FISCAL DECENTRALIZATION: IS IT A GOOD CHOICE FOR THE SMALL NEW MEMBER STATES OF THE EU?

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Abstract

The main purpose of this paper is to analyze the impact of fiscal decentralization on economic growth in six small new member state of the European Union, namely Cyprus, Malta, Slovenia, and the Baltic states – Estonia, Latvia and Lithuania for the period 2000-2010. The empirical analysis is based on the multiple regression method.

The conclusion is that fiscal decentralization is a reliable instrument for an increase in budget performance efficiency in the small new member states of the EU. There is a positive relationship between the subnational share of total government expenditure and revenue (used as measures of fiscal decentralization) and economy growth. At the same time during the analyzed period the subnational revenue and expenditure presented as ratios to GDP have negatively affected economy growth in the analyzed countries. The relationship is not linear and the effects of changes in the ratios are not proportional. Because of that the policies promoting decentralization must be built on the base of precise analysis.

However, the empirical analysis of fiscal decentralization is still at an early stage and it is premature to draw definitive conclusions from these preliminary results.

Keywords: fiscal decentralization, local expenditure, local revenue, local taxes, economic growth

JEL classification: C33, H71, H77, O47

1. INTRODUCTION

Fiscal decentralization plays a major role in the traditional theory of public finance, which is based on the presumption of the improved allocation of the resources in the public sector. The allocative efficiency is declared as one of the main advantages of the fiscal decentralization. It is supported and explained by the decentralization theorem, which states that the provision of uniform levels of public goods and services across jurisdictions is generally inefficient (Oates, 1972).

The theorem is proved by a simple model, which includes two communities with different demand for one public service and is based on the following preconditions: there are no economy of scale in the production of the service, no spillover effects, and no possibility for the citizens to move to another jurisdiction. In this case a uniform level of public service offered in each community is inefficient, because marginal benefits and marginal costs of the public service differ widely, due to the variance in demand for the public service in both jurisdictions. As a conclusion of this model, allocative efficiency can be achieved by diversifying public goods and services, according to local demands, which can be done by the local governments through fiscal decentralization. Moreover, it is obvious that the wider the variance in the local preferences and particular circumstances, the larger the benefits of decentralization.

Including mobile households in this model causes incentives for individuals to seek out jurisdictions that provide the best combination of public service and local tax rate, thereby contributing to efficient resource allocation and increasing the potential gains from the decentralized provision of public goods and services (Tiebout, 1956). Moreover, in contrast to the monopolist position of the central government, local government face competition from their neighbors, this generally constrains budgetary growth and provides pressures for the efficient provision of public services. (Oates, 2007)

However, freedom for local communities to decide on public spending and taxation themselves inevitably results in inequities. Moreover, considering the economic efficiency of centralized provision of public goods and services, which overcomes spillover effects and allows for economies of scale makes apparent the need for central government intervention. At the same time this intervention erodes fiscal decentralization (Prud'homme, 1994).

In short the basic rationale for decentralization of the public sector is not as simple and clear as it appears. There is a continuing debate on the costs and benefits of fiscal decentralization, but so far no systematic evidence has been provided for the capacity of fiscal decentralization to provide an unambiguously positive contribution to an improved economic performance.

Some recent studies contributed to the empirical analysis of the impact of fiscal decentralization on the economic growth. Studying the urban public finance in developing countries Bahl and Linn (1992) argued that economic gains from fiscal decentralization tend to emerge only beyond a certain threshold income level. Using the share of subnational government expenditures in consolidated government expenditures as the indicator of fiscal decentralization, Zhang and Zou (1998) found a statistically significant negative relationship between fiscal decentralization and economic growth in China. Expanding the analysis Davoodi and Zou (1998) studied the relation between fiscal decentralization and economic growth in 46 developed and developing countries for the period 1970-1989. In developed countries they did not find a clear relationship, while in developing countries not significant, but negative effect of fiscal decentralization on economic growth was detected. Continuing the research, Xie, Zou and Davoodi (1999) discovered a highly insignificant effect of fiscal decentralization on economic growth for the United States, but they maintained that the degree of fiscal decentralization in this country may be at an optimal level so that benefits from a further expansion of fiscal decentralization are unlikely. Thiessen (2001) analyzed for high-income OECD countries the relationship between per capita economic growth, capital formation and total factor productivity growth, on the one hand, and indicators of fiscal decentralization, on the other hand. The evidence appeared to be consistent with the hypothesis that the benefits of fiscal decentralization on economic growth and capital formation are

limited, so the author suggested that fiscal decentralization may not be without costs, in particular in high-income countries.

