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A COMPREHENSIVE ANALYSIS OF EXPENDITURE DECENTRALIZATION AND OF THE COMPOSITION OF LOCAL PUBLIC SPENDING

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A comprehensive analysis of expenditure decentralization and of the composition of local public spending[(*)]

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Abstract

Many countries have recently implemented fiscal decentralization reforms, assigning more functions and spending responsibilities to sub-national governments. In this paper we investigate the reasons behind the decentralization process of different categories of government expenditure (such as health, education, social security and welfare, housing, transports, public order) using IMF and OECD data for 21 developed countries over the period 1972-2006. We pay particular attention to the roles played by the taxing power of sub-national governments and by grants received from upper tiers of government. Then, we also study the determinants of the composition of local expenditure. Using a general-to-specific empirical approach, we adopt different models for each of the spending functions under analysis. This leads to a number of results, not yet reached in the existing literature, on the importance of tax decentralization, demographics, politics, and a number of other socio-economic variables.

Keywords: *fiscal decentralization, COFOG, task assignment, local tax revenue, budget composition.*

JEL classification: *H500, H750, H760, H770*

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1. Introduction

Recently, there has been a wave of new studies on decentralization and fiscal federalism following widespread reforms in both developed and developing countries (Rodríguez-Pose and Ezcurra 2010). Major decentralization processes have occurred over a relatively short period of time in traditionally "unitary" European countries (such as France, Italy, and the United Kingdom), some of which now show decentralization levels that are comparable to those of federalist countries (Ter-Minassian 1997; Stegarescu 2005). Although the literature offers a number of contributions on fiscal decentralization and its determinants (Wallis and Oates 1998; Panizza 1999; Letelier 2005; Beramendi 2007; Bodman and Hodge 2010), it has largely overlooked the characteristics and the implications of the various expenditure categories such as those included in the Classification Of the Functions Of Government (COFOG) provided by the United Nations.[1]

Fiva (2006, p. 260) states: "the effects of fiscal decentralization may differ according to the extent that the public spending enters as an input into the production function. It may also be reasonable to expect the effects to differ according to the redistributive effect of different kinds of government spending. Hence, separating public spending according to the United Nations (...) COFOG could be useful. Unfortunately, there is, as far as I know, no reliable longer time series available in the cross-country setting for this classification." The existing empirical evidence on decentralization of these spending items is, accordingly, scarce, as most of the previous literature uses large spending conglomerates due to data availability issues (e.g., Persson and Tabellini 2003; Kappeler and Valila 2008; Rodríguez-Pose *et al.* 2009). The COFOG definition of aggregate public expenditure has only been studied in different contexts, such as those related to efficiency/government size (Shelton 2007; Ashworth *et al.* 2009), or to political economy considerations (Brender and Drazen 2009; Creedy and Moslehi 2009).

The aim of this paper is twofold: first, we offer evidence on the determinants of decentralization of seven different expenditure categories, based on some theoretical considerations. Then, we analyze the composition of the local budget according to the same classification. To these purposes, we construct a novel dataset on expenditure decentralization referred to the COFOG categories combining OECD *National Accounts Statistics* and IMF *Government Finance Statistics* (GFS) data for 21 developed countries over the period 1972-2006. We pay particular attention to the role played by different local financing mechanisms (i.e., own taxes *versus* intergovernmental grants) in shaping

[1] Public expenditure can be classified according to the following ten COFOG functions (policy domains): general public services; defence; public order and safety; housing and community amenities; economic affairs; environment protection; health; recreation, culture and religion; education; social protection. Each of them includes both current and capital expenditure. This makes the COFOG method different from the ECOG (Economic Classification of Government Expenditure) one, where total spending is divided into current and capital expenditure and then further into goods and services *versus* transfers. Hence, ECOG classifies expenditure by economic characteristics; COFOG by the function or purpose served. As we will explain later, in this paper we adopt the COFOG approach as provided by IMF.

expenditure decentralization by function. This has been rarely done before, although it is consistent with the prescriptions of Mc-Lure and Martinez-Vazquez (2000) according to whom a stable (and meaningful) decentralization process requires an unambiguous and well-defined institutional framework in the assignment of expenditure responsibilities among different government levels combined with a sufficient budgetary autonomy to carry out the assigned responsibilities at each level. However, the fiscal federalism literature does not add much to these guidelines, as a substantial part of it typically assumes that lower levels of government both collect taxes and spend funds, so regional authorities can be classified either as low-tax–low services or high-tax–high-services (Bardhan 2002). This assumption can be problematic for many countries characterized by fiscal imbalances, i.e. with either little or no relationship between fiscal autonomy and fiscal decentralization (OECD 2006).

Using a general-to-specific empirical approach, we adopt different models for each of the spending functions under analysis and we provide a comprehensive analysis of the determinants of expenditure decentralization. We take advantage of the previous empirical studies by including in our model variables that have been found to significantly affect aggregate measures of fiscal decentralization (see Section 4 for details). We then use the same framework to analyze the determinants of the local budget composition, using the weights of each decentralized spending category over aggregate local expenditures.

We offer a number of new results on the roles played by tax decentralization, demographics, politics, and a number of additional socio-economic variables in shaping decentralization of the single expenditure functions. Tax decentralization and other financing tools appear to be extremely relevant in determining expenditure decentralization for the majority of the COFOG spending items considered. In detail, tax decentralization leads to lower social spending decentralization, whereas the opposite relationship holds for the rest of the functions (expectedly, there is no meaningful relationship with defence expenditure decentralization). On the other hand, tax decentralization and grants play a relatively minor role in affecting the composition of the local budget. We also find a non-negligible role of the political variables in affecting decentralization of all the spending categories examined, as well as the composition of sub-national expenditure. Openness, the level of economic development, government size, and educational attainment also affect either expenditure decentralization or the local spending composition.

The remainder of the paper is organized as follows. Section 2 provides some theoretical considerations on expenditure and tax decentralization and describes the main hypotheses to be tested. Section 3 illustrates the variables and the empirical strategy used in our analysis. Section 4 presents and discusses the estimation results. Finally, section 5 concludes.

2. The theoretical framework

Following Stegarescu (2009), the aim of this section is not to so much contributing to the theoretical discussion, but formalizing some empirically testable hypotheses concerning the relationship between the degree of expenditure decentralization and the level of tax autonomy of local governments in a scenario where sub-national and central governments provide different public services to individuals. We propose a theoretical sketch on the linkages between the so-called "tax assignment" issue at a local level (see Liberati 2011 for an extensive discussion) and the "expenditure task" problem (OECD 2009), due to the importance of benefit taxation in ensuring adequate coverage of the expenditures of sub-national governments.

