.2 Specification of the empirical model

We analyse the relationship between government size and fiscal decentralization by means of a fixed-effects panel data model, which seems to be more appropriate when working with macro panels, especially when the cross-sections are not sampled randomly and when the research focuses on the behaviour of the specific sample without drawing inferences about the whole population. In addition, the fixed-effects estimator is consistent even when individual effects are correlated with the regressors (Baltagi, 2008). In these regards, the assumption that the regressors are not correlated with the disturbance term, which is critical for employing the random effects model, seems to be a priori unrealistic (Wooldridge, 2002) as many of the regressors included in the model may be correlated with the unobserved country-specific effects. For instance, urbanization is associated with the country's geography and history; the level of economic development depends on the various country-specific cultural and institutional factors; the dependent population is affected by the demographic trends in a country; inflation may reflect the society's aversion etc. Formally, we base our choice of the fixed-effects vis-á-vis the random-effects model on the Hausman-test (Hausman, 1978), which in each case rejects the null-

hypothesis that the regressors and the disturbances are not correlated.[2] In addition, our preference for the fixed-effects model is supported by the results of the F-test for the joint significance of the fixed effects, which are shown at the bottom of Table 1.

The empirical model has the following general specification:

$$y_{it} = \alpha_i + \gamma z_{it} + x_{it}\beta' + u_{it} \quad (1)$$

where:

- y is the dependent variable (*size*);
- z represents the various alternative measures of fiscal decentralization (*locexp*, *locrev*, *autonom*, and *grant*);
- x is a k-dimensional vector of explanatory control variables (*urban*, *depend*, *dens*, *open*, *gdp*, *debt*, *infl*, and *crisis*);
- α , γ and β are the constant, the parameter before the fiscal decentralization variable and the k-dimensional vector of parameters of the control variables, respectively;
- u are the residuals;
- i and t are the country and time subscripts, respectively.

5.3 Discussion of the regression results

Table 1 shows the estimates of the empirical model with the local expenditure as a measure of fiscal decentralization. As can be seen, the decentralization variable turns out to be highly statistically significant in the whole sample (at 1% level of significance) as well as the two sub-samples consisting of the developed countries and CEE countries (the p-values are 1.7% and 1.4%, respectively). Also, the regression coefficient has a negative sign, suggesting that fiscal decentralization indeed is associated with smaller government as suggested by the Leviathan hypothesis. Its magnitude ranges from -0.0825 for the developed countries to -0.2113 for the CEE countries, thus, implying non-negligible effects on the government size. This is especially true for the former transition economies where the decentralization seems to offer the greatest benefits. This result may be explained with the initially high level of centralization in the former communist countries in which the public sector was large and highly inefficient. Under these conditions, decentralizing government activities (accompanied by widespread reforms towards

[2] The results of the Hausman-test are available from the authors upon request.

democratization of the society and introducing market economy) leads to an increase in the efficiency in the provision of public goods and smaller government (Shah, 2004). In this regard, the higher regression coefficient of the decentralization variable in the CEE sub-sample clearly reflects the fact that roughly half of the time period refers to the transition phase when most of the political, institutional and economic reforms had been implemented. As for the developed countries, although we find a negative relationship between government size and fiscal decentralization, the magnitude of the regression coefficient is much lower, suggesting that the benefits of decentralization are modest in the countries with more efficient public sector.

Now we turn briefly to the estimates of regression coefficients of the various control variables included in the empirical model. Two of them (*infl* and *gdp*) are found to be statistically insignificant in both the whole sample as well as the sub-samples. In fact, the *gdp* is significant at 10% significance level in the developed countries sample, but the magnitude of the regression coefficient is extremely small in all the three regressions, suggesting that the level of economic development has negligible effects on government size in the European countries. In other words, we cannot provide empirical evidence in favour of the Wagner law. This result might reflect the non-linear effects of the economic development on government size, i.e. it might be possible that above some threshold level of economic development the further increase in income per capita does not have important effects on the demand for public goods. As expected, we find a positive and statistically significant association between public debt and government size in all the three samples, implying that the level of public debt has important effects on government expenditure. The regression coefficient is larger in the developed countries sub-sample where a ten percentage point increase in the public debt leads to a 1.5 percentage point higher government expenditure/GDP ratio. The effects of the public debt are non-negligible in the CEE sub-sample, too, where a ten percentage point increase in the public debt leads to almost one percentage point higher government expenditure/GDP ratio. The larger regression coefficient in the developed countries sub-sample probably reflects the considerably higher indebtedness in comparison to the CEE countries.

