

Quantitative Study of Impact of Fiscal Federalism on Size of Government¹⁾

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Abstract

The federalism theory suggests that a fiscal decentralization has a dampening effect on the size of a government. This idea, **which** was originally proposed by Brennan and Buchanan (1980), states that intrusion of government into economy can be restricted if responsibilities of government with respect to taxes and expenditures are decentralized. This is the essence of decentralization hypothesis. We test this hypothesis for a panel of 29 OECD countries over the period from 1978 to 1993. We study the effect of decentralization on growth of public sector by using two proxy variables of fiscal decentralization. One proxy is a quantitative measurement of decentralization which reflects the revenue and expenditure allocation between the central and sub-national governments. Another proxy is an index of fiscal federalism which incorporates the extent of fiscal and administrative autonomy of sub-national governments granted by constitution and statutory laws. Using both measures of fiscal decentralization we cannot reject the decentralization hypothesis for sample under study. Furthermore, we provide evidence of gains of direct democracy that is an significant complement of fiscal federalism. We show that direct democracy at the local level has a strong negative effect on growth of public sector. This conclusion is robust for the several robustness-tests performed.

Keywords: size of government, fiscal federalism

JEL classification: H71, H72, H73, H77

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1. Introduction

A growing size of government in most developed societies around the globe, especially during the eighties and nineties, motivated theoretical and empirical studies of economic and institutional factors driven growth of government in the long run.

The major purpose of our study is threefold: **First**, it empirically explores the cross-country effect of fiscal decentralization on size of government. To study this effect we use both the share of total governments' expenditure and revenue to GDP. **Second**, this study examines the decentralization hypothesis using two different proxy variables of fiscal decentralization: (i) the measure of expenditure and revenue decentralization based on the Government Financial Statistic (IMF), and (ii) index of fiscal federalism, which incorporates fiscal and administrative autonomy of sub-national governments, given them by constitution and statutory law. **Third**, it explores the democracy hypothesis which states that direct democracy at the local level has a dampening effect on the growth of government.

Our paper is organized as follows: *Section 2* provides theoretical explanation and review of the existing empirical research. *Section 3* provides the evidence on the institutional provision for the fiscal decentralization in OECD countries. *Section 4* characterizes the empirical model. The estimated results and implications are presented in *Section 5*, and concluding remarks are given in *Section 6*.

2. Theoretical explanation and review of empirical research

A public finance literature distinguishes several approaches to analyse economic gains from fiscal decentralization. We will deal with normative and positive theories, and will survey existing empirical research.

2.1 Normative theory

The *normative theory* investigates the optimal division of the public functions between the central and local governments with respect to stabilization, redistribution and allocation

policies (Musgrave, 1959, Persson and Tabellini, 1996). It states that “.....*the allocation branch should be permitted to differ between states, depending on the preferences of their citizens. The objectives of the distribution and stabilization branches, however, require primary responsibility at the central level*” (Musgrave, 1959: 181). This theoretical approach argues that stabilization policy should be assigned to the central government as the local government uses fiscal and to significantly less extend the monetary policy instruments. They must be restricted to operate the stabilization of the prices and employment because of their relatively openness to the trade and interjurisdictional migration of individuals. Likewise, there is the reason that the redistributive policy should lay in the responsibility of the central government. The decentralized policy to redistribute the income creates the incentives for the low-income individuals to move to the jurisdictions with larger redistributive programmes (Sinn, 1996). By contrast, allocation function should be decentralized to a large extent. The local governments have the better information about the local preferences and are more responsive to the heterogeneous demand for the public goods (Frey, B.S., 1997, 2002, Frey, B.S. and Eichenberger, R., 1999). Along the line of the discussed arguments, Oates (1972) investigates his *decentralization theorem*. He focuses the main attention on the potential trade-off between the internalization of spillovers when the central government provides the public goods and the tailoring of public goods to the heterogeneous local preferences through decentralization⁴. As long as the principle of correspondence⁵ of public spending and taxing decisions is respected, the decentralization theorem predicts that the size of government should be smaller with more decentralized public sector. In a somewhat different way, Wallis (1997) argues that the increased fiscal decentralization could lead to higher level of the public spending at the state and local level. As decentralized provision of the public goods can better suit the local preferences, it will result in an increase in demand for the local public goods and lead to a higher level of the local public spending (Schadbegian, 1999: 265).

2.2 Positive theory

The positive theory of public finance suggests that the efficiency-enhancing properties of fiscal decentralization originate from the mobility of taxpayers. This takes the form in the

⁴ The political economy of fiscal federalism produces a large body of the theoretical models that address the question of a trade-off between the benefits from centralized versus decentralized provision of the public goods (Inmann and Rubinfeld, 1997; Besley and Coate, 2000). Contrary to the theorem of Oates, which defines the decentralization as an exogenous variable, the political economy of federalism analyzes the decentralization as an endogenous process. These models predict the outcome in line with the Oates' predictions (1972).

⁵ This principle is also known as a principle of fiscal equivalence (Olson, 1969).

Tiebout (1956) mechanism of „voting by one’s feet”. The unsatisfied taxpayers reveal their preferences moving to the jurisdictions that best reflect their tastes for the fiscal bundle of the tax burden and public services. The equilibrium in the Tiebout (1956) model is Pareto-efficient. The similar perspective on the role of fiscal decentralization in the public sector is argued by *the public choice literature*. Brennan and Buchanan (1980) develop the Leviathan model that beholds the government as maximizing revenues with monopolistic tax power irrespective of the preferences of their taxpayers. This theory predicts the excessive tax burden in the absence of the electoral constraints and claims the desirability of the fiscal decentralization to restrict tax power of the Leviathan. Brennan and Buchanan (1980) suggest that the mobility of taxpayers stimulates the competitive pressure on the local governments to provide the public goods at the optimal level according to desires of their residents.⁶ Hence, they put forward that these two mechanisms can fully or partially substitute the explicit fiscal constraints⁷. The authors define their *Leviathan hypothesis* by suggesting that “...overall intrusion of government into economy may be smaller the greater the extent, to which taxes and expenditures are decentralized” (Brennan and Buchanan, 1980: 184)⁸. In any case, the logic of the theoretical literature leads us to conclude that, other things being equal, we should expect that the level of tax burden and public expenditure varies inversely with the extent of fiscal decentralization. A substantial body of empirical literature tested this hypothesis empirically.

2.3 Existing empirical research

Empirical evidence from states in the U.S. and the cantons in Switzerland shows that fiscal decentralization and fiscal competition has a strong negative effect on the size of public sector. Kirchgässner, Feld and Schaltegger (2003) empirically explore the decentralization hypothesis in the state- and local-level panel data of Swiss cantons from 1980 to 1998. They investigate the different channels of the impact of fiscal federalism on the size and the structure of the revenues of Swiss cantons. The authors find that fiscal decentralization has

⁶ Epple and Zelenitz (1981) represent the model of intergovernmental competition, which restrict rent-seeking of government defining the number of jurisdictions as endogenous variable. They show that horizontal tax competition is not sufficient conditions to guarantee the efficiency of the provision of the local public goods.

⁷ Another view presents "fiscal common resource" problem (Keen, 1995). This approach refers to vertical competition in federation, when federal and sub-federal governments have to share the common tax base. It can lead to higher tax rates and consequently to the higher tax burden. Dabhy (1996) suggests that having the common tax base lead to a smaller tax base of the federal government and consequently to the lower tax burden.

⁸ Another approach models revenues maximizing government along the line of Niskanen model (1975). Wim Moesen and Ph. Van Cauwenberge (2000) provide an interesting application to the model.

strong negative effect on the level of tax burden in the Swiss cantons. They argue that the revenues-reducing effect of fiscal decentralization originates mainly from the large tax autonomy and tax power of the cantons granted by the constitution. Hence, they can not find, for instance, the support for the Brennan and Buchanan fragmentation hypothesis (1980). Tax exporting weakens the dampening effect of fiscal decentralization on the size of government and lead to an increase in tax burden. This finding is in line with the prediction of McLure (1967) who originally tested the tax exporting hypothesis for the U.S. states and found that it creates the incentives for the local governments to increase the tax burden and to provide the public goods at the sub optimal level.

Similar evidence provides research from the states and local levels in the U.S. Schadbegian (1996, 1999) using state-level panel data (1979-1992) tests three hypotheses. He shows that the state and local own-purpose expenditure decentralization causes a decrease of the expenditure of total and central governments, as it is suggested by the Leviathan hypothesis. Moreover, he provides the support for the Wallis hypothesis that predicts an increase in the level of the state and local public spending. As long as the decentralized provision of the local public goods can be better tailored to the preferences of the taxpayers, it leads to an increase in demand for the public goods and to the higher level of the local public spending. Hence, he shows that the higher share of the federal grants is associated with the higher aggregate public spending, lending support to the Brennan and Buchanan collusion hypothesis (1980).