We assume an economy with total population N and two different levels of government, the State and two regions ($j = 1,2$) of equal size, i.e. $N_1 = N_2 = N/2$ (Goodspeed 2000). Central and local governments provide non-rival public goods and services of different type (respectively, g_C and g_L) as they have different competences and responsibilities by law. As in Stegarescu (2009), g_L may refer, e.g., to infrastructure or school education, given in equal amount to citizens belonging to the same region according to local preferences ($0 < \alpha_j < 1$). The model of this paper assumes a situation wherein Tiebout-style stratification has already taken place and, since individuals are already sorted according to their preferences, there is no role for mobility (see also Alesina and Spolaore 1997; Panizza 1999). In contrast, public services supplied by the central government, g_C , are of uniform type and may include national public goods (e.g., defense and macroeconomic stabilization); g_C is provided according to general preferences ($0 < \beta < 1$).[2]

Actually, central and local governments may also provide different components of the same function (e.g., local primary schools and national university, concerning education).[3] As we will show later, this can permit a better specification of the degree of fiscal decentralization, namely expenditure decentralization by function. More generally, we define the degree of fiscal decentralization as the

[2] We follow the *Decentralization Theorem* of Oates (1972) in assuming homogenous individual preferences for local public goods within region and heterogeneous ones across regions, then different α_j exist. On the other hand, preferences for central public goods are assumed, without loss of generality, homogenous across regions, thus $\beta_j = \beta_k = \beta$. Actually, we could allow preferences for central government services to differ across regions as in Stegarescu (2009) where there is a parameter measuring the preference distance between the type of central government services preferred by the region's inhabitants and the type actually provided. However, we choose to simply focus just on pure economic factors promoting (expenditure) decentralization, rather than relying on differences in preferences (see also Arzaghi and Henderson 2005). In the same vein, we can affirm that results are the same even considering $\alpha_j = \alpha_j = \alpha$ for local public goods as in Stegarescu (2009).

[3] This approach is similar to that of Arze del Granado *et al.* (2005) according to which the provision of some publicly private goods (such as education in their case) is divided between the central and local governments. In this regard, one can observe (also historically) a frequent overlapping of responsibilities between different levels of government which has led to performing together the same function by the central government and sub-central units.

local share in total governmental services provided by each region: $\theta = g_L / g$ whereby $g = g_C + g_L$ represents total (central plus local) public expenditure, as in Stegarescu (2009).[4] This allows us to re-define local and central public goods as functions of fiscal decentralization and total spending, such as $g_L = \theta g$ and $g_C = (1-\theta)g$. The parameter θ identifies the level of expenditure decentralization (by function if central and local governments concurrently provide services belonging to the same spending category).

Individuals pay a lump-sum tax t on income y_j (normalized to 1) in order to finance central and local government provisions. Hence, the tax paid is identical for everyone and determined by the per capita costs of the public services as they are supplied in equal amounts in each region;[5] then, the contribution required to each citizen is: $t = \frac{g^C}{N} + \frac{g^L}{N/2}$. Based upon these assumptions, the individual utility function is given by the following:

$$U_j = \ln(g_L)^{\alpha_j \gamma} + \ln(g_C)^{\beta} + y_j - t \qquad (2.1)$$

where γ represents the degree of tax decentralization, satisfying $0 < \gamma < 1$, where higher tax decentralization ($\gamma \to 1$) implies wider tax autonomy assigned to local governments which can rely more on own resources rather than on those of other levels of government. The idea is that citizens perceive positively the role of tax decentralization as it is a byword for sufficient budgetary autonomy to carry out the assigned responsibilities (see Mc-Lure and Martinez-Vazquez 2000) and can favor, to some extent, (more) political accountability and transparency in local government financing.[6]

The theoretical basis for this assumption is provided by the existing literature (see Weingast 2009 for an extensive review) suggesting that the best way to enforce local responsibility is to assign significant tax autonomy to local governments. On the contrary, central government grants would

[4] Other studies analyzing the determinants of fiscal centralization (e.g., Panizza 1999) and those focusing on the effects of fiscal decentralization on the economic distribution of public expenditures (Alegre 2010) adopt a similar approach to identify the level of centralization; it is usually assumed equal to the fraction of public expenditure provided by the central government. In all cases, the degree of centralization (or decentralization) is related to public provision of one government level.

[5] We rely on a lump-sum tax in order to abstract from redistributive and distortionary effects of taxation. Indeed, we assume homogeneous income among individuals; then income distribution issues are beyond the scope of the paper as we focus on efficiency reasons driving fiscal (i.e., expenditure) decentralization. Actually, a more realistic scenario may imply the existence of proportional income taxes based on different income distribution across regions. For an extensive discussion on the cost and benefits of local *versus* central redistribution see Wildasin (1991, 1994).

[6] Versions of the same idea have already appeared in the theoretical literature (see Besley 2007 for a review) and applied to such different items as the observability of government reporting procedures (Milesi-Ferretti 2000), government's choice between taxes or debt (Alt and Lassen 2003), the trade-off between accountability and efficiency (Bordignon and Minelli 2001), the political economic budget cycle (Rogoff and Sibert 1988), local public good provision under shared accountability (Joanis, 2010) and so on.

facilitate local governments' misconduct. Hence, own resources are likely to make local governments more accountable for their fiscal decision (Bahl and Linn 1992; McLure 1998; Shah 1998; Martinez-Vazquez and McNab 2003) and residents more informed and able to control how politicians spend public money.[7] All these aspects are captured in our model by the parameter γ, which has a positive effect on individual welfare through its "virtuous" impact on local services (g_L), according to which more tax decentralization increases the benefit of local spending. Preferences for central government services (β) are also assumed to be influenced by the degree of local tax autonomy as individuals may evaluate/demand differently central spending (g_C) given the various dimensions of tax decentralization. This gives rise to an indirect impact on the utility function through the marginal effect of γ on β (i.e., β_γ).

Substituting g_L and g_C both in t and in the utility function, we can re-write equation (2.1) to get:

$$U_j = \ln(\theta g)^{\alpha_j \gamma} + \ln[(1-\theta)g]^{\beta} - \frac{g(1+\theta)}{N} \tag{2.2}$$

Differentiating with respect to g and θ, we then obtain:

$$g^* = \frac{N}{2}(2\beta + \alpha_j \gamma) \tag{2.3}$$

and

$$\theta^* = \frac{\alpha_j \gamma}{2\beta + \alpha_j \gamma} \tag{2.4}$$

Since local and central government services are complementary, tax decentralization raises total public output in this special case ($\frac{\partial g^*}{\partial \gamma} = g^*_\gamma > 0$). On the other hand, the effect of tax decentralization on expenditure decentralization is not so clear *a priori*: $\theta^*_\gamma \lesseqgtr 0$ due to $\frac{\partial \theta^*}{\partial \gamma} = \theta^*_\gamma = \frac{2\alpha(\beta - \gamma\beta_\gamma)}{(2\beta + \alpha_j \gamma)^2}$. Thus, the effect of local tax autonomy on the degree of expenditure

[7] More recently, and for the Italian case, Boetti *et al*. (2010) show that more autonomous municipalities – i.e., local governments with a higher share of current spending covered by own taxes – exhibit less inefficient behaviours; furthermore, public services provided to citizens are more efficient and effective. As also pointed out by Bordignon and Piazza (2010), "it is self-financing, more than decentralization per se, the key ingredient of a successful decentralization process."

decentralization depends on the marginal effect of the former on the preferences for central government services. If relatively small (i.e., $\beta_\gamma < \frac{\beta}{\gamma}$), more tax decentralization increases the degree of expenditure decentralization ($\theta_\gamma^* > 0$); otherwise (i.e., $\beta_\gamma > \frac{\beta}{\gamma}$), the opposite conclusion can be drawn ($\theta_\gamma^* < 0$).