Further on, we find statistically significant and economically important effects of trade openness on government size. Here, the regression coefficient is negative, suggesting that the small countries, which are exposed to the forces of globalization and international competition, cannot obey the pressure to increase the efficiency of the public sector. Alternatively, this result could

be explained by the negative association between country size and trade openness associated with the cultural and ethnic diversity (Alesina and Wacziarg, 1998). Population density is highly significant in the three samples, but the sign of the regression coefficient differs across the samples: it is positive in the whole sample and the developed countries sub-sample while it is negative in the CEE countries sub-sample. The developed countries are able to provide the same quantity and quality of public goods to all areas notwithstanding whether they are populated or not. As a result, in these countries, population density does not reduce the government size through the effects of marginal costs for the supply of public goods. On the other hand, we find statistically significant and negative association between urbanization and government size in the full sample and the developed countries sub-sample. As for the variable *depend*, it is significant in the two sub-samples, though it has the expected positive sign only in the CEE countries whereas it is negative in the developed. These divergent effects of *depend* probably reflect the differences in both the composition of budget expenditure and the institutional characteristics across the two groups of countries. For instance, as a result of the underdeveloped financial markets as well as the lower level of income, private pension savings are lower in the CEE region, so that pensions consume a large portion of government expenditure in comparison with the developed countries. Finally, Table 1 reveals the strong effects of the Global Financial Crisis across Europe as many of the countries included in the sample have seen large increase in the government expenditures related to the massive costs associated with the rehabilitation of their vulnerable banking sectors.

Table 1: Government size and decentralization of public expenditure

Variables	Whole sample	Developed countries	CEE countries
constant	87.9461***	114.8096***	47.6657**
	(7.8352)	(8.9133)	(19.0416)
locexp	-0.1541***	-0.0825**	-0.2113**
	(0.0314)	(0.0343)	(0.0849)
debt	0.1213***	0.1512***	0.0995***
	(0.0122)	(0.0144)	(0.0222)
gdp	0.0000	0.0000*	0.0000
	(0.0000)	(0.0000)	(0.0000)
infl	0.0654	0.0124	0.0418
	(0.0499)	(0.0685)	(0.0590)

open	-0.0755***	-0.0949***	-0.0608***
	(0.0112)	(0.0147)	(0.0156)
dens	0.0975***	0.1441***	-0.4956***
	(0.0342)	(0.0399)	(0.1890)
urban	-0.6523***	-0.9385***	0.0042
	(0.1113)	(0.1273)	(0.2273)
depend	-0.1501	-0.6458***	1.2552***
	(0.1842)	(0.2147)	(0.3773)
crisis	3.0176***	2.8327***	2.0448***
	(0.4203)	(0.5504)	(0.5621)
F-test	66.36	83.40	30.54
	(0.0000)	(0.0000)	(0.0000)
R^2	0.4641	0.5519	0.5371
Cross-sections	28	17	11
Observations	478	322	156

Note:

1. ***/**/* denotes significance at 1%, 5% and 10% level of significance, respectively.