Akai, Nishimura and Sakata (2004) contributed to the empirical work on this topic by their study on 50 states of the USA, which is based on the endogenous growth model of Barro, adopted as a conceptual framework. They found a "hump-shaped" relationship between fiscal decentralization and economic growth for USA. The analysis of Wingender (2005) is focused on ten provinces of Canada for the period 1965-2004. A conceptual framework of the research is the wide accepted Barro's model. The results of the analysis are unclear and ambiguous. The regression coefficients for some provinces are positive and statistically significant, but these ones estimated with use of aggregate data do not present clear evidence of a significant impact. The empirical research focused on four provinces of Pakistan was made by Malik, Hassan and Hussain (2006). A conceptual framework of the analysis used by authors is the model of Barro and its modifications in the study of Zhang and Zou (1998). According to results of the research, there are a statistically significant positive impact and "hump-shaped" relationship between fiscal decentralization and economic growth.

Among the last empirical analyses on the relationship between fiscal decentralization and economy growth is the study of A. Samimi, S. Lar, G. Haddad, M. Alizadeh (2010), which is focused on Iran. As analytical framework of the investigation has been used the Barro's model and its development from Davoodi and Zou. The researchers found a positive and statistically significant impact of fiscal decentralization on economy growth for Iran.

This paper attempts to contribute to the empirical research of the impact of fiscal decentralization on economic growth by studying the experience of six small new member states of the European Union, namely Cyprus, Malta, Slovenia, and the Baltic states – Estonia, Latvia and Lithuania. The hypothesis tested is as follows: if a country and/or its population are relatively small, the preferences of all its inhabitants might be relatively homogeneous. In this case, differences in individual preferences for public goods and services may not be pronounced, thus neutralizing the allocative efficiency and reducing the potential gains from decentralization. In addition, the fixed costs which decentralization implies may not be justifiable by the standards of the economic efficiency.

The study is structured as follows. Section two introduces the specifics of countries' government structure and analyzes the dynamics of the main fiscal decentralization indicators in the selected countries for the period 2000 - 2010. The degree of the fiscal decentralization is assessed on the base of the relative share of local expenditures respectively in consolidated government expenditures and GDP. Special emphasis is placed upon the local tax revenues, measured as percentage of the total tax revenues and GDP, as a basic precondition for financial autonomy of the local governments. Third section presents the results of the empirical analysis of the effects on economic growth of fiscal decentralization. Fourth section concludes.

2. DYNAMICS OF THE BASIC FISCAL DECENTRALIZATION INDICATORS

The countries, included in the analysis are the small new member states of the European Union, namely Cyprus, Malta, Slovenia, and the Baltic states – Estonia, Latvia, and Lithuania. These countries are unitary states, which population is not more than 3.3 million and the total area does not exceed 65 000 km². Since 1990 four of them (Slovenia, Estonia, Latvia, and Lithuania) have undergone a transition from a centralized, socialist type econo-

my towards a market based economy, while Cyprus and Malta have not passed any significant economic transformation during the last ten years.

As a whole, the government structure of the analyzed countries is not very fragmented. Although the administrative reforms, conducted during the transition period, the number of the local governments have not been dramatically increased. (Table 1) Presently, the small new member states of the EU enjoy comparatively simple subordination scheme.

Territorial structure of Estonia includes two types of municipalities: urban and rural municipalities. Practically, there is no other status distinction between them. Since October 2005 there is total of 227 municipalities in Estonia, 34 of them are urban and 193 are rural. (Wikipedia, 2012)

Cyprus is divided into six districts for administrative purposes and there are 33 municipalities. (CLGF, 2012)

After the last territorial reform (2009) Latvia has one-level administrative division. According to the reform, the districts were liquidated, but towns, towns countryside territories and parishes were merged into 110 municipalities and there are 9 republican cities with own city council and administration. (Ministry of Environmental Protection and Regional Development, 2009)