To sum up, a higher tax decentralization does not necessarily lead to a higher expenditure decentralization as, even assuming its positive impact on individual welfare, a greater reliance on own taxes could enhance, e.g., rent-seeking behavior of political agents who can act, also locally, as budget-maximizing Leviathans (Brennan and Buchanan 1980). Issues of this type may be at the roots of the fiscal mismatch between local revenue and expenditure that characterize many OECD countries (OECD 2006).

On the other hand, fiscal (and thus expenditure) decentralization is more likely to be successful when sub-national governments are able to control their own sources of revenue (see also Mc-Lure and Martinez-Vazquez 2000). This could justify the possible positive effect of tax decentralization on the analogous expenditure process in our model.

These general implications are also valid when we refer to expenditure decentralization by function, i.e. when we consider the "narrower" definition of θ according to which central and sub-national governments continue to provide public services within the same spending program.

3. The empirical strategy

Based on the theoretical considerations above, we now turn to the empirical analysis. First, we study the effects of tax decentralization, intergovernmental grants, and other socio-economic variables on public expenditure decentralization of seven COFOG categories. Second, we investigate the role of a similar set of explanatory variables on the composition of sub-national budget (decomposed into the seven spending categories above plus a residual one). The choice of sample under investigation is dictated by data availability, particularly because of the lack of fiscal decentralization data after 2006. Actually, to our knowledge, there is no single dataset that classifies public expenditures of general and, especially, local governments according to the COFOG for a longer time period.[8]

[8] On the one hand, Sanz and Velázquez (2007) and Gemmell *et al.* (2008) study general government expenditures classified by COFOG in OECD countries but their analysis differs from our in several respects (for further details on these studies and their database see also Potrafke 2011). On the other hand, only Shelton (2007) considers both individual categories of expenditure (such as defence, education, healthcare and others) and different levels of government (central and local) using data from IMF-GFS from 1970–2000.

The empirical results on expenditure decentralization by function are based on the following model:

$$exp\_dec_{i,[t-t+2]} = \alpha_{i,0} + \alpha_{i,1} td_{i,t} + \alpha_{i,2} grants1_{i,t} + \beta_{i,j}^{'} \mathbf{Z}_{i,t} + \tau_t + u_{i,t}, \quad (3.1)$$

where $exp\_dec_{i[t-t+2]}$ denotes the three-year averages of local spending as a share of general government expenditure for the same category.[9] Therefore, we estimate seven different specifications, depending on the function under analysis: health (*hea_dec*); education (*edu_dec*); social protection and welfare (*soc_dec*); housing (*hou_dec*); transports (*tra_dec*); public order and safety (*ord_dec*); defence (*def_dec*).

The explanatory variables are all expressed as initial three-year period values in order to address reverse causality issues (see Furceri and Zdienicka 2011). $td_{i,t}$ stands for tax decentralization (i.e., sub-national revenue minus grants from other governments, divided by general government revenue); $grants1_{i,t}$ is the ratio between transfers received by sub-national governments from upper levels and general government revenue. $\boldsymbol{Z}$ is a set of additional socio-economic controls: a) $gdppc_{i,t}$ is real GDP per capita; b) $govsize_{i,t}$ is the government consumption share of GDP; c) $open_{i,t}$ is trade openness measured by the sum of imports and exports divided by GDP; d) $educ_{i,t}$ is tertiary school enrollment; e) $urb_{i,t}$ stands for urbanization (measured by the percentage of urban population over the total); f) $popdens_{i,t}$ is population density; g) $pop14_{i,t}$ is the percentage of population below age 15; h) $pop65_{i,t}$ is the percentage of population above age 65; i) $popgr_{i,t}$ is the growth rate of the total population; j) $lifexp_{i,t}$ is life expectancy at birth; k) $party\_1,2,4,5_{i,t}$ are dummies taking the value 1 in each period with dominance/hegemony of either right (*1*/*2*) or left (*4*/*5*) in the cabinet (the reference/missing category being a balanced cabinet). The choice of the covariates reflects some of the prescriptions of the literature on government spending (e.g., Wagner's Law; Rodrik's theory of trade openness; electoral rules theories), and also that on the role of demand and supply for specific expenditure categories (Shelton 2007).

We then look at the determinants of local budget composition by estimating the following model:

$$exp\_comp_{i,[t-t+2]} = \delta_{i,0} + \delta_{i,1} td_{i,t} + \delta_{i,2} grants2_{i,t} + \eta_{i,j}^{'} \mathbf{Z}_{i,t} + \nu_t + \varepsilon_{i,t}, \quad (3.2)$$

where $exp\_comp_{i[t-t+2]}$ denotes eight different indexes gauging the importance of each spending item (i.e., the seven COFOG categories plus one, obtained as a residual component) over aggregate sub-national expenditures. The dependent variable is once again expressed as three-year averages, and the

[9] In macroeconomics, it is standard to use five-year periods. However, adopting this particular data frequency would greatly reduce the number of observations of our regression analysis, thus we present our benchmark results using three-year periods (they have been used before, e.g. by Borghi 2010). In any case, we check the sensitivity of our results to the use of different data frequencies: annual, four-year, and five-year periods.

right-hand-side variables as beginning-of-the-period values. The explanatory variables are those of equation (3.1), except $grants2_{i,t}$ that stands for the weight of transfers (from other governmental levels) received by sub-central units, normalized on the basis of aggregate local revenues (i.e., its construction mimics that of the dependent variable).

Fixed-effects estimations are performed to control for country-specific time-invariant factors (e.g., institutional factors, such as whether the country is federal); period dummies are also included in both equations (τ_t and v_t), and $u_{i,t}$ and $\varepsilon_{i,t}$ are, respectively, the disturbance terms of the two models. Equations (3.1) and (3.2) are estimated over three-year non-overlapping periods: 1972-1974, 1975-1977, ..., 2002-2004, and 2005-2006 (note that the last is a two-year period). There are three main reasons for adopting this procedure. First, we smooth out cyclical fluctuations. Second, our dependent variable contains a number of missing values - a problem that is reduced by computing period averages (Easterly 1999; Li and Reuveny 2003). Third, we deal with potential reverse causality issues by expressing the dependent variables as period averages and the right-hand-side variables as beginning-of-the-period values.