2. F-test for the significance of the fixed effects (p-value in the parentheses).

Table 2 shows the estimates of the empirical model with the local revenue as a measure of fiscal decentralization.[3] Here, the results differ widely across the three samples: the revenue decentralization variable is statistically significant only in the developed countries sub-sample where the regression coefficient is positive. Though it is positive in the full sample, too, its magnitude is extremely small (virtually zero) and it is not significant. On the other hand, this variable carries a negative sign in the CEE countries sub-samples, but it is not statistically significant. Therefore, employing this measure of fiscal decentralization fails to conform to the previous set of results, i.e. it does not provide support to the Leviathan hypothesis. We suspect that these findings probably reflect the fact that the local revenue data do not adequately reveal the true extent of fiscal decentralization, because significant portion of the local government revenue comes from various forms of tax-sharing and/or fiscal transfers. Moreover, local governments usually do not have full discretion over the "pure" local tax revenues, such as property taxes, whose tax rates are normally determined by law. Therefore, even when we use

[3] Alternatively, we have employed another measure of fiscal decentralization - local tax revenue, yielding virtually the same estimates of the regression parameters. This set of results is available from the authors.

the local tax revenue as a measure of fiscal decentralization we obtain virtually the same regression estimates.

Table 2: Government size and decentralization of public revenue

Variables	Whole sample	Developed countries	CEE countries
constant	81.6261***	105.7489***	50.4440***
	(8.4863)	(8.9133)	(19.0416)
locrev	0.0000	0.0802**	-0.0188
	(0.0349)	(0.0377)	(0.0788)
debt	0.1435***	0.1761***	0.1081***
	(0.0121)	(0.0137)	(0.0225)
gdp	0.0000	0.0000**	0.0000
	(0.0000)	(0.0000)	(0.0000)
infl	0.0883*	0.0095	0.0695
	(0.0477)	(0.0687)	(0.0521)
open	-0.0841***	-0.1058***	-0.0623***
	(0.0114)	(0.0143)	(0.0158)
dens	0.0873**	0.1381***	-0.6870***
	(0.0350)	(0.0400)	(0.1816)
urban	-0.6328***	-0.8903***	-0.0841
	(0.1157)	(0.1297)	(0.2273)
depend	-0.0845	-0.6139***	1.6967***
	(0.1896)	(0.2153)	(0.3738)
crisis	2.7594***	2.2167***	2.1279***
	(0.4414)	(0.5610)	(0.5826)
F-test	62.39 (0.0000)	83.74 (0.0000)	31.01 (0.0000)
R^2	0.4358	0.5500	0.5210
Cross-sections	28	17	11
Observations	479	322	157

Note:

1. ***/**/* denotes significance at 1%, 5% and 10% level of significance, respectively.

2. F-test for the significance of the fixed effects (p-value in the parentheses).

As for the regression coefficients of the control variables included in the empirical model, generally they retain the signs and the statistical significance as before. Again, *gdp* is significant at 10% significance level in the developed countries sample, but the magnitude of the regression coefficient is extremely small in all the three regressions, suggesting negligible effects on

government size. The regression coefficient of *infl* is positive in the three samples, but it is statistically significant at 10% only in the full sample. As for the regression coefficients of *debt, open*, *depend*, and *crisis*, the estimates are virtually the same as in the previous set of results. The same is true for the magnitude and statistical significance of the variable *dens*. The estimates of *urban* remain unchanged in the full sample as well as the developed countries sub-sample, but here we obtain a negative coefficient in the CEE sample, too (though it is not significant).

Table 3: Government size and local tax autonomy

Variables	Whole sample	Developed countries	CEE countries
constant	82.7754***	115.0029***	60.7212***
	(8.0358)	(9.2232)	(20.3692)
autonom	-0.0108	-0.0316	-0.0182
	(0.0140)	(0.0274)	(0.0140)
debt	0.1442***	0.1677***	0.1097***
	(0.0117)	(0.0130)	(0.0223)
gdp	0.0000	0.0000*	0.0000
	(0.0000)	(0.0000)	(0.0000)
infl	0.0787	0.0190	0.0564
	(0.0512)	(0.0689)	(0.0597)
open	-0.0862***	-0.1079***	-0.0655***
	(0.0116)	(0.0148)	(0.0159)
dens	0.0898**	0.1434***	-0.7672***
	(0.0351)	(0.0401)	(0.1735)
urban	-0.6532***	-0.9597***	-0.2382
	(0.1166)	(0.1291)	(0.2500)
depend	-0.0671	-0.6334***	1.9150***
	(0.1890)	(0.2153)	(0.3476)
crisis	2.6797***	2.4552***	1.8852***
	(0.4358)	(0.5468)	(0.5865)
F-test	66.36 (0.0000)	66.85 (0.0000)	31.72 (0.0000)
R^2	0.5765	0.5452	0.5220
Cross-sections	28	17	11
Observations	479	323	156

Note:

1. ***/**/* denotes significance at 1%, 5% and 10% level of significance, respectively.