The cross-country examination of the decentralization hypothesis is relatively inconclusive. Oates (1972, 1985) testes the decentralization hypothesis in two separate studies by using samples of 57 and 43 OECD countries, respectively. He uses four measurements of fiscal centralization: (i) the share total government revenue of central government, (ii) the share of expenditure of central government in total expenditure, (iii) the share of central government in government consumption expenditures and (iv) the share of central government expenditure in civil consumption expenditure. He finds no significant association between the fiscal decentralization and the size of the government. He also testes the decentralization hypothesis in two sub-samples of 6 federal and 12 unitary countries and concludes that: "...the mean of value of the share of total government revenue in GDP is less for federal than for the unitary countries - a result that is presumably consistent with the Leviathan hypothesis" (Oates, 1989:

422). More recent study of Heil (1991) using cross-sectional data of 22 OECD and 39 IMF countries fails to find the support for the decentralization hypothesis.

A study by Moesen and Ph. van Cauwenberge (2000) is particularly interesting. They develop the model along the line of the Niskanen theory (1979) and show that even by ignoring the argument of fiscal competitive pressure on the local governments the fiscal federalism should lead to a lower public spending. The provision of the local public goods under harder budget constraints limits the allocative and technical inefficiencies and reduces the public spending. In order to examine the effect of fiscal decentralization stemming from the harder budget constraints, Moesen and Ph. van Cauwenberge (2000) define the fiscal decentralization as a share of public expenditure financed only by the own-source revenues. This allows them to empirically investigate the significant negative connection between the fiscal decentralization and the share of the public spending in a cross-sectional panel of 19 OECD countries.

A more recent study by Rodden (2003), considering a similar approach in a large panel data of 52 OECD countries (1976-1996) provides the support for the Leviathan hypothesis. He defines the fiscal decentralization as a share of local own-source tax revenue in total revenue and shows that the fiscal autonomy of sub-national governments has a significant negative effect on the growth of the share of governments' expenditure in GDP. Moreover, in accordance with the Brennan and Buchanan collusion hypothesis, he provides the evidence that central government transfers have a positive effect on the growth of the share of public expenditure. His finding is in line with the following arguments. In order to stifle the competitive pressure, local governments collude with the federal government. This collusion takes the form of the vertical governments' transfers and hence leads to an increase in the public spending.⁹ Jin and Zou (2001) provide similar evidence. They examine the decentralization hypothesis in the panel data of 32 OECD countries (1980-1994) and find that fiscal decentralization has a strong negative effect on the share of aggregate government expenditure in GDP. Hence, they find a strong negative effect of revenue decentralization on the share of public spending, but fail to find any significant effect of the expenditure decentralization. Moreover, they address the share of government spending in federal versus

⁹ This argument is explored in comparative study on fiscal federalism in Switzerland and Germany (Blankart, 2001)

unitary countries and show that the federal countries exhibit significantly lower size of the public sector¹⁰.

3. The institutional provision for fiscal decentralization

The OECD countries differ with respect to the legal and constitutional setting considering the organisational form of the governments. Federal countries consist of three levels of government with given noticeable fiscal autonomy to the intermediate level. The unitary countries have only two levels of government with the large fiscal competences granted to the central level. In a large number of unitary countries, there is no officially intermediate level: Denmark, Great Britain, the Netherlands and Sweden have two levels of government, while local governments in Finland, Luxembourg and Ireland are set at one level only.

The cross-country variation in fiscal decentralization can be explained with respect to two different measures. One possibility is to use the quantitative measure based on the allocation of expenditure and revenues. Another way is to employ the qualitative measure taking into account the division of the spending and revenues-raising power between the central and local governments. Examining the allocation of the expenditure detects the large variation between the federal and unitary countries. Based on the *International Monetary Fund Statistics*, Table 3.1 displays the data on the degree of expenditure decentralization for each country in the sample.

Table 3.1: Taxes by the level of government in the selected OECD countries

Countries	Central or Federal government		State government		Local government	
	1975	1997	1975	1997	1975	1997
Federal countries						
Australia	80.1	77.7	15.7	19	4.2	3.3
Austria	51.7	52	10.6	9.3	12.4	10.6
Belgium	63.4	35.6		23.2	4.7	5.1
Canada	47.6	41.7	32.5	36	9.9	8.9
Germany	33.5	29	22.3	21.5	9.0	7.3
Mexico		83.9				
Switzerland	27.4	27.9	24.2	19.9	14.7	12.3

¹⁰ Saunders (1988) came to similar conclusion and find that share of government expenditure in GDP is significantly lower in federal countries. In more recent study, Fiva (2006) shows that fiscal decentralization has an effect for both the size and composition of government when using panel data for 18 OECD countries. He concludes that tax revenues decentralization is associated with a smaller government while expenditure decentralization leads to growth of government.

United States	49.9	49	20.8	21.2	10.6	9.0
Unitary countries						
Denmark	56.6	51.5			29.8	31.2
Finland	56.6	51.5			23.6	22.3
France	51.2	47.4			7.6	10.4
Ireland	77.4	85.2			7.3	2.1
Luxembourg	63.8	66.9			6.5	6.0
Netherlands	58.9	54.7			1.2	3.0
Norway	50.6	60.5			22.4	18.3
Spain	48.2	48.8			4.3	16.1
Sweden	51.3	46.2			29.2	30.5
United Kingdom	70.5	76.9			11.1	3.9

Source: Revenues Statistics 1999, OECD, p.21.

The data shows that federal countries have a remarkably larger local public sector. For instance, in Switzerland, Canada and the U.S. about 50 percent of the public spending takes place at the local level, while the corresponding share is only 3 percent in Luxembourg.

We can set the above information against the alternative measure of fiscal autonomy. The survey of the Council of Europe (2001) reveals the quite remarkable cross-country differences in fiscal autonomy of local governments (Appendix B Table 3.1). It can be seen that in Germany, Switzerland and the U.S. the provision of the services in primary education is assigned to the sub-federal governments, whereas in Finland, France and Luxembourg this responsibility lies with the central government. Another lesson can be drawn from this table is that the central government has a great room in the matters of the local governments not only in the unitary but also in a number of the federal countries. In Austria¹¹ and Germany the federal government has a large competence in practically every matter on the local level. The local governments have very limited spending capacities and are restricted in decision making about the provision of the public goods. Hence, the very few areas of their responsibilities are free from the regulations and standards of the central government. As regards the primary education and health care, the costs of the provision of these services are covered by the local governments, while the wages and salaries are regulated by the central government.

Analysis of the revenue side provides a similar picture except that the degree of decentralization is significantly lower. Table 3.2 reports the data of the tax revenue allocation between the central and sub-national governments.

¹¹ Feld, L.P. and Schneider F. (2002) Zum Wandel des föderalistischen Aufgaben-, Ausgaben- und Finanzierungsspektrums: Österreich und die Schweiz im Vergleich

Table 3.2: Taxes, non-tax revenues and grants by the level of the governments in the selected OECD countries

Countries	Tax revenues		Non-tax revenues		Grants	
	1980	1996	1980	1996	1980	1996
Federal countries						
Australia						
<i>State</i>	29.9	34.9	14.5	25.9	55.6	39.0
<i>Local</i>	54.2	45.1	22.8	38.0	23.0	16.9
Austria						
<i>State</i>	47.3	46.4	13.1	14.4	39.6	39.2
<i>Local</i>	53.2	49.9	30.6	35.1	16.1	14.9
Belgium						
<i>State</i>	-	99.1	-	0.0	-	0.9
<i>Local</i>	27.6	36.9	8.5	7.9	63.9	55.2
Canada						
<i>State</i>	63.2	65.8	14.5	14.6	22.4	19.6
<i>Local</i>	36.5	40.5	15.1	15.8	48.4	43.7
Germany						
<i>State</i>	70.2	67.7	11.7	13.4	18.1	18.9
<i>Local</i>	36.0	29.6	33.9	38.8	30.1	31.6
Mexico						
<i>State</i>	30.6	12.4	44.9	22.7	24.5	64.9
<i>Local</i>	30.8	39.3	61.5	46.9	7.7	13.8
Switzerland						
<i>State</i>	54.8	50.0	18.1	19.6	27.1	30.4
<i>Local</i>	52.9	50.1	31.6	33.9	15.6	16.0
United States						
<i>State</i>	55.2	47.9	19.4	29.1	25.4	23.0
<i>Local</i>	37.9	39.7	18.0	22.4	44.1	37.9
Unitary countries						
Denmark	38.7	46.9	9.3	10.0	51.9	43.1
Finland	45.1	42.4	22.3	34.5	32.6	23.1
France	40.9	48.0	17.8	18.8	41.2	33.2
Ireland	7.9	5.9	17.5	19.8	74.6	74.3
Luxembourg	38.9	35.1	13.3	24.6	81.6	67.1
Netherlands	5.3	8.3	13.1	35.9	18.1	9.1
Norway	50.0	44.4	14.8	18.4	35.2	37.3
Spain	52.4	67.0	37.8	19.5	9.8	13.5
Sweden	57.0	73.8	17.7	12.0	0.0	0.0
United Kingdom	29.6	11.4	23.6	16.2	46.7	72.4

Source: Revenues Statistics 1999, OECD, p.277.