It is worth spending a few words on the spending and revenue data, which mostly come from the IMF-GFS database. As for the former, we adopt the disaggregation of local expenditure into its main components according to the COFOG approach in order to use a definition as homogenous as possible across countries and clearly identifiable for each spending program, avoiding large aggregates such as government consumption (used in Fiva 2006) or redistributive spending (in Persson and Tabellini 2003). It should be noted that there are no other data sources permitting to construct decentralization indexes accordingly to the COFOG definition. However, a few shortcomings related to IMF-GFS are well-known, whereby the most relevant concerning the overestimation of the real autonomy of sub-central governments over their expenditure and tax decisions. While improved tax decentralization indexes have been constructed by researchers starting from this source (Stegarescu 2005; Gemmell *et al.* 2008, 2009), on the expenditure side it is yet impossible to find more reliable data.

As for the revenue variables, we take into account tax decentralization and intergovernmental grants by distinguishing the way through which local governments finance their expenditures (i.e., common pool *versus* own resources) as different financing tools may have different restraining or expanding effects on alternative spending items as also suggested by Ashworth *et al.* (2009). We use the "own revenue" tax decentralization index constructed by Gemmell *et al.* (2009) that captures a wide degree of local taxing power as it contains also locally collected taxes over which local governments have little or no control. In detail, it includes shared taxes and other piggybacked revenues at a local level, not distinguishing them from more autonomous forms of taxation. However, the index is net of resources purely transferred from other governmental levels (i.e., grants); therefore,

it only contains the revenues generated by sub-national governments and which are not discretionarily fixed by central government.[10]

Finally, it is important to keep in mind that all these data do not allow any distinction among regional, local, and other lower tiers of governments: all sub-national units are aggregate into a single group; therefore, the number of participating sub-central governments and their different competencies are not properly taken into account. However, a further horizontal disaggregation would pose cross-country comparability issues that we want to avoid at this stage of the analysis.

The rest of the variables are included in the models for their potential role in shaping both the expenditure decentralization processes and the importance of each spending category in the local budgets. Some potentially meaningful variables such as the unemployment rate or regional ethnic and economic disparities are ruled out the analysis due to data availability. The general-to-specific approach implies that each specification of the models (3.1) and (3.2) will only include the explanatory variables with a *t*-statistic above a certain threshold (that we set equal to 1.00).

Table 1 contains some descriptive statistics of the variables used in the analysis (at an annual frequency), while details on their definitions and sources can be found in the Appendix. The panel is unbalanced mainly due to missing values of the dependent variables.

Insert Table 1 about here

4. Results and discussion

4.1 The determinants of expenditure decentralization

Table 2 reports the estimates for the seven different specifications of equation (3.1).

Insert Table 2 about here

Tax decentralization plays a significant role for most of the decentralized spending categories. In particular, it is positively correlated with healthcare, education, housing, and public order expenditure; it is negatively associated with social protection expenditure decentralization. On the other hand, it does not explain decentralized transports and defence spending. As for the latter, it is worth saying that this function is very hard to decentralize (and actually the bulk of this kind of spending is done at

[10] Actually, Gemmell *et al.* (2008, 2009) also build two additional revenue decentralization measures which are more refined as they take into account the role of sub-national governments in determining either the tax base or tax rates. This methodology is the same adopted by Stegarescu (2005) and it is based on more qualitative information from a pioneering OECD study (1999). In all cases, data do not go beyond the year 2000 and this happens for a few countries; in any case, the sample is restricted to 18 countries. Hence, they are only used as robustness checks on the other indicators also in such previous studies.

the central government level in most of the countries of the sample) given its nature of purely "national" public good. Therefore, it is difficult to draw meaningful conclusions regarding it, i.e., the lack of clear evidence is not surprising. In turn, the negative coefficient associated with decentralization of social spending could have also been easily expected. It is common practice for central governments to finance this type of function even when it is assigned to regional and local governments (OECD 2006, 2009). The negative coefficient on $td_{i,t}$, and the positive one on *grants1* seem to well capture this phenomenon. This also reflects, to some extent, the normative prescriptions of the traditional theory of fiscal federalism on avoiding decentralized redistributive function.

The positive relationship between tax decentralization and decentralized spending on education is also interesting. Simple tax-benefit principles and the fact that limited spillover effects and–little economies of scale characterize this type of expenditure at a local level (mostly consisting in school building and planning, professional training and students' services) support the link between decentralized revenues (also including tax-sharing mechanisms) and education spending. Our results suggest that adequate tax decentralization is likely to favour expenditure decentralization, increasing consistency between those that benefit from the programs and those who end up financing and paying for them. Similar conclusions apply to the following functions: health, housing and public order and safety. In the last case, the coefficient on tax decentralization shows the highest magnitude. To sum up, our results are in line with the previous theoretical considerations according to which tax decentralization has an ambiguous effect on expenditure decentralization. The empirical evidence is able to better qualify this indeterminacy, distinguishing among different spending functions.

An additional finding is that the effect of tax decentralization is stronger than that of intergovernmental transfers. Results suggest a positive relationship between grants and expenditure decentralization of housing and public order only (and social protection, but barely significant at conventional levels). The explanation may lie in the fact that even though these spending items can be easily classified as "local" functions, they can be mandated by the central government or spent on behalf of it, revealing the importance of intergovernmental transfers as their financing tool or as financial incentives. Indeed, the available data do not allow us to know whether grants are assigned, for example, in matching form indicating a specific initiative of the central government concerning certain services provision by sub-national governments.

The rest of the explanatory variables carry interesting information. Demographic variables (*urb*, *popdens*, *pop14*, *po65*, *popgr*) prove to be particularly important for the decentralization of all the different spending categories apart from public order. In particular, the proportion of population living in urban areas is always associated with negative coefficients (when included in the model), similarly to the proportion of people aged 14 years old or less. The results for the rest of the demographic variables vary across the seven specifications. The political dummies also play a part in shaping the expenditure decentralization processes, but again results vary widely. Having left dominance in the cabinet (*party_5*), though, is associated with lower expenditure decentralization in the majority of the

specifications. Similarly wide ranges of results hold for the rest of the controls. Finally, higher real GDP per capita does not favour decentralized expenditure for welfare purposes (e.g., health and social security), while it better enhances housing spending decentralization (and defence but a lower level of significance). In turn, trade openness increases the level of decentralization of the transport sector and decreases that of housing and public order expenditure.

4.2 Robustness analysis

This section deals with the robustness of the results reported above. Tables 3-5 report the estimates of the different specifications of model (3.1) carried out with the data at four-year, five-year and annual frequencies, respectively. When annual data are used, the explanatory variables are lagged by one period to deal with reverse causality.