2. F-test for the significance of the fixed effects (p-value in the parentheses).

As already mentioned, besides the Leviathan hypothesis, we aim to test the relevance of the common-pool hypothesis, i.e. to investigate whether intergovernmental grants lead to a larger government. To this end we employ the vertical fiscal imbalance as a measure of fiscal decentralization. Table 3 and Table 4 present the estimates from the regression with the local-government tax autonomy (*autonom*) and intergovernmental grants (*grants*) as explanatory variables. Both variables serve as proxies for the fiscal imbalance as the former shows the proportion of local expenditure financed by local tax revenue while the latter emphasize the reliance on central government grants as a source of finance. The greater degree of tax autonomy means that local governments rely predominantly on their own sources of tax revenue, which reduces the room for common-pool financing arrangements. Therefore, one expects a negative association between *autonom* and *size*.

Table 3 reveals that the regression coefficient of the variable *autonom* has the expected sign in the three samples, but it is not statistically significant. As can be seen from Table 4, similar results are obtained for the second measure of the vertical fiscal imbalance, the variable *grant*, which has the "correct" sign in the three regressions, but it is significant only in the CEE country sample (with a p-value of 6.4%). Hence, we are able to provide empirical support to the common-pool hypothesis only for this group of countries where the reliance on tax-sharing, central government grants and other forms of intergovernmental fiscal transfers indeed leads to larger government. In these regards, one may argue that the absence of strong institutions and rule-based criteria in the allocation of fiscal transfers give rise to the common-pool phenomenon in these countries. Finally, concerning the control variables included in the empirical model, Table 3 and Table 4 reveal that both their sign and the magnitude have remained virtually unchanged as in the previous specifications, so that we will not discuss them.

Table 4: Government size and central grants

Variables	Whole sample	Developed countries	CEE countries
constant	80.7377***	110.4820***	55.8761***
	(7.9882)	(9.1277)	(19.0679)
grant	0.0138	0.0277	0.0310*
	(0.0163)	(0.0324)	(0.0166)

debt	0.1447***	0.1680***	0.1108***
	(0.0117)	(0.0130)	(0.0221)
gdp	0.0000	0.0000*	0.0000
	(0.0000)	(0.0000)	(0.0000)
infl	0.0889*	0.0128	0.0698
	(0.0476)	(0.0690)	(0.0513)
open	-0.0859***	-0.1059***	-0.0659***
	(0.0115)	(0.0146)	(0.0158)
dens	0.0940***	0.1438***	-0.7305***
	(0.0358)	(0.0402)	(0.1660)
urban	-0.6454***	-0.9303***	-0.2540
	(0.1149)	(0.1287)	(0.2403)
depend	-0.0701	-0.6416***	1.9382***
	(0.1886)	(0.2158)	(0.33379)
crisis	2.6888***	2.4952***	1.8986***
	(0.4343)	(0.5450)	(0.5707)
F-test	59.44 (0.0000)	75.88 (0.0000)	32.24 (0.0000)
R^2	0.4368	0.5443	0.5327
Cross-sections	28	17	11
Observations	480	323	157

Note:

1. ***/**/* denotes significance at 1%, 5% and 10% level of significance, respectively.