The table indicates that the federal government in Mexico collects about 80 percent of total tax revenue, while in Switzerland a significantly larger share is collected by the sub-federal government. Likewise, there is wide variation among the unitary countries. The share of the revenue collected by sub-national governments in Sweden and Luxembourg is about 50 percent and 0.15 percent, respectively.

Focusing attention on the allocation of tax power, Table 3.2 shows more tremendous differences between two groups of countries. The constitution of several federal countries gives to the sub-national governments the considerable tax power, but only few assign to

them the exclusive legislative tax power¹². Sub-federal governments in Switzerland, Canada and the U.S. have a competence to levy the main local taxes. However, Swiss Constitution gives to the cantons the legislative power over income and property taxes¹³. The local governments levy a surcharge on the cantonal income tax and raise the property tax. The tax rates for income tax are explicitly stipulated by the constitution. In the U.S. and Canada, states and provinces have considerably tax autonomy and tax power over sales taxes and natural resource taxes, while power to legislate on income and corporate taxes is given to the federal government. On contrary, sub-national governments in Germany have very limited tax power. The constitution gives to the federal government the power to legislate on personal and corporate income taxes.¹⁴ Hence, a very few taxes are in exclusive competence of each tier of government. The states (*Länder*) in Germany have no rights to set tax rates or to define tax base, and there is no horizontal tax competition. A similar situation can be observed in Austria where the fiscal decentralization occurs to significantly larger extent on the expenditure side. The legislative power over the main taxes is given to the federal government. In the unitary countries sub-national governments have significantly less fiscal discretion. The exclusive legislative tax power is given to the central government in Norway and France¹⁵ that enjoys also the competence to set local fees and charges. Consequently, the sub-national governments heavily depend on the central governments' transfers that amount to about 90 percent of their total tax revenue.

In fact, data on expenditure and revenue allocation overlook the strong dependence of sub-national governments on intergovernmental transfers¹⁶. It can be observed from the Table 3.2 that the grants are the main element of the local government finance in both groups of countries. The table shows that sub-federal expenditures in Mexico are financed by up to 64 percent by the federal transfers, while in Canada this share is only 19 percent. Unitary

¹² Sect. 75, Constitution of Argentina defines the concurrent power of Congress with the province's power to levy indirect taxes; it guarantees the right of the provincial and municipalities to levy taxes. Art.30, Constitution of Brazil gives the right to the municipalities to institute and to collect taxes coming under their jurisdictions; Art. 155 defines the rights of States and Federal Districts to institute taxes on transfers by death and donation of any property and rights to set the tax rates; Art.156 gives the right to municipalities to levy urban real property taxes; Art.156 gives the right to municipalities to institute and collect taxes coming under their jurisdiction; incentives to set exemptions, reductions, or temporary deferment of federal taxes.

¹³ Study of institutional provision for fiscal federalism in Switzerland, (Feld, Kirchgässner and Schaltergger, 2003)

¹⁴ Art. 106.5a, Constitution of Germany.

¹⁵ Art 34 of Constitution of France gives original power to legislate over taxes to Parliament, including rules concerning the assessment bases, rates and methods of collecting taxes of all types.

¹⁶ Art.106 of Constitution of Germany defines sharing of revenues from income and corporation taxes between the Federation and the Länder. Sect. 75 of Constitution of Argentina explicitly stipulates the sharing share of revenues from taxes between the federal government and the regions. Arts. 157-159 of the Constitution of Brazil defines the revenues sharing between the Federal districts and the states. In Austria the sharing share may be changed unilaterally only by the Parliament without the consent of Ländern (OECD; 1999).

countries employ typically system of the revenue sharing when the central government collects tax revenue and then distributes it in the form of lump-sum grants to the sub-national governments. Such a system imposes significant constraints on fiscal autonomy of sub-national government, especially if the central government has a large competence in spending decisions on the local level. In the United Kingdom, for example, such a system of central government lump-sum grants has lead to a substantial “erosion” of fiscal autonomy of the sub national governments (Oates, 1972:18).

The following conclusion can be drawn from the analysis. **Empirical estimation and quantification of the fiscal decentralization in the cross-country analysis pose two major difficulties:**

- (i) The measures based on the allocation of expenditure and revenues do not necessary reflects the fiscal autonomy of the local governments. Hence, the data overlook the heavily dependency of the local governments on the intergovernmental grants.
- (ii) There is a need additionally to explore the fiscal and administrative autonomy of the local governments granted by the constitution and the statutory law.

In what follows, we provide the empirical evidence and show that stronger legislative power of the local government is associated with the lower growth of the share of public expenditure and revenue to GDP.

4. Hypotheses, data and specification

To examine **our first** decentralization hypothesis which states that **the more decentralized a country is, the lower government growth is, ceteris paribus**, we define the size of government both on the revenue and expenditure side as a share of aggregate governments’ expenditure and revenue¹⁷ which are given in GDP ratios, respectively¹⁸. We rely on the previous research¹⁹ and define the following models:

¹⁷ The aggregate governments’ expenditure and revenues is a combination of the expenditure and revenues of all four tiers of government: (i) federal, central government; (ii) state, provincial, cantonal, governments; (iii) local governments, which include the municipalities etc.; and (iv) supranational authorities, which exercise the taxation and public expenditure functions (OECD, 1999).

$$(1) \quad \Delta \text{Exp}_{it} = \alpha + \beta_1 \Delta \text{Exp}_{it-1} + \beta_2 \Delta \text{Exp}_{it-2} + \beta_3 \Delta \text{FD}_{it} + \beta_4 \text{DD}_i + \beta_5 \Delta \text{CV}_{it} + \varepsilon_{it},$$

$$(2) \quad \Delta \text{Rev}_{it} = \alpha + \beta_1 \Delta \text{Rev}_{it-1} + \beta_2 \Delta \text{Rev}_{it-2} + \beta_3 \Delta \text{FD}_{it} + \beta_4 \text{DD}_i + \beta_5 \Delta \text{CV}_{it} + \varepsilon_{it}.$$

where, Exp_{it} is aggregate (central and sub-national) expenditures as ratio of GDP (defined in natural logarithm)²⁰; the variable Rev_{it} is aggregate (central and sub-national) revenue as ratio of GDP (defined in natural logarithm); the term Δ denotes the difference operator, the variable FD_{it} is a vector of used measurements of fiscal decentralisation on expenditure and revenue side respectively; CV_{it} is a vector of considered economic and structural control variables (defined in natural logarithm); the variable DD_i incorporates legal provision for local democracy, and ε_{it} is the error term which is assumed to be stationary. Subscripts $i = 1 \dots 29$ identify the countries and $t = 1978 \dots 1993$ are the years. Following the previous discussion, we estimate the models by using an unbalanced panel data of 29 OECD countries²¹. The sample is based on the annual data over the period 1978-1993²². The unit of observation is a country. Econometric analysis is performed using pooled cross-sectional time series model²³ and generalized least squares (GLS) estimator with White-correction.

To estimate the effects of fiscal decentralization we use two proxy variables:

- (i) One variable is defined by the data of IMF's *Government Financial Statistics Yearbook* (GFS) as (i) expenditure decentralization (defined as a share of expenditure of sub-national government to aggregate expenditure of total government) and (ii) revenue decentralization (defined as a share of revenue of sub-national governments to total revenue of government).
- (ii) Additionally we explore the decentralization hypothesis by using the qualitative measure following the methodology of Arzaghi and Henderson (2002) (see Appendix A for description of the constructed index). The idea behind this index is

¹⁸ The used measurements of the size of government are defined as GDP ratio.

¹⁹ See for instance, Rodden (2002), Feld et al. (2003) etc.

²⁰ The IMF statistics does not provide the clear distinction between the expenditure for the different social welfare systems. This distinction is made for only 4 countries in our sample: Germany, Austria, Spain and Netherlands (but not for Belgium)

²¹ Sample includes following OECD countries: Argentina, Australia, Austria, Belgium, Bolivia, Brazil, Canada, Denmark, Finland, France, Germany, India, Indonesia, Ireland, Israel, Kenya, Luxembourg, Mexico, Netherlands, Norway, Philippine, South Africa, Spain, Sweden, Switzerland, Thailand, United Kingdom, USA.

²² We are very grateful to Mr. Rodden Jonathan for the shared data on fiscal decentralization, used in the empirical part of this paper.

²³ Prior to econometric work with panel data, we employed Im, Pesaran and Shin test for panel stationary of variables in the model.