Insert Tables 3-5 about here

Although there are a few differences depending on the different time frequencies utilized, the benchmark results and the related conclusions are confirmed. A similar consistency is found when using simple period averages both for the dependent and the right-hand-side variables (not reported for the sake of brevity), instead of using beginning-of-the-period values for the latter to deal with reverse causality.

4.3 The determinants of local spending composition

In this section we further exploit our dataset to analyze what affects the local expenditure composition, when a country "chooses" to adopt the decentralization process for different spending programs. The theoretical literature on the issue only provides some normative prescriptions (Stigler 1957; Musgrave 1959; Oates 1972; Keen and Marchand 1997) by distinguishing among functions that sub-national governments should perform (e.g., allocation of resources) and those which are better accomplished at the central level (e.g., redistribution and stabilization). The empirical literature has overlooked the potential impact of decentralization on the composition of public expenditures (see Sanz and Velázquez 2002).

The few existing studies only consider limited decompositions of the public budget, distinguishing between investment *versus* current expenditure (Alegre 2010), or among different types of public investment (Faguet 2004; Kappeler and Valila 2008), or between pork barrelling *versus* different expenditures (Diaz-Cayeros *et al.* 2002). In general, a highly detailed decomposition of the public budget such as the one permitted by the COFOG definition has rarely been used in studies on the role played by fiscal decentralization in shaping the composition of spending, with the following few notable exceptions. Arze del Granado *et al.* (2005) test whether higher levels of fiscal decentralization increase the shares of consumption expenditures in the public budget (defined as the

ratio of education and health expenditures to total public expenditures, which also represents the share of publicly provided public goods).

Similarly, Ashworth *et al.* (2009) study the effects of fiscal decentralization on the composition of growth of government decomposing consolidated (total) expenditure into three different programs, each one as a percentage of GDP: healthcare, education and social security. Their results highlight the importance and the different impact of alternative financing tools on such expenditure items.[11]

We offer our evidence in Table 6, reporting the estimates of the different specifications for equation (4.2), depending on the spending categories shares over the local budget used as dependent variables one at a time. In this case, we add a residual spending category (*res_comp*) obtained by subtracting the seven COFOG items from aggregate local expenditures.

Insert Table 6 about here

Tax decentralization proves to be an important determinant of decisions regarding which spending programs to implement at a sub-national level, although less than in the expenditure decentralization analysis. Results suggest that more tax autonomy leads sub-central governments to spend more on both healthcare and housing matters (see the positive coefficients) to the detriment of social protection and any other expense different from the seven COFOG categories (for which negative coefficients are estimated). The finding on social security expenditure is consistent with the result of section 4.1. We can now extend the above conclusions affirming that, even controlling for the decentralization level of this function, sub-central governments do not devote many resources for these spending programs even when higher degrees of tax autonomy are granted. Rather, they prefer to "invest" in other sectors (e.g., health and housing).

The rest of the functions seem to be unaffected by tax decentralization (in the education specification, $td_{i,t}$ is included in the model but its coefficient is statistically insignificant; in the remaining specifications it is excluded from the model). This suggests that, in order to allocate resources from the local public budget towards different spending topics and thus choose the proper policy mix locally, the extension of the taxing power and revenue autonomy assigned to sub-national governments seems to play a negligible role. The same can be said for transfers from upper governmental levels, as the variable gauging the importance of grants in the sub-national revenues (*grants2*) does not influence the weight of any of the seven COFOG categories, but it is negatively associated with the residual expenditure.

[11] First, grants have a positive effect on health expenditure but not on education and social security. Second, the greater is the proportion of own taxes collected at the local level, the lower the proportion that is spent on all the three items. Finally, it seems that more decentralization leads to larger shares of GDP spending on education, while for healthcare and social security the opposite pattern is true.

To sum up, it seems that the composition of the local budget is quite independent from the revenue side, even considering both own sources and grants. This reveals, to some extent, a lack of correspondence between the available resources and the way they are spent as the driving reasons explaining the local budget composition lie elsewhere. In fact, the rest of the explanatory variables all seem to significantly affect at least one spending category (with the exception of *party_5*), with a wide variety of results depending on the specific function analyzed. Alternative estimates with different time frequencies (available upon request) confirm the robustness of the results.

5. Summary and conclusions

In this paper we offer evidence on the determinants of expenditure decentralization analyzing seven different COFOG functions for 21 developed countries over the period 1972-2006, given the ongoing fiscal federalism processes experienced by most of them. To this purpose, we combine OECD and IMF data to construct a new and rich dataset. In contrast with much of the previous literature, we concentrate on the role played by the revenue side, i.e. taxes and grants, in shaping expenditure decentralization by function. We advance some theoretical considerations to support this investigation. In the second part of the empirical analysis, we focus on the local budget only, analyzing the determinants of the expenditure composition.

The analysis leads to a number of novel and interesting results. On theoretical grounds, higher tax decentralization (i.e., more tax autonomy) - perceived to be positive on the individual welfare - can lead either to increase spending decentralization (confirming a suitable convergence between expenditure and revenue decentralization) or to lower spending decentralization (confirming the presence of fiscal imbalances at the local level also in many OECD countries).

On the empirical side, tax decentralization and other local financing tools appear to be extremely relevant in shaping expenditure decentralization for the majority of the COFOG items considered. In particular, tax decentralization leads to lower social expenditure decentralization, but to higher decentralization of the rest of the spending programs. No meaningful relationship emerges with decentralized defence expenditure as one could expect. In turn, tax decentralization and intergovernmental grants do not seem to play a substantial role in affecting the local budget composition. Instead, we find a non-negligible impact of the political variables in explaining decentralization of all the spending categories under analysis, as well as the expenditure policy mix at a sub-national level. Similar evidence arises for the variables capturing trade openness, the level of economic development, government size, and educational attainment.

To sum up, it seems that the decentralization degrees of different spending functions in OECD countries have been enhanced by a common tendency to finance a large fraction of such expenditures (with some exceptions) using sub-national tax revenues in preference to intergovernmental transfers -

i.e. with ‘own versus others’ money’. At the same time, given a certain degree of expenditure decentralization, local governments of developed countries do not rely so much on their tax autonomy - neither on grants - as the key factor to determine (and then decide) the allocation of sub-central resources across different spending categories. The driving force seems to lie elsewhere.

Some of our results seem to better qualify some of the existing theoretical prescriptions. For example, those of the fiscal federalism mainstream on limiting decentralized redistribution are basically supported by our findings on the relationships between tax decentralization/grants and social protection spending. On the other hand, some of the evidence offered in this paper suggests that other general concepts should be reconsidered. For instance, a substantial part of the literature on fiscal decentralization typically assumes that lower levels of government both collect taxes and spend funds, so regional authorities can be classified either as low-tax–low services or high-tax–high-services. This sentence turns out to be yet problematic according to our “mixed” effects of tax decentralization on the decentralization process of the various spending categories. This evidence claims for a better understanding of the decentralization reforms in countries characterized by little or no linkages between fiscal autonomy and fiscal decentralization.