2. F-test for the significance of the fixed effects (p-value in the parentheses).

6. Conclusions

This paper provides for an empirical study of the association between fiscal decentralization and government size on a panel of 28 European countries during 1990-2011, estimated by the fixed-effects model. Our main research task is to test empirically the two standard hypotheses concerning the effects of fiscal decentralization: the Leviathan hypothesis and the common-pool hypothesis. To this end, we regress the government expenditure (as % in GDP) on several fiscal decentralization variables (local expenditure, local revenue, and vertical fiscal imbalance), controlling for the effects of various demographic, institutional, and macroeconomic variables, such as: the level of economic development, trade openness, population density, urbanization, dependent population, the level of public debt, and inflation. In addition, we take into account the effects of the Global Financial Crisis on government expenditure. In order to check for the robustness of the results, we run three separate regressions, covering the full sample as well as

two sub-samples: one that includes the developed countries and another one consisting of the former transition economies.

The main findings from our investigation are as follows: The expenditure decentralization variable is highly statistically significant in the whole sample as well as the two sub-samples. The regression coefficient has a negative sign, suggesting that fiscal decentralization indeed is associated with smaller government as suggested by the Leviathan hypothesis. We provide evidence for non-negligible effects of expenditure decentralization on government size, especially in the CEE countries. However, when we employ the revenue decentralization as an explanatory variable we cannot provide support to the Leviathan hypothesis.

We suspect that these findings probably reflect the fact that the local revenue data do not adequately represent the true extent of fiscal decentralization, because significant portion of the local government revenue comes from various forms of tax-sharing and/or fiscal transfers. Therefore, we include two measures of the vertical fiscal imbalance focusing on the composition of local government finance, i.e. tax autonomy versus intergovernmental fiscal transfers. Here, we provide empirical support to the common-pool hypothesis only for the CEE countries where the reliance on tax-sharing, central government grants and other forms of intergovernmental fiscal transfers indeed leads to larger government.

As for the effects of the control variables, our research results suggest that higher public debt leads to larger government, while trade openness is associated with smaller government size. Also, we find that the effects of population density and dependent population on government size differs between the developed and the CEE countries, while higher degree of urbanization reduces government size only in the developed countries sub-sample. Finally, we confirm that the Global Financial Crisis has had strong effects on the level of government expenditure across Europe.

References

Alesina, Alberto, and Wacziarg, Romain (1998), "Openness, country size and government", *Journal of Public Economics*, 69(3), pp. 305-321.

Baltagi, Badi H. (2008), *Econometric Analysis of Panel Data* (fourth edition). Chichester, UK: John Wiley & Sons.

Baskaran, T., (2011), "Fiscal decentralization, ideology and the size of government", *European Journal of Political Economy*, 27(3), pp. 485-506.

Bordignon, M., and Turati, G. (2009), "Bailing out expectations and health expenditure", *Journal of Health Economics*, 28(2), pp. 305-321.

Brennan, Geoffrey, and Buchanan, James M. (1980), *The power to tax: Analytical foundations of a fiscal constitution*. New York: Cambridge University Press.

Buchanan, J. M., and Wagner, R. E. (1977), *Democracy in deficit*. New York: Academic Press.

Cassette, A., and Paty, S. (2010), "Fiscal decentralization and the size of government: a European country empirical analysis", *Public Choice*, 143(1-2), pp. 173-189.

Ebel, R. and Yilmaz, S. (2002), "On the Measurement and Impact of Fiscal Decentralisation", World Bank Policy Research Working Paper Series, No. 2809.

Ehdaie, J. (1994), "Fiscal decentralization and the size of government: an extension with evidence from cross-country data", World Bank Policy Research Working Paper Series, No. 1387.

Eyraud, L., and Lusinyan, L. (2011), "Decentralizing Spending More than Revenue: Does It Hurt Fiscal Performance?", IMF Working Papers, No. 226.

Feld, Lars P., Gebhard Kirchgässner, and Christoph A. Schaltegger (2010). "Decentralized taxation and the size of government: Evidence from Swiss state and local governments", *Southern Economic Journal*, 77(1), pp. 27-48.

Fiva, J. (2006), "New Evidence on the Effects of Fiscal Decentralization on the Size and Composition of Government Spending", *FinanzArchiv/Public Finance Analysis*, 62(2), pp. 250-280.