Lithuania is divided into three levels of administrative division. The first-level division consists of 10 counties. These are sub-divided into 60 municipalities. The municipal units are further sub-divided into over 500 smaller groups, known as elderships. (Wikipedia, 2012)

Malta is a unitary multiparty republic with one legislative house. The territorial structure of Malta included three regions, which are administrative territorial entities and 68 municipalities - 54 on Malta and 14 on Gozo, the country's other island. (Britannica, 2008; CDSP, 2010)

Slovenia is a unitary country. It is divided into 211 municipalities of which 11 have urban status. There are two statistical regions - West Slovenia, East Slovenia. (Wikipedia, 2012)

Table no. 1 Country profiles

Country	Population, 1 January 2011 (persons)	Total area (km^2)	Population density, (inhabitants per km^2)	GDP (million euro) 2011	GDP per capita (euro)	Local governments (number)
Estonia (EE)	1 340 194	45 000	30.9	15973.0	11900	227
Cyprus (CY)	804 435	9 250	87.2	17761.4	22000	33
Latvia (LV)	2 229 641	65 000	36.0	20049.6	9700	110
Lithuania (LT)	3 244 601	65 000	52.4	30701.6	9500	60
Malta (MT)	417 617	316	1 316.4	6393.2	15300	68
Slovenia (SI)	2 050 189	20 273	101.7	35638.6	17400	210

Source: [Eurostat - Country profiles, Wikipedia]

Decentralization of the public sector in Slovenia, Estonia, Latvia and Lithuania was conducted by the transition process, from centralized, socialist type economy to market based economy, which started in 1990. Moreover, the break-up of centralized decision-making forced the establishment of new systems of fiscal decentralization. As a result, the relative shares of local expenditures in GDP and consolidated public expenditures have been significantly increased in all the former socialist countries.

Table no. 2 Local Government Expenditures
A) percentage of GDP

Country	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Av
Estonia	8.5	10.0	10.3	9.6	9.6	9.5	9.3	9.5	10.9	11.4	10.0	9.9
Cyprus	1.6	1.7	1.7	1.8	2.0	2.2	2.0	1.9	1.9	2.2	2.2	1.9
Latvia	9.7	9.7	10.3	9.4	10.0	9.5	10.7	11.1	12.6	12.7	12.0	10.7
Lithuania	9.1	10.0	9.5	8.9	8.8	8.1	8.4	8.3	9.3	10.8	11.3	9.3
Malta	0.7	0.7	0.7	0.7	0.7	0.6	0.6	0.6	0.5	0.7	0.7	0.7
Slovenia	8.4	8.5	8.6	8.6	8.6	8.6	8.7	8.4	9.1	10.1	10.2	8.9
EU (27)	10.8	10.9	11.1	11.3	11.4	11.4	11.4	11.3	11.6	12.4	12.2	11.4

B) percentage of general government expenditures

Country	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Av
Estonia	23.6	28.7	28.8	27.6	28.2	28.3	27.7	27.9	27.6	25.2	24.6	27.1
Cyprus	4.3	4.5	4.3	4.0	4.7	5.1	4.7	4.6	4.5	4.8	4.7	4.6
Latvia	25.8	27.7	28.6	26.9	27.9	26.5	27.9	30.9	32.2	28.7	27.0	28.2
Lithuania	23.4	27.3	27.5	27.0	26.5	24.4	25.1	24.0	25.0	24.7	27.6	25.7
Malta	1.7	1.7	1.6	1.5	1.5	1.3	1.4	1.4	1.1	1.6	1.6	1.6
Slovenia	18.1	18.0	18.6	18.6	18.8	19.0	19.5	19.8	20.6	20.5	20.4	19.3
EU (27)	24.2	23.6	23.8	23.9	24.4	24.4	24.6	24.8	24.6	24.3	24.1	24.2

Source: [Eurostat – Data Explorer]

The highest is local expenditures to GDP ratio in Latvia, respectively 12.7% in 2009 and 12.0% in 2010 by comparison with 9.7% in 2000. In Lithuania local expenditures represent 9.1% of GDP in 2000, 10.8% in 2009 and 11.3% in 2011. Slovenian local governments spent 8.4% of GDP in 2000, 10.1% in 2009 and 10.2% in 2010. In Estonia local expenditures to GDP ratio reached 11.4% in 2009 and 10.0% in 2010 by comparison with 8.5% in 2000. Moreover, in 2010 local expenditures to GDP ratio in Slovenia, Estonia, Latvia, and Lithuania was near to the EU (27) average (12.2%).