This test allows for heterogeneous coefficients of $\text{Exp}_{i,t-1}$ and $\text{Rev}_{i,t-1}$, based on average of individual unit root test statistics and allows serial correlation of error term with serial correlations across cross-sections (Baltagi, 2001). Based on estimated test statistics we conclude that all variables are not stationary in their levels, but are stationary in their first differences (Appendix B, Table 9). Therefore, we estimated models in first differences of time series.

that data on the expenditure and revenues allocation do not exactly describe the autonomy of sub-national governments in their spending and revenues-raising decisions. Given these facts, there is a reason to build an indicator of constitutionally and statutory defined fiscal and administrative autonomy of the sub-national governments. This index varies from zero (low fiscal autonomy) to six (high fiscal autonomy) and is highly correlated with the degree of expenditure and revenue decentralization, measured by GFS data (Appendix B, Table B8).

Following our theoretical prediction, we expect strong negative effect of used measures of the two used measures of fiscal federalism on the growth of the public sector according to our decentralization hypothesis.

Further, we explore our second hypothesis on the dampening effect of direct democracy on growth of revenue- and expenditure-GDP ratios which argues that the more direct democratic institutions a country has, the lower government growth is, *ceteris paribus*. Using the approach of the previous empirical studies in this area of research we include the dummy-variable for those countries that have the legal provision for local referenda and initiative. A large body of empirical studies from Switzerland and the U.S. shows that government expenditures are significantly lower in direct democracy (Pommerehne, 1978, Pommerehne and Schneider, 1982). Given the prediction of the theoretical and empirical research we expect the complementary relations between the fiscal federalism and direct democracy.

Next, we test our third hypothesis of the collusion proposed by Brennan and Buchanan (1980). This hypothesis predicts that the sub-federal governments form the tax and expenditure cartels in order to stifle the fiscal competitive pressure (Blankart, 2002). This collusion takes the form of federal grants. The empirical literature shows that an increase in the share of federal transfers leads to the higher level of total public spending (Schadbegian, 1999; Feld, Kirchgässner and Schaltegger, 2003; Rodden, 2003). To control for collusion hypothesis we include the share of central government transfers in total government revenue.

Following theoretical prediction and previous empirical research we expect the positive effect on growth of the government.²⁴

Furthermore, we use a set of economic and structural control variables defined by the theory on growth of the public sector:

- (1) Wagner's law predicts that the size and growth of the public sector may be explained by the level of per capita income, and the structure of the population in size and age. Therefore, we include real GDP per capita to explore the Wagner's law effect.
- (2) Moreover, the theory argues that growth of the population implies an increase in economies of scale in public goods production. We include the number of the population and expect the negative effect on the growth of the government.
- (3) Additionally, we take **into account the** ageing of the population. The theory explains the shift in public spending towards social security and health care with an increase of the share of "old-age-population". We include the share of the population older than 65 years to account for the life cycle hypothesis and expect the positive effect on the growth of the government.
- (4) Another argument suggests that the size of government depends on the extent of external shocks encountered by the country. Rodrik (1998) provides the evidence that a large share of trade in the GDP leads to an increase of social security and welfare spending. To account for the "openness effect" we include the share of trade in GDP.
- (5) Finally, we test the hypothesis on the effect of the majoritarian and presidential systems on the growth of the government. Persson and Tabellini (1996) provide the evidence that the growth of the public expenditure is sufficiently lower in countries with the majoritarian systems of elections than with the proportional systems. They show that presidential democracies exhibit significantly smaller size of government than the parliamentary democracies. To account for these effects, we include dummy-variables for the said countries.

5. Results

²⁴ The classification by the GFS of the intergovernmental grants refers to central government transfers in the yearly budget, which exclude the recurring the automatic distributions of the shared taxes.

We estimate the effect of fiscal decentralization by using two proxy variables: (i) share of sub-national governments' expenditure (revenue) in total governments' expenditure (revenue) and (ii) index of fiscal federalism. Table 5.1 presents the results for the model for government expenditure-GDP ratio and Table 5.2 displays the results for government revenue-GDP ratio. The variance of the dependent variable is explained to 54 percent for government expenditure and to 45 percent for the revenue. Most variables in the model are statistically significant and have the expected sign. Since the Durbin-Watson statistic for the models with lagged dependent variable is not valid, we explored other tests for the presence of autocorrelation in the residuals²⁵.

Following the previous discussion, we expect the negative effect of fiscal decentralisation on the growth of the public sector.²⁶ The estimated models evidence support for discussed decentralization hypothesis. The slope on expenditure decentralization is statistically significant and has an expected negative sign. The effect remains significant, even after including the additional control institutional variables for the countries with the presidential and majoritarian systems of elections. It indicates that countries with fiscally more decentralized public sector have the slower growth of the share of public spending according to prediction of the decentralization hypothesis. Hence, this evidence is valid for both measures, for the expenditure and revenue decentralization. The model for the expenditure decentralization provides the better explanation of the effects of fiscal decentralization than those for the revenue decentralization. The dampening effect of expenditure decentralization for expenditure model is three-fold stronger than the effect of revenue decentralization for the revenue model. The estimated results show, for example, that an increase in expenditure decentralization by one point leads to a slower growth of total government expenditure as a share to GDP by more than five percent. Taking into consideration the fact that all dependent variables are defined in ratios to GDP, this effect seems to be large. The effect of the revenue decentralization has the expected direction, but smaller magnitude and is statistically insignificant for some specifications of the model. This finding is compatible with conclusions of earlier studies in this area of research (Rodden, 2003).

²⁵ We have explored the Breusch-Gofrey LM test for the serial autocorrelation, obtained by the regression of the residuals from the original model on the all regressors and the lagged residuals; the ARCH test for the autoregressive conditional heteroscedasticity, by the regression of the squared residual from the original model on their lags and constant. The all tests provide the satisfactory results on no autocorrelation in the residuals. Hence, we have performed the Hausman specification test for the check of the measurement error in the fiscal decentralization variables by using the two-stage procedure. The two-tailed t test of the null hypothesis that there is no measurement error was accepted at the one percent level.

²⁶ We have also re-estimated the models with the country fixed effects. Since the estimations results provide the similar evidence, we do not present the results it in the paper.

In the next step, we test the decentralization hypothesis by using fiscal federalism index that incorporates constitutional and statutory provision for fiscal and administrative autonomy of sub-national governments. Looking at the estimated effect provides the useful information. It shows that the magnitude of the effect of fiscal federalism index is sufficiently large and is stable for different specifications of the model. The coefficient on fiscal federalism index variable has an expected negative sign and is statistically significant. The effect is stronger for the revenue model than for the expenditure model. This finding is well reasonable and could be understood in the light of the previous discussion. The countries that give more tax power to their sub-national units, exhibit a significantly slower growth of the public sector. The results indicate that the fiscal decentralization has a strong negative effect on the expansion of government. These results are robust for several robustness tests performed.

The estimated effect of local democracy on growth of government is statistically significant and robust against several modifications of the models (see [Tables 5.3 and 5.4](#)). The results show that local provision for direct democracy is associated with a significantly lower growth of the total government expenditure- and revenue-GDP ratio in the panel under study. This effect is in line with the findings of the previous empirical research. It shows that countries with the institutional provision for local direct democracy exhibit the significantly slower growth of the public sector. In order to test the sensitivity of the estimated effect, we additionally include two institutional dummy variables for the majoritarian and presidential countries, as suggested by Persson and Tabellini (1996). We can see that it does not affect the magnitude of the impact of local democracy, which remains negative and highly significant²⁷. We then address the question of whether our sample contains observations that have a significant influence on the estimated coefficient of direct democracy variable. To check this question, we perform a DFBETA test with respect to the parameter of direct democracy for baseline model, presented in columns (2) in [Tables 5.3 and 5.4](#). The results of the DFBETA-test are presented in [Table 5.5](#). Columns (2) and (5) show coefficients of variable local democracy for the re-estimated model by omitting step-by-step each of the 29 countries from the sample. Columns (3) and (6) show values of DFBETAS for omitted observations. DFBETAS are less than 1.96 in absolute values. Therefore, we conclude that there are no

²⁷ Hence, we have performed test for the bias of omitted variables. We have re-estimated models with a set of additional economic and structural variables to check the robustness of the effect of direct democracy. In neither case we could reject hypothesis on significant effect of direct democratic rights on growth of public sector. We do not present the findings in details but simply state that all robustness checks performed for estimated model show stable and highly significant effect of legal provision for direct democratic rights on growth of public sector in both models for expenditure and revenues share.

observations with a significant influence on coefficient of local democracy. Hence, the sensitivity analysis of regression results suggests that regression errors are normally distributed.

According to the estimated results we can state that the control variables are as well consistent with the theoretical prediction and conclusions of earlier empirical literature in this area of research. The direction and magnitude of the coefficient of variable central governments' grants support the common pool hypothesis (Brennan and Buchanan, 1980). The variable is statistically significant and has the predicted positive sign in the model for expenditure-GDP ratio. This finding is in line with results of previous empirical studies (Jin and Zou, 2002 and Rodden, 2003). Moreover, we show that the effect vanishes in the model for total government revenue-GDP share.