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Tables and Figures

Table 1 - *Descriptive statistics*

	N	Mean	Standard deviation			Min	Max
			overall	between	within		
hea_dec	506	39.72	32.46	32.76	9.71	0.00	99.18
edu_dec	517	56.88	29.01	30.02	6.76	2.06	97.17
soc_dec	519	17.31	13.00	12.25	3.22	0.00	57.69
hou_dec	519	63.33	23.99	19.87	14.42	0.00	100.00
tra_dec	387	49.64	20.30	20.59	6.49	0.00	100.00
def_dec	469	0.94	3.45	3.00	0.96	0.00	20.70
ord_dec	370	42.49	32.16	30.20	11.18	0.00	100.00
hea_comp	520	14.74	12.71	12.92	4.28	0.00	67.06
edu_comp	526	20.56	8.81	8.58	3.69	0.88	40.24
soc_comp	533	15.85	12.67	11.67	4.49	0.00	58.76
hou_comp	533	6.96	5.65	4.89	2.91	0.00	25.00
tra_comp	447	7.91	5.30	4.93	2.59	0.00	28.89
def_comp	541	0.08	0.34	0.28	0.16	0.00	2.55
ord_comp	488	3.48	2.88	2.50	1.30	0.00	12.53
res_comp	375	30.48	15.35	16.54	4.36	9.40	78.67
td	707	22.81	13.78	13.82	2.93	3.21	54.82
grants1	641	13.36	7.13	6.33	3.71	0.00	34.33
grants2	658	33.73	16.09	13.03	9.68	0.00	86.41
gdppc	735	26.00	8.64	5.99	6.35	8.73	78.66
govsize	735	9.49	2.45	2.39	0.75	3.28	17.28
open	735	61.69	44.91	42.20	17.85	10.25	309.18
educ	689	41.57	24.80	21.85	16.28	1.06	106.05
urb	735	73.73	12.16	12.10	2.88	39.60	97.32
popdens	735	117.98	114.41	116.88	7.85	1.72	484.19
pop14	735	20.53	3.59	2.38	2.74	13.99	31.45
pop65	735	13.70	2.26	1.81	1.42	8.07	19.79
popgr	735	0.61	0.51	0.36	0.37	-0.93	3.80
lifexp	735	75.95	2.53	1.15	2.27	67.52	81.49
party_1	724	0.40	0.49	0.25	0.43	1.00	0.00
party_2	724	0.15	0.36	0.22	0.28	1.00	0.00
party_4	724	0.09	0.29	0.13	0.26	1.00	0.00
party_5	724	0.16	0.37	0.22	0.31	1.00	0.00

Note: the descriptive statistics refer to the annual data (1972-2006); N = 21 countries (Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom, USA).
Source: Authors' calculations

Table 2 - *Dependent variable: expenditure decentralization by function - Fixed Effects estimation*

	hea_dec	*edu_dec*	*soc_dec*	*hou_dec*	*tra_dec*	*def_dec*	*ord_dec*
td	1.388***	1.068***	-0.178**	0.931***	0.243		1.458**
	(3.25)	(3.75)	(-2.22)	(3.03)	(1.24)		(2.07)
grants1			0.140*	0.849**			0.942**
			(1.85)	(2.43)			(2.56)
rgdpl	-1.566***		-0.199***	0.978**		0.150*	
	(-3.86)		(-3.29)	(2.22)		(1.70)	
govsize		2.929*	-0.689	4.939**	-1.007	-0.388*	
		(1.74)	(-1.36)	(2.43)	(-1.25)	(-1.88)	
openk	0.144*			-0.501***	0.196***	-0.011	-0.694***
	(1.73)			(-3.46)	(3.06)	(-1.14)	(-3.33)
educ	-0.229	-0.137*	0.072**		-0.082	0.020	-0.290
	(-1.54)	(-1.95)	(2.31)		(-1.11)	(1.57)	(-1.62)
urb	-1.281**		-0.262*		-0.361	-0.302***	
	(-2.12)		(-1.74)		(-1.21)	(-3.75)	
popdens	0.594*				-0.678***	0.046**	
	(1.83)				(-3.75)	(2.36)	
pop14		-2.092***		-7.367***	-2.216***		1.749
		(-2.95)		(-5.83)	(2.79)		(1.18)
pop65		-1.906		-4.944***	6.164***	0.220	
		(-1.61)		(-2.93)	(6.86)	(1.59)	
popgr	3.372		2.734***	-10.033***		-0.338**	-5.556
	(1.17)		(3.05)	(-2.64)		(-2.06)	(-1.61)
lifexp				5.100	1.260**	-0.271	8.838**
				(1.60)	(2.11)	(-1.41)	(2.51)
party_1		2.499*	1.390**		-3.028***	0.176*	-7.654**
		(1.71)	(2.07)		(-2.63)	(1.86)	(-2.57)
party_2			1.360*		-3.629***		
			(1.90)		(-3.46)		
party_4	-5.217**		1.342	2.869	-2.819	-0.271	-7.343*
	(-2.45)		(1.45)	(1.04)	(-1.59)	(-1.41)	(-1.73)
party_5	-4.479*	-2.030*	0.980	-3.054	-4.783***		-9.402**
	(-1.68)	(-1.67)	(1.53)	(-1.38)	(-3.90)		(-2.10)
No. of obs.	175	179	175	183	134	171	136
R squared	0.38	0.37	0.44	0.56	0.67	0.59	0.59

Note: t-statistics in parenthesis based on robust standard errors. ***, **, * denote significance at 1%, 5% and 10%, respectively. Country dummies and time fixed effects included but not reported. Three-year non-overlapping periods are used: the dependent variables are expressed as period averages; the explanatory variables are expressed as beginning-of-the-period values to deal with reverse causality.

Table 3 - *Dependent variable: expenditure decentralization by function - Fixed Effects estimation (four-year periods data)*