During the analyzed period local governance has expanded its relative importance within the governmental system. In 2010 the expenditures of the local governments formed 27.6% of general government expenditures in Lithuania, 27.0% in Latvia, 24.6% in Estonia, and 20.4% in Slovenia. In 2010 local-to-consolidated expenditures ratio in the Baltic states exceeded the EU (27) average (24.1%).

However, this is not the case in Cyprus and Malta. These countries are highly centralized and no decentralization process has been observed during the analyzed period. Local government expenditures in Malta have been kept steady at 0.7% of GDP and 1.6% of the general government expenditures on an average. In Cyprus local government expenditures hardly reached 2.2% of GDP and 4.7% of the general government expenditures in the end of the period.

The lack of local tax autonomy has been a fundamental weakness of the revenue assignment system in Malta during the analyzed period. Almost the same was the situation in Cyprus, where local taxes accumulated 0.5% of GDP and accounted for less than 2.1% of the total tax revenues.

Table no. 3 Local Government Tax Revenues
A) percentage of GDP

Country	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Av
Estonia	**4.3**	**4.1**	**4.0**	**4.0**	**4.0**	**4.0**	**4.1**	**4.2**	**4.9**	**5.0**	**4.6**	**4.3**
Cyprus	0.4	0.5	0.4	0.4	0.5	0.4	0.5	0.5	0.5	0.5	0.5	**0.5**
Latvia	5.0	5.0	4.9	5.1	5.1	4.9	5.2	5.4	5.6	5.1	5.7	**5.2**
Lithuania	6.1	5.7	2.8	2.6	2.8	2.8	2.8	3.0	3.4	3.5	3.2	**3.5**
Malta	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
Slovenia	2.8	2.9	2.9	3.0	3.0	2.9	3.0	3.5	3.4	3.8	4.2	**3.2**
EU (27)	4.0	3.9	3.9	4.0	4.1	4.2	4.2	4.2	4.2	4.2	4.1	4.1

B) percentage of general tax revenues

Country	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Av
Estonia	21.9	20.5	19.8	20.0	19.9	19.8	19.9	21.2	22.1	24.2	23.5	21.2
Cyprus	1.7	2.1	1.6	1.6	1.9	1.4	1.5	1.6	1.9	1.9	2.1	1.8
Latvia	25.6	26.0	24.9	26.0	25.0	22.9	24.2	26.1	31.3	27.3	29.2	26.2
Lithuania	30.7	28.8	14.3	13.2	14.1	13.6	13.6	14.5	19.5	21.2	16.1	18.1
Malta	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Slovenia	12.1	12.3	12.1	12.6	12.4	12.0	12.7	15.2	15.1	16.8	18.2	13.8
EU (27)	15.1	15	15.1	15.4	15.6	15.6	15.6	15.8	16.5	16.4	15.5	15.6

Source: [Eurostat – Data Explorer]
Note: Social contributions are not included

During the period 2000-2010 Latvia has enjoyed the greatest financial autonomy of the local governmental level amongst the small new member states of the EU. The positive dynamics has also been observed in Estonia, Slovenia and Lithuania. In 2010 local taxes accumulated 5.7% of GDP and formed 29.2% of the general tax revenues in Latvia. Similar values were reported in Estonia, where local taxes represented 23.5% of general tax revenues and 4.6% of GDP. Slovenian local governments collected 18.2% of the general tax revenues and 4.2% of GDP in 2010. Lithuania reported indicators below the EU (27) averages, namely local taxes-to-GDP ratio equal to 3.2% and local-to-general tax revenues equal to 16.1%.

3. EMPIRICAL ANALYSIS OF THE IMPACT OF FISCAL DECENTRALIZATION ON ECONOMY GROWTH

3.1. Conceptual framework

The analytical framework of Davoodi and Zou (Davoodi *et al*, 1998, p.245-247) is adopted in the present analysis.