The slope on variable GDP per capita is statistically significant and has an expected negative sign (see for similar findings studies of Rodden (2003), Rodrik (1998) and Saunders (1988)). With respect to this finding, it can be argued that results do not support the "Wagner's Law" for the panel under study. One possible explanation for this evidence is that the decline in GDP per capita may be followed by the rise of expenditure-GDP ratio as a result of use of automatic stabilizers, for instance, unemployment benefits.

The coefficient on variable openness of country measured as a share of foreign trade in GDP is statistically significant and has a positive effect on growth of the government (see also study of Rodrik (1998) for similar estimated effect). By contrast, the coefficient on the variable population is not statistically significant. The variable old-age population is significant and shows a negative effect on expenditure-GDP ratio (similar evidence is given in studies of Heil (1991), Saunders (1988), Rodrik (1998) and Rodden (2003)). The effect of old-age population is statistically significant for the expenditure model, and vanishes for the revenue model.

6. Summary and conclusion

This paper examines the effect of fiscal decentralization on growth of public sector in a large sample of OECD countries. Although there are the uncertainties about the empirical results on the effect of fiscal decentralization in the earlier cross-country studies, the evidence presented in this study shows that the degree of fiscal decentralization by exploring both measurements

on the revenue and expenditure side has an effect on growth of government. More specifically, in countries with revenues and expenditure responsibilities decentralized to a large extent, substantially lower growth of public expenditure and tax burden is observed. Test of decentralization hypothesis is performed for panel of 29 OECD countries over the period from 1978 to 1993. This evidence is in line with theoretical discussion and results of previous empirical research. The quantitative measure of expenditure decentralization has a sufficiently stronger explanatory power than those of revenue decentralization. Further, we re-examine decentralization hypothesis by using an additional proxy variable which incorporates the fiscal and administrative autonomy of sub-national governments. We show that higher fiscal and administrative autonomy, as given to local governments by constitution and statutory law is associated with a slower growth of the public sector. Hence, this study first find a dampening effect of local democracy on growth of government for the large panel of OECD countries. We show that the estimated negative effect of local democracy variable is stable and robust for several robustness and sensitivity tests performed.

Appendix A: Data Description

Total government expenditure in GDP

Share of total public expenditure in GDP is calculated as a sum of expenditure of the central, state and local governments from the IMF Government Financial Statistics (GFS). The data are friendly provided by Rodden, Jonathan.

Source: Database on Fiscal Indicators, by the World Bank, based on the IMF's Government Finance Statistics.

Total government revenues in GDP

Share of total public revenues in GDP is calculated as a sum of the revenues of the central, state and local governments from the IMF Government Financial Statistics (GFS). The data are friendly provided by Rodden, Jonathan.

Source: Database on Fiscal Indicators, by the World Bank, based on the IMF's Government Finance Statistics.

Fiscal decentralization variables

Fiscal decentralization are computed as a percentage of the local revenues (expenditure) on the aggregate revenues (central plus local) or expenditure. Scale from 1 to 100. The data are friendly provided by Rodden, Jonathan.

Source: IMF Government Financial Statistics (GFS)

Share of central government transfers in total revenues of government

It is computed as a percentage of the central government transfers in total government revenues. Scale from 1 to 100. The data are friendly provided by Rodden, Jonathan.

Source: Database on Fiscal Indicators, by the World Bank, based on the IMF's Government Finance Statistics.

Dimensions of Federalism Index:

(1) Revenues raising authority

It takes the value (4) if constitution explicitly stipulates rights of sub national governments to levy and to impose taxes; (2) if the sub national governments have limited tax power, given them by statutory law; (0) otherwise

Source: Data compiled by author from the Constitution of each country in the sample and Arzaghi and Henderson (2002)

(2) Revenues sharing authority

It takes value (4) if revenues sharing scheme is stipulated by constitution and both levels of government regularly receive share of national taxes, and share of funds are given unconditionally; (2): if one level of government receives a regular share of national revenues, or if both receive funds, but one or other level has no discretion over how funds are spent; (0): if there is no regular revenue sharing with either level of sub-national government, or if both sub-national governments receive funds, but neither has any discretion over how they are spent.

Source: Data compiled by author from the Constitution of each country in the sample and Arzaghi and Henderson (2002)

(3) Authority for education

It refers to responsibilities of sub national government for primary education (authority over hiring primary school teachers etc.) It takes values (4) if authority is assigned exclusively to local government; (3) if authority is assigned to the regional or it is shared between the regional and local government; (2) if authority is shared between the regional and central government; (1) if authority is assigned to central government; (0) otherwise.

Source: Data compiled by author from Arzaghi and Henderson (2002) and survey of Council of Europe (2001)

(4) Government's structure

It defines constitutional structure of government. It takes value (1) if country has federal structure by constitution, (0) if country is unitary by constitution.

Source: Data compiled by author from the Constitution of each country in the sample.

(5) Election of local executive

It incorporates whether the local executives are elected or appointed. It takes value (1) if the local executives are elected and (0) if they are appointed.

Source: Data compiled by author from the Constitution of each country in the sample and survey of Council of Europe (2001).

(6) Constitutional recognition of sub national governance

It is constructed based on the inspection of the constitutions of each country in the sample. It takes value (1) if constitution recognises and guarantees rights and responsibilities of sub national governments, and (0): otherwise.

Source: Data compiled by author from the Constitution of each country in the sample and Arzaghi and Henderson (2002)

Overall score:

Country specific fiscal federalism score is computed as an average of above listed six dimensions of federalism index.

Local Democracy

It takes value (1) if there is legal provision for initiative or referenda at local level; (0) otherwise.

Source: Data compiled by author from the Constitution of each country in the sample and from the survey on local referendum of the Council of Europe (Council of Europe, 2001).

GDP per capita

Real Gross Domestic Product

Source: Alan Heston, Robert Summers and Bettina Aten, Penn World Table Version 6.1, Center for International Comparisons at the University of Pennsylvania (CICUP), October 2002.

Population

Total Population

Source: Alan Heston, Robert Summers and Bettina Aten, *Penn World Table Version 6.1*, Center for International Comparisons at the University of Pennsylvania (CICUP), October 2002.

Openness

It is constructed as Import plus Export in GDP

Source: Alan Heston, Robert Summers and Bettina Aten, *Penn World Table Version 6.1*, Centre for International Comparisons at the University of Pennsylvania (CICUP), October 2002.

Share of old-age population

It is constructed as number of population over 65, divided by total population (both reported by WDI) and multiplied by 100.

Source: *World Development Indicators CD-Rom 1999*.

Majoritarian

It takes values (1) for exclusive reliance on plurality rule in (lower house) legislative elections, (0): otherwise.

Source: *Persson and Tabellini (2003)*

Peesidential

It takes value (1) for countries, where executive is not accountable to legislature through confidence procedure, (0): otherwise.

Source: *Persson and Tabellini (2003)*

Appendix B

Table B1: The institutional provision for fiscal decentralization in the sample of 29 OECD countries

Country	Authority to set the tax rates and tax base	Revenues sharing arrangements	Constitutional recognition of the local-self-government	Authority for the provision of the services primary education	Election / appointment of the regional executive	Government structure	Legal provision for referenda at the sub national level	Majoritarian system	Presidential system
1	2	3	4	5	6	7	8	10	11
Argentina*	Yes	Yes	Yes	R	Yes	Federal	No	0	1
Brazil	Yes	No	No	C	Not elected	Federal	No	0	1
Bolivia	No	No	No	C	Not elected	Unitary	No	0	1
India*	Limited	Yes	No	C/R*	Not elected	Unitary	No	1	0
Israel***	No	No	No	C	Elected	Unitary	No	0	0
Kenya*	Limited	No	No	C	Not elected	Unitary	No		
Indonesia*	No	No*	No	C	Not elected	Unitary	No		
Mexico*	Limited	Limited	No	C/R	Elected	Federal	No	0	1
Malaysia	Limited	Limited	Yes	C	Not Elected	Federal	No	1	0
South Africa*	Limited	Limited	Yes	C/R	Not elected	Federal	No	0	0
Thailand*	Limited	Limited	Yes	C/L	Not elected	Unitary	No	1	0
Philippine*	Limited	Limited	Yes	C	Not Elected	Unitary	No	1	1
Australia*	Limited	Yes	No	R	Elected	Federal	Yes	1	0
Austria	Limited	Limited	Yes	R/C**	Elected	Federal	Yes	0	0
Belgium	Yes	Yes	Yes	R/C**	Elected	Federal	No	0	0
Germany	Yes	Yes	Yes	R	Elected	Federal	Yes	0	0
Canada***	Yes	Limited	No	R	Elected	Federal	Yes	1	0
Denmark	Yes**	Yes**	Yes	R/L**	Elected	Unitary	No	0	0
Spain	Limited*	Yes**	Yes	C/R***	Elected	Federal	Yes	0	0
Finland	Yes**	Yes**	Yes	C	Elected	Unitary	No	0	0
France*	Limited	Limited	Yes	C/R/L	Elected	Unitary	Yes	1	0
Ireland	Limited	No	No	-**	Elected	Unitary	Yes	0	0
Luxembourg	Limited	No	Yes	C	Elected	Unitary	No	0	0
Norway	Limited**	Limited**	No	R/C	Elected	Unitary	Yes	0	0
Netherlands	Yes	No	Yes	C/R/L*	Not elected	Unitary	No	0	0
United Kingdom***	Yes**	No*	No	R/L	Elected	Unitary	Yes	1	0
Sweden	Yes**	No**	Yes	C/R/L	Elected	Unitary	Yes	0	0
Switzerland	Yes	Yes	Yes	R/L	Elected	Federal	Yes	0	1
USA	Yes*	Limited*	Yes	R/L*	Elected	Federal	Yes	1	1

Notes: *: Arzaghi and Henderson (2002); **: OECD; ***: Canada, Israel and United Kingdom have no constitution in the written form.