Forbes, Kevin F., and Ernest M. Zampelli (1989), "Is Leviathan a mythical beast?", *American Economic Review* 79(3), pp. 568-577.

Grossman, J. P. (1989), "Fiscal Decentralization and government size: an extension", *Public Choice*, 62(1), pp. 63-69.

Grossman, J. P., and West, G. E. (1994), "Federalism and the growth of government: revisited", *Public Choice*, 79(1-2), pp. 19-32.

Hausman, J., A. (1978), "Specification Tests in Econometrics", *Econometrica*, 46(6), pp. 1251-1271.

Heil, J. B. (1991), "The search for Leviathan revisited", *Public Finance Review*, 19(3), pp. 334-346.

Jin, J. and Zou, H. (2002), "How Does Fiscal Decentralisation Affect Aggregate, National and Subnational Government Size?", *Journal of Urban Economics*, 52(2), pp. 270-293.

Josselin, J. M.; Padovano, J., and Rocaboy, Y. (2012), "Fiscal rules vs. political culture as determinants of soft budget spending behavior, Evidence from Italian and French regions", IREF Working Paper No. 1/2012.

Joulfaian, D., and Marlow, M. L. (1991), "Centralization and government competition", *Applied Economics*, 23(10), pp. 1603-1612.

Joumard, I., and Kongsrud, P. M. (2003), "Fiscal relations across government levels", OECD Economic Studies, No.1, pp. 155-229.

Marlow, M. L. (1988), "Fiscal Decentralization and Government Size", *Public Choice*, 56(3), pp. 259-269.

Martinez-Vazquez, J., and Yao, M. (2009), "Fiscal Decentralization and Public SectorEmployment: A Cross-Country Analysis", *Public Finance Review*, 37(5), pp. 539-571.

Musgrave, R. A., (1959), *Theory of public finance*. New York: McGraw Hill.

Nelson, M. A. (1986), "An Empirical Analysis of State and Local Tax Structure in the Context of the Leviathan Model of Government", *Public Choice*, 49(3), pp. 283-294.

Oates, W. E. (1972), *Fiscal Federalism*. New York: Harcourt Brace Jovanovich, Inc.

Oates, W.E. (1985), "Searching for Leviathan: An empirical study", *American Economic Review*, 75(4), pp.748-757.

Peacock, Alan T., and Wiseman, Jack (1961), *The growth of public expenditure in the United Kingdom*, Princeton: Princeton University Press.

Prohl, S. and Schneider, F. (2009), "Does Decentralization Reduce Government Size? A Quantitative Study of the Decentralization Hypothesis", *Public Finance Review*, 37(6), pp. 639-664.

Rodden, J. (2003), "Reviving Leviathan: Fiscal Federalism and the Growth of Government", *International Organization*, 57(4), pp. 698-729.

Rodrick D. (1998), "Why Do More Open Economies Have Bigger Governments?", *Journal of Political Economy*, 106(5), pp. 997-1032

Shadbegian, R. J. (1999), "Fiscal Federalism, Collusion, and Government Size: Evidence from the States", *Public Finance Review*, 27(3), pp. 262-281.

Shah, A. (2004), "Fiscal decentralization in developing and transition economies: progress, problems, and the promise", World Bank Policy Research Paper, No. 3282.

Stegarescu, D. (2005), "Public Sector Decentralisation: Measurement Concepts and Recent International Trends", *Fiscal Studies*, 26(3), pp. 301-333.

Stein, Ernesto H. (1998), "Fiscal Decentralization and Government Size in Latin America", Working Paper, Inter-American Development Bank, Office of the Chief Economist, No. 368.

Wallis, J. J., and Oates, E. W. (1988), "Decentralization in the public sector: an empirical study of state and local government", in Harvey S. Rosen, ed., *Fiscal Federalism: Quantative Studies*. Chicago: University of Chicago Press, pp. 5-32.

Wooldridge, J. (2002). *Econometric Analysis of Cross Section and Panel Data*. Cambridge, MA: MIT Press.