Following Barro (Barro, 1990, p.108-125), the production function has two inputs: private capital and public spending. Davoodi and Zou depart from the Barro model by assuming that public spending is carried out by three levels of government: federal, state, and local. Let k be private capital stock, g total government spending, f federal government

spending, *s* state government spending, and *l* local government spending, all measured on a per capita basis:

$$(1)\ g = f + s + l$$

The production function is Cobb - Douglas:

$$(2)\ y = k^{\alpha} f^{\beta} s^{\gamma} l^{\omega}$$

where *y* is per capita output, $1 > \alpha > 0$; $1 > \beta > 0$; $1 > \gamma > 0$; $1 > \omega > 0$ и $\alpha + \beta + \gamma + \omega = 1$.

The allocation of consolidated or total government spending *g* among different levels of government takes the following form:

$$(3)\ f = \theta_f g;\ \ s = \theta_s g;\ \ l = \theta_l g,$$

where $\theta_f + \theta_s + \theta_l = 1$ and $0 < \theta_i < 1$ for $i = f, s$ и l. Thus, if θ_f is the share of federal government in total spending, θ_s the share of state government and θ_l the share of local government. Consolidated government spending g is financed by a flat income tax at rate *t*:

$$(4)\ g = \tau y$$

The representative agent's preferences are given by

$$(5)\ U = \int_0^{\infty} \frac{c^{1-\sigma} - 1}{1-\sigma} e^{-\rho t} dt$$

where *c* is per capita private consumption, and p is the positive time discount rate.

The dynamic budget constraint of the representative agent is

$$(6)\ \frac{dk}{dt} = (1-\tau)y - c = (1-\tau)k^{\alpha} f^{\beta} s^{\gamma} l^{\omega} - c$$

We further assume a constant tax rate along the balanced growth path.

Given total government spending *g*, a constant tax rate t, and the shares of spending by different levels of governments (θ_i's, $i = f, s, l$) the representative agent's choice of consumption is determined by maximizing *(5)* subject to *(6)* and the government's budget allocation. Along the balanced growth path, the solution for the per capita growth rate of the economy is given by

$$(7)\ \frac{dy/dt}{y} = \frac{1}{\sigma}\left[(1-\tau)\tau^{1-\alpha/\alpha}\alpha\theta_f^{\beta/\alpha}\theta_s^{\gamma/\alpha}\theta_l^{\omega/\alpha} - \rho\right]$$

Equation 7 shows that the long-run growth rate of per capita output is a function of the tax rate and the shares of spending by different levels of government. It forms the basis for our empirical analysis of the relationship between fiscal decentralization and growth. Fol-

lowing the literature on fiscal federalism, we regard a country as more fiscally centralized if it has a higher value of the federal spending share θ_f.

It is important to note that, for a given share of total government spending in GDP, a reallocation of public spending among different levels of governments can lead to higher economic growth if the existing allocation is different from the growth-maximizing expenditure shares. To show this point, we maximize the growth rate in *(7)* by choosing θ_f, θ_s, and θ_l subject to the constraint $\theta_f + \theta_s + \theta_l = 1$. The growth-maximizing government budget shares are

$$\theta_f = \frac{\beta}{\beta+\gamma+\omega};\ \theta_s = \frac{\gamma}{\beta+\gamma+\omega};\ \theta_l = \frac{\omega}{\beta+\gamma+\omega}$$

Therefore, as long as the actual government budget shares are different from growth-maximizing shares, the growth rate can always be increased without altering the total budget's share in GDP.

3.2. Empirical methodology and data

The quantitative effect of fiscal decentralization on economy growth will be estimated by the means of equation (8)'s procedure.

$$(8)\ y_{it} = b_1 + b_2\theta_{it} + b_3\tau_{it}\ (or\ \xi_{it}) + b_4X_{it} + b_5D_{it} + \varepsilon_{it}$$

where y_{it} is growth rate of GDP for each country and year, θ_{it} is measure of fiscal decentralization - subnational share of total government expenditure (or revenue) , τ_{it} - ratio of local government revenue (or expenditures - ξ_{it}) to GDP, X_{it} - dummy variables - quantitative indicators - investments of private sector, inflation rate for each country and year, population growth for each country and year measured by percent, D_{it} - dummy variable - qualitative indicator - such variable in this case is the membership of concrete country in the Euro area. This variable receives a value "one" for years of membership and "zero" for all others. ε_{it} expresses the error term of distribution. Source of data is Eurostat.