	hea_dec	*edu_dec*	*soc_dec*	*hou_dec*	*tra_dec*	*def_dec*	*ord_dec*
td	1.121**	1.047**	-0.159*	1.102***	0.234	0.072	
	(2.09)	(2.42)	(-1.68)	(2.68)	(1.06)	(1.27)	
grants1			0.193***	0.817**		0.020	
			(2.58)	(2.23)		(1.13)	
rgdpl	-2.055***		-0.227***	1.146**		0.165*	
	(-3.58)		(-2.83)	(2.00)		(1.81)	
govsize		2.305	-0.952*	4.180**	-1.031	-0.388*	
		(1.07)	(-1.80)	(1.67)	(-1.61)	(1.68)	
openk	0.146			-0.477***	0.206***	-0.020	-0.935***
	(1.35)			(-3.04)	(2.83)	(-1.59)	(-4.02)
educ	-0.267*		0.064		-0.108*	0.021	
	(-1.84)		(1.44)		(-1.87)	(1.43)	
urb	-1.652**		-0.241*	1.003	-0.374	-0.255***	
	(-2.18)		(-1.84)	(1.36)	(-1.52)	(-3.58)	
popdens	0.687*	0.414			-0.638***	0.034**	0.838**
	(1.67)	(1.34)			(-4.27)	(2.01)	(2.39)
pop14		-2.947***		-7.267***	1.910**	-0.106	
		(-3.36)		(-5.62)	(2.50)	(-1.27)	
pop65		-2.560*		-4.862***	5.106***		
		(-1.92)		(-3.06)	(5.48)		
popgr	7.221**	-4.054	2.607***	-12.373***		-0.387*	
	(2.46)	(-1.43)	(3.75)	(-3.38)		(-1.70)	
lifexp				4.354	1.609***	-0.392*	9.703***
				(1.08)	(2.66)	(-1.67)	(3.13)
party_1	4.345***	2.303	0.630				-5.234
	(2.99)	(1.24)	(1.31)				(-1.35)
party_2	6.776**	3.616*	0.895			-0.188	7.146
	(2.24)	(1.95)	(1.57)			(-1.09)	(1.41)
party_4			0.781*		-1.872	-0.580	-11.506*
			(1.79)		(-1.64)	(-1.60)	(-1.84)
party_5					-2.303*		
					(-1.73)		
No. of obs.	137	146	137	143	104	131	112
R squared	0.43	0.29	0.48	0.52	0.69	0.59	0.51

Note: t-statistics in parenthesis based on robust standard errors. ***, **, * denote significance at 1%, 5% and 10%, respectively. Country dummies and time fixed effects included but not reported. Four-year non-overlapping periods are used: the dependent variables are expressed as period averages; the explanatory variables are expressed as beginning-of-the-period values to deal with reverse causality.

Table 4 - *Dependent variable: expenditure decentralization by function - Fixed Effects estimation (five-year periods data)*

	hea_dec	*edu_dec*	*soc_dec*	*hou_dec*	*tra_dec*	*def_dec*	*ord_dec*
td	0.428	1.028***	-0.192**	1.198***	0.381***		
	(1.57)	(3.28)	(-2.18)	(3.00)	(2.82)		
grants1			0.175**	0.771***		0.018	
			(2.09)	(3.16)		(1.05)	
rgdpl	-1.657***		-0.233***	1.342***		0.109*	
	(-2.75)		(-2.95)	(2.79)		(1.71)	
govsize		1.774	-0.639	2.788	-1.757***	-0.317	
		(1.10)	(-1.38)	(1.29)	(-3.14)	(-1.54)	
openk		-0.151		-0.561***	0.119		-1.167***
		(-1.12)		(-3.49)	(1.43)		(-4.65)
educ	-0.248*	-0.173	0.056		-0.129***	0.027*	-0.193
	(-1.74)	(-1.12)	(1.07)		(-2.77)	(1.76)	(-1.07)
urb	-1.825***		-0.202	1.006		-0.346***	-3.122*
	(-2.65)		(-1.23)	(1.39)		(-2.96)	(-1.74)
popdens	0.665*	0.514			-0.845***	0.042**	1.165**
	(1.69)	(1.21)			(-7.71)	(2.08)	(1.97)
pop14		-3.266***		-6.749***	2.590***		
		(-2.81)		(-5.35)	(4.24)		
pop65	2.142	-2.699*		-4.313***	6.109***	0.223*	
	(1.10)	(-1.69)		(-2.92)	(7.66)	(1.72)	
popgr	10.753***	-3.415	3.329**	-12.81***			
	(2.98)	(-1.18)	(2.37)	(-3.36)			
lifexp				4.280	1.424***	-0.306	7.391***
				(1.31)	(3.91)	(-1.56)	(2.85)
party_1	4.278***	3.644***	1.459	-2.452	-4.759***	-0.245	3.812
	(2.75)	(2.62)	(1.53)	(-1.31)	(-2.98)	(-1.10)	(1.57)
party_2	5.780**			-4.745	-5.901**		5.462
	(2.09)			(-1.22)	(-2.57)		(1.05)
party_4				-5.691**	-7.941***	-0.504	
				(-2.02)	(-4.06)	(-1.40)	
party_5			1.145		-6.464***	-0.371*	
			(1.25)		(-3.82)	(-1.68)	
No. of obs.	106	108	105	110	83	102	86
R squared	0.38	0.44	0.42	0.59	0.79	0.61	0.63

Note: t-statistics in parenthesis based on robust standard errors. ***, **, * denote significance at 1%, 5% and 10%, respectively. Country dummies and time fixed effects included but not reported. Five-year non-overlapping periods are used: the dependent variables are expressed as period averages; the explanatory variables are expressed as beginning-of-the-period values to deal with reverse causality.

Table 5 - *Dependent variable: expenditure decentralization by function - Fixed Effects estimation (annual data)*

	hea_dec	*edu_dec*	*soc_dec*	*hou_dec*	*tra_dec*	*def_dec*	*ord_dec*
td	1.118**	1.076***		1.010***	-0.219		0.868
	(2.33)	(3.46)		(3.11)	(-1.03)		(1.54)
grants1			0.207***	0.826**	-0.295		
			(2.73)	(2.15)	(-1.23)		
rgdpl	-1.773***	-0.192	-0.176**	0.937*		0.234**	-1.201**
	(-3.89)	(-1.03)	(-2.11)	(1.91)		(2.06)	(-2.05)
govsize		2.776*	-1.334**	5.327**		-0.292*	
		(1.76)	(-2.20)	(2.43)		(-1.78)	
openk	0.146			-0.492***	0.159		-0.645***
	(1.34)			(-3.07)	(1.59)		(-2.66)
educ	-0.248	-0.143*	0.074*			0.013	-0.227
	(-1.60)	(-1.75)	(1.87)			(1.02)	(-1.50)
urb	-1.529**				-0.743***	-0338***	
	(-2.50)				(-2.73)	(-4.95)	
popdens	0.692*				-0.509*	0.056***	0.468
	(1.77)				(-1.79)	(3.41)	(1.00)
pop14		-2.010**		-6.594***	-1.902*	0.107*	2.144
		(-1.75)		(-5.32)	(1.83)	(1.93)	(1.30)
pop65		-2.001		-3.732*	-5.588***	0.323**	
		(-1.54)		(-1.72)	(5.16)	(2.14)	
popgr	6.125***		1.702**	-8.080***	2.843**	-0.219*	
	(2.74)		(2.41)	(-2.85)	(2.39)	(-1.75)	
lifexp				4.370	2.175**	-0.164	7.282**
				(1.21)	(2.30)	(-1.39)	(2.16)
party_1		3.372**	0.630			0.180**	-3.890*
		(2.33)	(1.16)			(2.34)	(-1.79)
party_2			1.030*	-3.377	-1.961*		
			(1.69)	(-1.32)	(-1.84)		
party_4	-4.289**		0.663		-2.536**	-0.220*	-5.604*
	(-2.49)		(1.36)		(-2.31)	(-1.65)	(-1.86)
party_5	-4.853**			-4.034*	-2.011**		-7.740**
	(-1.98)			(-1.81)	(-2.33)		(-2.12)
No. of obs.	455	466	445	482	362	421	329
R squared	0.33	0.34	0.42	0.46	0.43	0.62	0.54

Note: t-statistics in parenthesis based on robust standard errors. ***, **, * denote significance at 1%, 5% and 10%, respectively. Country dummies and time fixed effects included but not reported. Annual data are used: explanatory variables lagged by one period are used to deal with reverse causality.