Table 5.1: Estimates of effect of fiscal decentralization on total government expenditure-GDP ratio, 29 OECD countries over period 1978-1993

Variable	Coefficients (t-values)	Coefficients (t-values)	Coefficients (t-values)
(1)	(2)	(3)	(4)
Expenditure decentralization	-0.462*** (-5.917)	-0.524*** (-5.376)	-0.518*** (-5.541)
Real GDP per capita	-1.254*** (-5.151)	-1.282*** (-4.558)	-1.285*** (-4.700)
Population	0.047 (0.057)	0.349 (0.341)	1.095 (1.214)
Openes	1.046*** (6.696)	1.039*** (5.066)	1.047*** (5.148)
Old age population	-	-0.547*** (-3.524)	-0.595*** (-3.787)
Central government transfers	-	0.117*** (2.652)	0.116*** (2.724)
Fiscal federalism index	-0.011** (-2.919)	-0.005 (-1.577)	-0.004 (-1.179)
DV(-1)	-0.121 (-3.389)	-0.119 (-4.022)	-0.128 (-4.265)
DV(-2)	0.249*** (3.202)	0.294*** (3.920)	0.297*** (4.030)
Majoritarian system	-	-	-0.013 (-1.491)
Presidential system	-	-	-0.025** (-2.559)
Control for outliers	Yes	Yes	Yes
Constant	-0.569*** (-3.164)	-0.579*** (-3.975)	-0.625*** (-4.276)
Country-fixed effect	No	No	No
Time-fixed effect	No	No	No
Observations	364	306	306
Adjusted R ²	0.503	0.548	0.554
F-test	39.937	32.520	27.947
Jarque-Berra test	3.478	1.777	2.140
Durbin-Watson test	2.112	2.109	2.127

Notes: All quantitative variables are defined in growth rates. DV - denoted dependent variable which is defined in GDP ratio. GLS-estimator is used to estimate the testable condition. *, **, *** denotes the significance level at the 10, 5 and 1 percent, respectively.

Table 5.2: Estimates of effect of fiscal decentralization on total government revenue-GDP ratio, 29 OECD countries over period 1978-1993

Variable	Coefficients (t-values)	Coefficients (t-values)	Coefficients (t-values)
(1)	(2)	(3)	(4)
Revenues decentralization	-0.134*** (-2.973)	-0.087 (-1.180)	-0.100 (-1.368)
Real GDP per capita	-0.944*** (-4.330)	-0.870*** (-4.268)	-0.895*** (-4.251)
Population	-0.187 (-0.199)	-0.722 (-0.626)	0.042 (0.041)
Openes	1.002*** (7.415)	0.930*** (5.510)	0.952*** (5.634)
Old age population	-	-0.191 (-1.034)	-0.259 (-1.397)
Central government transfers	-	-0.022 (-0.591)	-0.018 (-0.491)
Fiscal federalism index	-0.010** (-2.283)	-0.006* (-1.820)	-0.005 (-1.423)
DV(-1)	-0.130*** (-3.083)	-0.152*** (-3.538)	-0.159*** (-3.650)
DV(-2)	0.265*** (2.869)	0.329*** (3.799)	0.330*** (3.804)
Majoritarian system	-	-	-0.011* (-1.664)
Presidential system	-	-	-0.025** (-2.166)
Control for outliers	Yes	Yes	Yes
Constant	-0.641*** (-2.919)	-0.770*** (-3.483)	-0.810*** (-3.608)
Country-fixed effect	No	No	No
Time-fixed effect	No	No	No
Observations	362	306	306
Adjusted R ²	0.436	0.459	0.470
F-test	30.246	22.767	19.975
Jarque-Berra test	5.971	4.327	4.268
Durbin-Watson test	2.142	2.201	2.219

Notes: All quantitative variables are defined in growth rates. DV denoted dependent variable which is defined in GDP ratio. GLS estimator is used to estimate the testable condition. *, **, *** denotes the significance level at the 10, 5 and 1 percent, respectively.

Table 5.3: Estimates of effect of direct democracy on total government expenditure-GDP ratio in GDP, 29 OECD countries over period 1978-1993

Variable	Coefficients (t-values)	Coefficients (t-values)	Coefficients (t-values)
(1)	(2)	(3)	(4)
Legal Provision for Direct Democracy	-0.029** (-2.549)	-0.023** (-2.409)	-0.024** (-2.341)
Expenditures decentralization	-0.498*** (-6.902)	-0.515*** (-5.270)	-0.508*** (-5.389)
Real GDP per capita	-1.056*** (-4.968)	-1.217*** (-4.759)	-1.228*** (-4.889)
Population	0.350 (0.372)	0.660 (0.684)	1.054 (1.240)
Openess	1.008*** (6.454)	1.022*** (5.109)	1.023*** (5.187)
Old age population	-	-0.571*** (-3.551)	-0.608*** (-3.891)
Central government transfers	-	0.115*** (2.603)	0.115*** (2.659)
DV(-1)	-0.125*** (-3.871)	-0.131*** (-4.054)	-0.139*** (-4.094)
DV(-2)	0.240*** (3.958)	0.299*** (4.087)	0.302*** (4.144)
Majoritarian system	-	-	-0.004 (-0.460)
Presidential system	-	-	-0.034 (-3.134)
Control for outliers	Yes	Yes	Yes
Constant	-0.617*** (-3.666)	-0.647*** (-3.943)	-0.688*** (-3.998)
Country-fixed effect	No	No	No
Time-fixed effect	No	No	No
Observations	378	316	306
Adjusted R ²	0.501	0.531	0.531
F-test	55.115***	32.444***	27.657***
Jarque-Berra test	4.501	1.805	2.067
Durbin-Watson test	2.109	2.117	2.133
Wald-Test for local referenda effect	6.497**	5.805**	5.481*

Notes: All quantitative variables are defined in growth rates. DV denoted dependent variable which is defined in GDP ratio. GLS- estimator is used to estimate the testable condition. *, **, *** denotes the significance level at the 10, 5 and 1 percent, respectively.

Table 5.4: Estimates of effect of direct democracy on total government revenue-GDP ratio, 29 OECD countries over period 1978-1993

Variable	Coefficients (t-values)	Coefficients (t-values)	Coefficients (t-values)
(1)	(2)	(3)	(4)
Legal provision of direct democracy	-0.028** (-2.578)	-0.030*** (-3.020)	-0.035*** (-2.887)
Revenues decentralization	-0.185*** (-3.102)	-0.084 (-1.084)	-0.090 (-1.170)
Real GDP per capita	-0.797*** (-4.237)	-0.767*** (-4.526)	-0.801*** (-4.535)
Population	-0.213 (-0.221)	-0.612 (-0.569)	-0.313 (-0.316)
Openess	0.979*** (7.003)	0.904*** (5.495)	0.916*** (5.709)
Old age population	-	-0.190 (-1.018)	-0.245 (-1.364)
Central government transfers	-	-0.025 (-0.659)	-0.022 (-0.581)
DV(-1)	-0.136*** (-3.523)	-0.168*** (-3.617)	-0.178*** (-3.647)
DV(-2)	0.252*** (3.132)	0.336*** (3.944)	0.336*** (3.931)
Majoritarian system	-	-	-0.001 (-0.120)
Presidential system	-	-	-0.039 (-2.865)
Control for outliers	Yes	Yes	Yes
Constant	-0.689*** (-3.337)	-0.859*** (-3.535)	-0.909*** (-3.567)
Country-fixed effect	No	No	No
Time-fixed effect	No	No	No
Observations	376	306	306
Adjusted R ²	0.423	0.442	0.448
F-test	40.423***	23.011***	20.116***
Jarque-Berra test	6.788	4.023	3.775
Durbin-Watson test	2.137	2.214	2.227
Wald-Test for local referenda effect	6.647**	9.122**	8.337***

Notes: All quantitative variables are defined in growth rates. DV denoted dependent variable which is defined in GDP ratio. GLS- estimator is used to estimate the testable condition. *, **, *** denotes the significance level at the 10, 5 and 1 percent, respectively.