3.3. Regression results

The results from the estimation procedure are presented in Appendix 1 and Appendix 2.

The explanatory power of the model measured by Adjusted R-squared is not high (see Appendix 1). Across the different models the values of this indicator vary from 0.445742 to 0.509550.

There is a positive relationship between the subnational share of total government expenditure and economy growth for the small new member states of the EU. The regression coefficients across the specifications are statistically significant at 1% level. A non-linear relation hypothesis is tested but it is not empirically confirmed. Values of the coefficient vary from 0.762 to 1.193 for different models. The increasing efficiency of public expenditure affects GDP growth rate. Therefore these results are reliable empirical evidence for the

positive impact of fiscal decentralization, measured by the share of local government expenditures of total government expenditure, on economy growth.

Regression coefficients show negative influence of the ratio of local government revenue to GDP on economy growth for the small new member states of EU. These revenues are used for financing the spending programs of local governments. Results are "consistent with light of the conventional wisdom" (Samimi *et al*, 2010, p. 5492) that public sector's revenues have a negative impact on investment activity of business agents and GDP growth rate. The higher taxes lead to a decrease in investment resources. The coefficients are statistically significant at 1% level. Their values vary from -0.230 to -0.301 across the models. A non-linearity hypothesis has been tested. The results from this test support the hypothesis. There is a quadratic relation. The negative sign means the regression curve is concave down and has a maximum turning point. In terms of fixed share of local authorities' expenditure, the negative impact of local government revenue on growth decrease to the turning point. After this point, the negative effects for national economy sharply increase. The significance level of coefficients makes this result a reliable empirical evidence for the negative relationship between the amount of local government revenues and economy growth.

Fiscal decentralization could be measured by the local authorities' share of total government revenues. In this case the decentralization is helpful for an increase in the efficiency of the budgetary revenues collection. This hypothesis is tested by an estimation procedure based on changes of the regression model specification. The share of local authorities' revenue of total revenue is taken as a measure for fiscal decentralization. The ratio of local government revenues to GDP is exchanged by the ratio of local government expenditures to GDP. Regression coefficients are presented in Appendix 2.

Values of the adjusted R-squared vary from 0.445409 to 0.680218 across the models. Therefore the model's explanatory power is high. According to coefficients there is a positive relationship between the subnational share of total government revenue and economy growth. Coefficients have values from 1.016 to 1.379 across the models. The statistical significance of regression coefficients is at 1% level. Consequently, these results are reliable empirical evidence for the positive influence of fiscal decentralization on economy growth. A hypothesis for non-linear links is tested but there are no statistically significant results for such type of relationships.

The local authorities' expenditure presented as a ratio to GDP has a negative impact on economy growth for the small new member states of EU. Regression coefficients are statistically significant at 1% level. This fact makes results a reliable empirical evidence for a negative effect of the increasing expenditure on economy growth. In this case there is a difference. The form of relationship is quadratic. The negative sign means the parabola is concave down and has a maximum turning point. This means that an increase in the size of local authorities' spending in terms of fixed share of total revenue lead to a decrease of the negative effect to a point. After this point, every new increase in the expenditure size would lead to an increase in the negative effect on economy growth.

4. CONCLUSIONS

The conclusion is that fiscal decentralization is a reliable instrument for an increase in budget performance efficiency in the small new member states of the EU. There is a positive relationship between the subnational share of total government expenditure and revenue (used as measures of fiscal decentralization) and economy growth. At the same time during

the analyzed period the subnational revenue and expenditure presented as ratios to GDP have negatively affected economy growth in the analyzed countries. The relationship is not linear and the effects of changes in the ratios are not proportional. Because of that the policies promoting decentralization must be built on the base of precise analysis.

However, the empirical analysis of fiscal decentralization is still at an early stage and it is premature to draw definitive conclusions from these preliminary results.