Table 6 - *Dependent variable: sub-national expenditure composition - Fixed Effects estimation*

	hea_comp	*edu_comp*	*soc_comp*	*hou_comp*	*tra_comp*	*def_comp*	*ord_comp*	*res_comp*
td	0.489**	0.263	-0.799***	0.233**				-0.399**
	(2.11)	(1.28)	(-2.89)	(2.47)				(-2.11)
grants2	0.126	0.161	-0.095					-0.281**
	(1.27)	(1.60)	(-1.11)					(-2.34)
rgdpl	-0.270					0.024*	-0.092**	
	(-1.58)					(1.72)	(-2.07)	
govsize	-2.218**	1.275*		0.703*	-1.393***	-0.043	-0.678	1.173
	(-2.33)	(1.73)		(1.76)	(-3.28)	(-1.34)	(-1.53)	(1.14)
openk			-0.106*		0.090***	-0.003	-0.035**	-0.245***
			(-1.78)		(2.93)	(-1.53)	(-2.08)	(-3.65)
educ				-0.068***	0.043*	0.003		
				(-2.89)	(1.95)	(1.07)		
urb			-0.204			-0.059***		
			(-1.01)			(-3.18)		
popdens		0.217	-0.154*	-0.349***		0.007**	0.072**	0.284
		(1.37)	(-1.66)	(-6.25)		(2.04)	(2.20)	(1.53)
pop14	0.862**	-1.159***		-0.448***		-0.020	-0.266**	2.303***
	(2.16)	(-2.82)		(-2.89)		(-1.34)	(-2.33)	(2.75)
pop65		-1.769**		-0.923***				2.272**
		(-2.52)		(-2.89)				(1.96)
popgr	-1.668	-2.012*	2.341*			-0.067**		
	(-1.08)	(-1.86)	(1.84)			(-2.13)		
lifexp	1.166			1.138***	-0.797	-0.070*		
	(1.01)			(3.81)	(-1.60)	(-1.67)		
party_1		1.469**	1.139*	-0.673	-0.721	0.017		-2.048**
		(2.09)	(1.83)	(-1.49)	(-1.02)	(1.17)		(-2.16)
party_2			1.106*	-0.976*	-1.024*			-1.901*
			(1.91)	(-1.88)	(-1.65)			(-1.68)
party_4		1.670			-0.870			-5.815***
		(1.39)			(-1.37)			(-2.82)
party_5	-1.857		0.877	-0.812	-0.943		-0.725	
	(-1.49)		(1.35)	(-1.41)	(-1.17)		(-1.49)	
No. of obs.	186	189	190	183	156	191	181	142
R squared	0.23	0.37	0.45	0.64	0.52	0.56	0.39	0.42

Note: *t*-statistics in parenthesis based on robust standard errors. ***, **, * denote significance at 1%, 5% and 10%, respectively. Country dummies and time fixed effects included but not reported. Three-year non-overlapping periods are used: the dependent variables are expressed as period averages; the explanatory variables are expressed as beginning-of-the-period values to deal with reverse causality.

Appendix: variables description and sources

Expenditure decentralization (*exp_dec*). There are seven categories: health (***hea***), education (***edu***), social protection and welfare (***soc***), housing (***hou***), transports (***tra***), defence (***def***), public order and safety (***ord***). The expenditure decentralization indexes are constructed as ratios of sub-central expenditure over (consolidated) general government expenditure, category by category. *Source*: IMF and OECD.

Sub-national expenditure composition (*exp_comp*). There is one additional category with respect to the seven previous ones: residual (***res***). The composition indexes are constructed as ratios of each sub-national expenditure item over aggregate sub-national expenditure. *Source*: IMF and OECD.

Tax decentralization (*td*). Ratio between sub-national revenue (minus grants from other governmental levels) and (consolidated) general government revenue. *Source*: Gemmell, N., Kneller, R., Sanz, I. (2009). Fiscal decentralization and economic growth in OECD countries: Matching spending with revenue decentralization. Papeles the Trabajo 6, Instituto de Estudios Fiscales, Madrid (courtesy of the authors).

Intergovernmental grants (*grants1* & *grants2*). *grants1* (used in the expenditure decentralization part of the analysis) is constructed as the ratio between grants received by sub-national governments from upper tiers of governments and (consolidated) general government revenues. *grants2* (used in the local expenditure composition part of the analysis) is constructed as the ratio between grants received by sub-national governments from upper tiers of governments and aggregate sub-national revenues. *Source*: IMF.

Real GDP per capita (*gdppc*). PPP-converted GDP per capita (constant prices: Laspeyres - derived from growth rates of c, g, i), at 2005 US dollars. *Source*: Heston, A., Summers, R., Aten, B. Penn World Table Version 7.0, Center for International Comparisons of Production, Income and Prices at the University of Pennsylvania, May 2011 (PWT 7.0 from now on).

Government size (*govsize*). Government consumption share of PPP converted GDP per capita at 2005 constant prices. *Source*: PWT 7.0.

Openness (*open*). Trade openness of the economy at 2005 constant prices (%), measured as total trade (sum of import and export) as a percentage of GDP. *Source*: PWT 7.0.

Education (*educ*). School enrollment, tertiary (% gross - we used secondary enrollment for Canada and Germany to avoid missing values for the *educ* series). *Source*: World Bank - World Development Indicators (WDI from now on).

Urbanization (*urb*). Urban population (% of total). *Source*: WDI.

Population density (*popdens*). People per sq. km of land area. *Source*: WDI.

Population ages 0-14 & 65 and above (*pop14* & *pop65*). Population aged 0-14 (*pop14*) and 65 and above (*pop65*): % of the total. *Source*: WDI.

Population growth (*popgr*). Annual growth rates of total population. *Source*: WDI.

Life expectancy (*lifexp*). Life expectancy at birth (years), total population. *Source*: WDI.

Government parties (*party_1, 2, 4, 5*). Four dummies that take the value 1 in each period with dominance/hegemony of either right (*1*/*2*) or left (*4*/*5*) in the cabinet (the reference/missing category being a balanced cabinet). *Source*: Comparative political dataset, Armingeon, K., Gerber, M., Leimgruber, P., Beyeler, M. (2011). Comparative political data set 1960-2009. Institute of Political Science, University of Berne.