Table 5.5: Sensitivity Analysis. DFBETA test for 29 OECD countries. Independent variable is given by legal provision for local referenda

Total government expenditure-GDP ratio			Total government revenue-GDP ratio		
Omitted observation	β_{GLS}	DFBETA-test value	Omitted observation	β_{GLS}	DFBETA-test value
Argentina	-0.034 (0.011)	0.4563	Argentina	-0.033 (0.011)	-0.4887
Australia	-0.026 (0.010)	0.2654	Australia	-0.025 (0.010)	0.2334
Austria	-0.029 (0.011)	-0.0037	Austria	-0.027 (0.011)	0.0254
Belgium	-0.033 (0.013)	-0.3665	Belgium	-0.035 (0.014)	-0.5238
Brazil	-0.028 (0.011)	0.0407	Brazil	-0.027 (0.010)	0.0905
Canada	-0.023 (0.012)	0.4761	Canada	-0.020 (0.011)	0.6634
Denmark	-0.029 (0.011)	-0.0069	Denmark	-0.031 (0.012)	-0.2911
Finland	-0.029 (0.011)	-0.0069	Finland	-0.028 (0.010)	-0.0092
France	-0.029 (0.011)	-0.0240	France	-0.028 (0.010)	-0.0232
Germany	-0.029 (0.011)	0.0069	Germany	-0.028 (0.010)	0.0158
India	-0.025 (0.010)	0.3640	India	-0.022 (0.009)	0.5253
Indonesia	-0.024 (0.010)	0.4032	Indonesia	-0.024 (0.010)	0.3636
Ireland	-0.030 (0.011)	-0.1610	Ireland	-0.029 (0.011)	-0.1221
Israel	-0.025 (0.011)	0.2930	Israel	-0.024 (0.010)	0.3411
Kenya	-0.028 (0.011)	0.0499	Kenya	-0.028 (0.011)	-0.0307
Luxembourg	-0.029 (0.011)	-0.0710	Luxembourg	-0.028 (0.011)	-0.0459
Mexico	-0.031 (0.012)	-0.2169	Mexico	-0.032 (0.011)	-0.3657
Netherlands	-0.030 (0.011)	-0.1018	Netherlands	-0.027 (0.011)	-0.0455
Norway	-0.028 (0.011)	0.0341	Norway	-0.027 (0.010)	0.0579
Phillipine	-0.031 (0.011)	-0.1938	Phillipine	-0.030 (0.011)	-0.2084
Southe Africa	-0.026 (0.010)	0.2160	Southe Africa	-0.025 (0.010)	0.0218
Spain	-0.033	-0.3697	Spain	-0.031	-0.2923

	(0.011)			(0.011)	
Sweden	-0.030 (0.011)	-0.1155	Sweden	-0.028 (0.010)	-0.0358
Switzerland	-0.028 (0.011)	0.0175	Switzerland	-0.028 (0.010)	-0.0023
Thailand	-0.025 (0.011)	0.3081	Thailand	-0.025 (0.011)	0.1968
United Kingdom	-0.029 (0.011)	0.0008	United Kingdom	-0.027 (0.010)	0.0456
USA	-0.027 (0.011)	0.1080	USA	-0.027 (0.010)	0.0943
<i>BASELINE</i>	<i>-0.029</i> <i>(0.011)</i>		<i>BASELINE</i>	<i>-0.028</i> <i>(0.010)</i>	

Notes: Standard errors are depicted in brackets.

Table 5.6: Panel stationarity test results (Im, Pesaran and Shin W- Test)

Variables	In Levels Test statistics (Probability)	In I. Differences Test statistics (Probability)
Total government expenditure-GDP ratio	1.982 (0.023)	4.676 (0.000)
Total government revenues-GDP ratio	-1.719 (0.042)	-5.268 (0.000)
Share of sub-national expenditure in total expenditure	-0.542 (0.293)	-6.140 (0.000)
Share of sub-national revenues in total revenues	-0.134 (0.446)	-6.188 (0.000)
<i>Control Variables:</i>		
Population	4.648 (1.000)	-2.745 (0.003)
Openness	-2.182 (0.014)	-7.575 (0.000)
Share of central government transfers in total government revenues	0.092 (0.536)	-4.863 (0.000)
Share of old-age population	2.014 (0.978)	-4.968 (0.000)
Total (balanced) observations	392	392
Period	1978-1993	1978-1993
Cross-sections included	29	29

Table 5.7: Correlation of fiscal federalism index, expenditure, revenue decentralization and index for local referenda

Variable	Expenditure decentralization	Revenues decentralization	Federalism Index	Local Referenda
Expenditure decentralization	1.000	0.966	0.547	0.348
Revenues decentralization	0.966	1	0.478	0.323

Federalism Index	0.547	0.478	1	0.370
Local Referenda	0.348	0.323	0.370	1

References:

- Arzaghi M. and V. Henderson (2002), *Why countries are fiscally decentralizing*, Department of Economics, Brown University, Working Paper.
- Baltagi, B. H (2001). *Econometric analysis of panel data*, British Library.
- Blankart C.B. (2000) The Process of government Centralization: A Constitutional View. *Constitutional Political Economy*, 11: 27-39.
- Blankart, C. B. (2002). A Public Choice View of Tax Competition. *Public Finance Review*, 30: 366–376
- Bohnet, I. and B.S. Frey (1994). Direct-Democratic Rules: The Role of Discussion. *Kyklos*, 47 (3): 341-354.
- Besley, T. and A. Case (1995). Incumbent Behaviour: Vote-Seeking, Tax-Setting, and Yardstick Competition. *American Economic Review*, 85 (3): 25-45.
- Brennan, G., and J.M. Buchanan. (1980) *The Power to Tax: Analytical Foundations of a Fiscal Constitution*. Cambridge: Cambridge University Press.
- Buchanan, J.M., and R.L.Faith (1987) Secession and the Limits of Taxation: Toward a theory of internal exit. *American Economic Review*, 77: 1023-31.
- Compliance with members States' commitments (1994). Committee of Ministers Declaration of 10 November 1994. Progress achieved with the framework of the monitoring procedure on local democracy. Secretariat memorandum prepared by the Monitoring Department Secretariat of Strategic Planning.
- Local Referendums (1993). Report prepared by the Steering Committee on Local and Regional Authorities for the 10th Conference of the European Ministers responsible for Local Government, the Hague.
- Deller, S. C. and D.L. Chicoine, (1993). Representative versus Direct Democracy: A Test for Allocative Efficiency in Local Government Expenditures. *Public Finance Review*, 21:100–114.
- Downs, A. (1957). *An Economic Theory of Democracy*. Harper and Row, New York.
- Davoodi, H., and H. Zou (1988). Fiscal Decentralization and Economic Growth: A Cross-Country Study. *Journal of Urban Economics*, 43: 244-257.
- De Mello, L.R. (2000). Fiscal Decentralization an Intergovernmental Fiscal Relations: A Cross-Country Analysis. *World Development*, 28 (2): 365-380.
- Eichenberger, R. (1994). The Benefits of Federalism and the Risk of Overcentralization. *Kyklos*, 47: 403-420.
- Epple, D. and A. Zelenitz (1981), The Implications of Competition among Jurisdictions: Does Tiebout Need Politics?, *Journal of Political Economy*, 89: 1197-1217.

- Feld, L.P. and M.R. Savioz. (1997). Direct Democracy Matters for Economic Performance: An Empirical Investigation. *Kyklos*, 50(4): 507-538.
- Feld, L.P. and G. Kirchgässner (2001). The Political Economy of Direct Legislation: Is here a Role of Direct Democracy in EU Decision-Making? *Economic Policy*, 33: 329-367.
- Feld, L.P. and Schneider F. (2002). Zum Wandel des föderalistischen Aufgaben- Ausgaben- und Finanzierungsspektrums: Österreich und die Schweiz im Vergleich. Mimeo, Johannes Kepler Universität Linz.
- Feld, L., G. Kirchgaessner, and C.A. Schaltegger (2003). *Decentralized Taxation and the Size of Government: Evidence from Swiss State and Local Governments*. CESifo Working Paper No. 1087.
- Feld, L.P. and J.G. Matsusaka (in press). Budget Referendums and Government Spending: Evidence from Swiss Cantons. Forthcoming in *Journal of Public Economics*.
- Frey, B.S. (1988). Explaining the Growth of Government: International Perspectives. In: Lybeck, J. A., Henrekson, M. (eds.), *Explaining the Growth of Government*. Elsevier, Amsterdam, 21-29.
- Fiva, J.H. (2006). New Evidence on the Effect of Fiscal Decentralization on the Size and Composition of Government Spending. *FinanzArchiv* 62(2): 250-280.
- Frey, B.S. (1990). The Economic Approach to Institutions. Institutions matter. The Comparative Analysis of Institutions. *European Economic Review* 34: 443-449.
- Frey, B.S. (1992). Efficiency and Democratic Political Organisation: The Case for the Referendum. *Journal of Public Policy*, 12: 208-222.
- Frey, B.S. (1994). Direct Democracy: Politico-Economic Lessons from Swiss Experience. *American Economic Review*, 84 (5): 338-342.
- Frey, B. S. (1997). *Ein neuer Föderalismus für Europa: Die Idee der FOCJ*. Tübingen: Mohr Siebeck, 1997.
- Frey, B. S. and R. Eichenberger, (1999). *The New Democratic Federalism For Europe. Functional, Overlapping and Competing Jurisdictions*. Cheltenham, UK: Edward Elgar.
- Frey B.S. (2002). A Proposal for a New Democratic Federalism in Europe. In: Mansoob M. (ed.), *Issues in Positive Political Economy*. London and New York: Routledge: 9-21.
- Frey, B.S. (2003). *Direct Democracy for Transition Countries*, Institute of Empirical Research in Economics, University of Zurich, Working Paper No.165.
- Frey, B.S. and A. Stutzer (2003). *Direct Democracy: Designing a Living Constitution*, Institute of Empirical Research in Economics, University of Zurich, Working Paper No.167.
- Gramlich, E. M. (1977). Intergovernmental Grants: A Review of the Empirical Literature. In W. E. Oates (ed.), *The Political Economy of Fiscal Federalism*, pp. 219–239. Lexington, Mass.: D.C. Heath.
- Heil, J.B. (1991). The Search for Leviathan Revisited, *Public Finance Quarterly* 19: 334-346.