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Appendix 1. *Regression results from estimating equation (8) with the subnational share of total government expenditure for the small NMS of the EU.*

Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
(Constant)	-0.229 (-0.217)	-1.823 (-1.491)	-2.069* (-1.707)	-0.269 (-0.255)	-0.633 (-0.412)	-0.282 (-0.183)	0.717 (0.461)	0.899 (0.580)	-0.321 (-0.201)
Subnational share of total government expenditure (%)	1.193*** (7.353)	0.916*** (4.691)	0.870*** (4.482)	1.183*** (7.319)	0.792*** (3.980)	0.828*** (4.132)	1.158*** (7.040)	1.163*** (7.055)	0.762*** (3.734)
Ratio of local government revenues to GDP (%)^2	-0.293*** (-7.158)	-0.244*** (-5.500)	-0.230*** (-5.158)	-0.286*** (-6.973)	-0.236*** (-5.320)	-0.250*** (-5.671)	-0.294*** (-6.989)	-0.301*** (-7.217)	-0.230*** (-5.118)
Investment rate(% of GDP)^2		0.009** (2.369)	0.010*** (2.661)		0.011*** (2.936)	0.010*** (2.692)			0.011*** (2.971)
Inflation rate (%)^4			-0.001* (-1.727)	-9.54E-05 (-1.242)	-0.001 (-1.620)		-8.78E-05 (-1.134)		-0.001* (-1.656)
Population growth rate (%)					-1.448 (-1.494)	-1.572 (-1.606)	-0.868 (-0.863)	-0.997 (-0.995)	-1.417 (-1.455)
Euro area									-1.092 (-0.736)
R-squared	0.462887	0.507474	0.530433	0.475930	0.547277	0.527466	0.482248	0.471323	0.551394
Adjusted R-squared	0.445836	0.483642	0.499641	0.450572	0.509550	0.496480	0.448297	0.445742	0.505773
Durbin-Watson stat	1.811721	1.894953	2.068249	1.912945	2.007832	1.835402	1.868735	1.768885	2.034576
F-statistic	27.14688	21.29386	17.22671	18.76828	14.50629	17.02280	14.20423	18.42464	12.08640
Prob(F-statistic)	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Observations	66	66	66	66	66	66	66	66	66

Source of data: Eurostat
Note: t-test in parentheses
*** significant at 1%; ** significant at 5%; * significant at 10%

Appendix 2. *Regression results from estimating equation (8) with the subnational share of total government revenue for the small NMS of the EU.*

Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
(constant)	-0.703 (-0.634)	-4.664*** (-4.527)	-4.578*** (-4.330)	-1.806 (-1.482)	-10.724*** (-5.380)	-10.589*** (-5.412)	-2.049 (-1.153)	-1.220 (-0.692)	-10.566*** (-5.129)
Subnational share of total government revenue (%)	1.318*** (7.392)	1.118*** (8.008)	1.103*** (7.632)	1.363*** (7.754)	1.030*** (6.244)	1.045*** (6.526)	1.379*** (7.044)	1.351*** (6.773)	1.016*** (5.941)
Ratio of local government expenditure to GDP (%) ^2	-0.305*** (-7.413)	-0.292*** (-9.243)	-0.288*** (-8.786)	-0.322*** (-7.826)	-0.282*** (-8.379)	-0.285*** (-8.830)	-0.322*** (-7.738)	-0.307*** (-7.347)	-0.279*** (-8.081)
Investment rate (% of GDP)^2		0.016*** (6.766)	0.017*** (6.247)		0.712*** (6.134)	0.690*** (6.634)			0.714*** (6.097)
Inflation rate (%)			-0.068 (-0.423)	0.364** (1.980)	-0.072 (-0.441)		0.361* (1.935)		-0.078 (-0.472)
Population growth rate (%)					-0.673 (-0.812)	-0.679 (-0.824)	0.196 (0.189)	0.398 (0.379)	-0.673 (-0.805)
Euro area									-0.424 (-0.344)
R-squared	0.469779	0.694977	0.695870	0.501314	0.693698	0.692703	0.501607	0.471005	0.694310
Adjusted R-squared	0.452947	0.680218	0.675927	0.477184	0.668173	0.672553	0.468925	0.445409	0.663223
Durbin-Watson stat	1.203428	1.856772	1.875069	1.229136	1.903500	1.881652	1.239876	1.221108	1.922243
F-statistic	27.90919	47.08790	34.89296	20.77560	27.17708	34.37634	15.34833	18.40113	22.33434
Prob(F-statistic)	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Observations	66	66	66	66	66	66	66	66	66

Source of data: Eurostat
Note: t-test in parentheses
*** significant at 1%; ** significant at 5%; * significant at 10%