- Hines, J.R. and R.H. Thaler (1995). Anomalies: The Flypaper Effect, *Journal of Economic Perspectives* 9: 217-226.
- Inman, R. P. (1988). Federal Assistance and Local Services in the United States: The Evolution of a New Federalist Fiscal Order. In: H. S. Rosen (eds.), *Fiscal Federalism: Quantitative Studies*. Chicago: Chicago University Press.
- Inman, R. P. and D.L. Rubinfeld. (1997). The Political Economy of Federalism. In: D. C. Mueller (ed.), *Perspectives on Public Choice*, pp. 73–105. Cambridge: Cambridge University Press.
- Inman R.P. and D.L. Rubinfeld. (1999) . *Federalism*. University of California, Berkley, Working Paper No. 9700.
- International Monetary Fund (IMF) Government Finance Statistics Yearbook (GFS). Washington D.C.: IMF, annual publication.
- Jin, J. and H. Zou (2002). How Does Fiscal Decentralization Affect Aggregate, National, and Subnational Government Size?, *Journal of Urban Economics*, 52: 270-293.
- Jones, M.P, P. Sanguinetti and T. Tommasi (1999). Politics, Institutions, and Public Sector Spending in the Argentine Provinces, in: J. Poterba and J. von Hagen (eds.). *Fiscal Institutions and Fiscal Performance*, Chicago, Chicago University Press, 135-150.
- Joulfaian, D. and M. L. Marlow (1990). Government Size and Decentralization: Evidence from Disaggregated Data. *Southern Economic Journal*, 56: 103-134.
- Grossman, P.J. and West, E.G. (1994). Federalism and the Growth of Government Revisited. *Public Choice* 79 (4): 19-32.
- Kirchgässner, G. and W.W. Pommerehne (1988). Government Spending in Federal Systems: A Comparison between Switzerland and Germany. In: Lybeck, J. A., Henrekson, M. (eds.), *Explaining the Growth of Government*. Elsevier, Amsterdam, 327-357.
- Kirchgässner, G. and W.W. Pommerehne, (1996). Tax Harmonization and Tax Competition in the European Union: Lessons from Switzerland. *Journal of Public Economics*, 60: 351–371.
- 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): 283-294.
- Noam, E. M. (1980). The Efficiency of Direct Democracy. *Journal of Political Economy*, 88: 803–810.
- Matsusaka, J.G. (1995). Fiscal Effects of the Voter Initiative: Evidence from the Last 30 Years. *Journal of Political Economy*, 103(6): 587-623.
- Moesen W. and Ph. van Cauwenberge (2000). The Status of the Budget Constraint, Federalism and the Relative Size of Government: A Bureaucratic Approach, *Public Choice*, 104: 207-224.
- Musgrave, R. A. (1959). *The Theory of Public Finance*. New York: McGraw-Hill.
- Musgrave, R. A. (1969). Theories of Fiscal Federalism. *Public Finance*, 24(4): 521-532.

- Neck, R., and F. Schneider. (1988). The Growth of the Public Sector in Austria: An Exploratory Analysis. In: Lybeck, J. A., Henrekson, M. (eds.), *Explaining the Growth of Government*. Elsevier, Amsterdam, 231-263.
- Oates, W. E. (1972). *Fiscal Federalism*. New York, NY: Harcourt Brace Jovanovich, Academic Press.
- Oates, W. E. (1981). On Local Finance and the Tiebout Model. *American Economic Review*, 71: 93-98.
- Oates, W. E. (1988). On the Measurement of Congestion in the Provision of Local Public Goods. *Journal of Urban Economics*, 24: 85-94.
- Oates, W. E. (1994). Federalism and Government Finance. In J. M. Quigley and E. Smolensky (eds.), *Modern Public Finance*, pp. 126-151. Cambridge, Mass.: Harvard University Press.
- OECD. *Fiscal Design across Levels of Government*. Paris, 2001.
- OECD. *Taxing Powers of State and Local Government*. Paris, 1999.
- OECD. *Revenues Statistics of OECD member countries*. Paris, 2003.
- Panizza, U. (1999). On the Determinants of Fiscal Centralization: Theory and Evidence. *Journal of Public Economics*, 74: 97-139.
- Persson, T., R. Gerard and G. Tabellini (1996). *The Theory of Fiscal Federalism: What Does It Mean for Europe?* IGIER.
- Persson, T., and G. Tabellini (1996). Federal Fiscal Constitutions: Risk Sharing and Moral Hazard. *Econometrica*, 64: 623-646.
- Pommerehne, W. W. (1977). Quantitative aspects of federalism: a study of six countries, in: W. Oates (eds) *The political economy of fiscal federalism*. Lexington Books, Toronto, 275-357.
- Pommerehne, W.W.(1978). Institutional Approaches to Public Expenditure - Empirical Evidence from Swiss Municipalities. *Journal of Public Economics*, 9 (4): 255-280.
- Pommerehne, W.W. and B.S. Frey (1978). Bureaucratic behaviour in democracy: a case study. *Public Finance / Finance Publique* (1): 98-111.
- Pommerehne, W. W. and F. Schneider (1978). Fiscal illusion, political institutions, and local public spending. *Kyklos*, 31: 381-408.
- Rodden, J. (2002). The Dilemma of Fiscal Federalism: Grants and Fiscal Performance Around the World, *American Journal of Political Science*, 46: 670-687.
- Rodden, J. (2003). Reviving Leviathan: Fiscal Federalism and the Growth of Government, *International Organization*, 57: 695-729.
- Rodrik, D. (1998). Why Do More Open Economies Have Bigger Governments?, *Journal of Political Economy* 106, 5:997-1032.

- Rubinfeld, D.L. (2001). Structuring Intergovernmental Grants to Local Governments: Lessons from South Africa. *Constitutional Political Economy*, 12: 173-187.
- Saunders, P. (1988). Explaining International Differences in Public Expenditure: An Empirical Study, *Public Finance/Finances Publiques*, 43: 273-294.
- Shadbegian R. (1999). Fiscal Federalism, Collusion and Government Size: Evidence from the States, *Public Finance Review*, 27: 262-281.
- Shah, A. (1996). On the Design of Economic Constitutions. *Canadian Journal of Economics*, Vol. 29: 614-18.
- Schaltegger, Christoph A. and Lars P. Feld (2001). On Government Centralization and Budget Referendums: Evidence from Switzerland. CESifo Working Paper No. 615.
- Solano, P.L. (1983). Institutional Explanations of Public Expenditures Among High Income Democracies, *Public Finance/Finances Publiques*, 38: 440-458.
- Stutzer, A. and B.S. Frey (2000). Stärkere Volksrechte - Zufriedenere Bürger: Eine mikroökonomische Untersuchung für die Schweiz, *Swiss Political Science Review*, 6: 1-30.
- Tiebout, C. (1956). A pure theory of local expenditures. *Journal of Political Economy*, 64: 416-424.
- Weingast, B. (1995). The Economic Role of Political Institutions: Market Preserving Federalism and Economic Development, *Journal of Law, Economics and Organization*, 11(1): 1-31.
- Wellisch, D. (2000) *Theory of Public Finance in a Federal State*, Cambridge University Press.
- Wellisch, D. (1996). Decentralized Fiscal Policy with High Mobility Reconsidered: Reasons for Inefficiency and an Optimal Intervention Scheme, *European Journal of Political Economy*, 12: 91-111.
- Wildasin, D. (1991). Some Rudimentary 'Duopoly' Theory, *Regional Science and Urban Economics*, 21(3): 393-421.
- Wildasin, D. (1989). Interjurisdictional Capital Mobility: Fiscal Externalities and a Corrective Subsidy, *Journal of Urban Economics*, 25: 193-212.
- Zax J. (1989). Initiatives and Government Expenditures. *Public Choice*, 63: 267-277.