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

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Abstract

Many industrialized countries have recently implemented fiscal decentralization reforms assigning more competences and spending responsibilities to sub-national governments. In this paper we investigate what leads to the decentralization of different categories of public expenditure in 19 developed countries over the period 1980-2006. Adopting a general-to-specific empirical approach, we estimate different models for each of the spending functions under analysis. Our results confirm existing findings on the negative link between regional income disparities and expenditure decentralization. A similarly negative relationship is found for a set of demographic variables, leading to the conclusion that macroeconomic and, more importantly, political factors are the key to explain the recently increased decentralization levels in most industrialized countries. Finally, an analysis on the sub-national expenditure composition is also performed.

Keywords: *fiscal decentralization, COFOG, local revenue, macroeconomics, political institutions*

JEL classification: *H750, H760, H770, E020*

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1. Introduction

There has been a recent wave of studies on decentralization and fiscal federalism following widespread reforms in both developed and developing countries (see, among others, Arzaghi and Henderson 2005, Bodman and Hodge 2010). Major decentralization processes have occurred over a relatively short time period 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). The literature on fiscal decentralization and its determinants offers a high number of contributions (among others, Dafflon 1992; Wallis and Oates 1998; Panizza 1999; Beramendi 2007), but it has largely overlooked the characteristics and the implications of decentralizing the various expenditure categories such as those included in the Classification Of the Functions Of Government (COFOG) provided by the United Nations.[1]

This seems particularly interesting to investigate, as most decentralizing countries (even in the Eurozone) lacked clearly designed expenditure decentralization strategies. Sub-central governments are assigned diverse policy and spending functions depending on the extent of decentralization: in highly centralized countries the bulk of sub-national spending refers to local services such as education (mainly preschool, primary and secondary), economic affairs, recreation and other residential services. In more decentralized countries the spending structure is usually different, with health (e.g., hospitals and basic healthcare) and social welfare (e.g., social housing) becoming relatively more important, while education remains a core responsibility (OECD 2012). Moreover, the focus on the expenditure side is grounded on the fact that governments tend to decentralize

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[1] A notable exception is Letelier (2005) even though he considers only three cases of expenditure by function, i.e. education, housing, and health. Moreover, only a few explanatory variables (i.e., urbanization, population density, income and grants) are included into the empirical analysis. In general, 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 execution more than revenue collection (IMF 2011). For instance, while expenditure decentralization rose by about 4% between 1995 and 2009, the average increase in tax decentralization was only 2.5% (IMF 2012).

The importance of using a high level of details such as the one offered by the COFOG classification has been recognized by, among others, Fiva (2006). However, the existing empirical evidence on decentralization of these spending items is scarce due to data availability issues, and 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). COFOG expenditures have only been studied in different contexts, such as those related to efficiency/government size (Shelton 2007; Ashworth *et al.* 2012b), or to political economy considerations (Brender and Drazen 2009; Creedy and Moslehi 2009). A notable exception is a recent empirical study by the OECD (2012) that links the degree of decentralization of government spending on education to assess the extent to which educational outcomes are influenced by sub-central powers and school autonomy.

The aim of this paper is to offer evidence on the demographic, political, and macroeconomic determinants of decentralization of different expenditure categories (e.g., health, education, social welfare, housing, transports, public order and safety) adding new insights to the existing literature that is mainly based on the traditional theory of fiscal federalism (Tiebout 1956, Buchanan 1965, Oates 1972). On the empirical side, Letelier (2005) offers a comprehensive review of the results achieved, focusing on variables such as income per capita, trade openness, income inequality, population density and urbanization. More recently, authors like Beramendi (2007), Stegarescu (2009), Sacchi and Salotti (2013) pointed out that regional inequality also concurs in shaping the fiscal decentralization processes. However, little can be inferred on the decentralization decisions of the single spending categories that we analyze here.

Using a general-to-specific empirical approach, we adopt different models for each of the spending function under analysis providing a highly comprehensive picture in each case thanks to a wide set of explanatory variables included in the regressions. We take advantage of the previous empirical studies by using variables that have been found to significantly affect aggregate measures of

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fiscal decentralization (see Section 2 for details). To ensure the robustness of our results, we implement several estimation techniques, also allowing for some dynamics. Indeed, expenditure decentralization may depend on many factors, suggesting that there may be a long-run target, i.e. an equilibrium level, an aspect rarely considered before. We then use the same framework to analyze the composition of the local budget, using the weights of each decentralized spending category over aggregate expenditures at the local level.

In both cases, we combine data from several different sources, taking the COFOG expenditure decentralization series from OECD and, especially, IMF Government Finance Statistics (GFS) databases. Our dataset covers 19 developed countries over the period 1980-2006.

We offer new insights on the determinants of the decentralization process of the single expenditure functions. First of all, higher inter-regional income disparity seems to suggest the avoidance of expenditure decentralization according to equity considerations. Second, recent developments related to the population structure imply lower decentralization levels for expenditures related to social protection, housing and transport. Third, the reasons for the recent spending decentralization-increasing reforms in most European countries must be traced back to macroeconomic and, more importantly, political and institutional factors. Fourth, the higher the quality of institutions, the higher the pressure towards decentralization. Fifth, we find different results and implications for different spending items, a fact that supports the soundness of our research question. We also demonstrate the economic importance of our results by quantifying the effects of the variables under analysis making meaningful cross-country comparisons.

As for the local expenditure composition analysis, it emerges a lower importance of macroeconomic developments with respect to political and demographic changes in shaping the local spending mix. Even if results differ across the various categories, a common trend seems to emerge: sub-central governments have an incentive to spend more on productive investment such as housing policies or education and less on other spending items. In particular, local education spending likely to be favoured by higher levels of income and better institutions, and healthcare favoured by faster population growth and both moderate-left and moderate-right cabinets.

The remainder of the paper is organised as follows. Section 2 illustrates the empirical strategy and the variables used in our analysis. Section 3 presents and discusses the estimation results on expenditure decentralization by function. Section 4 analyses the composition of local public spending. Finally, section 5 concludes and provides some policy implications.

2. The empirical strategy: model and variables

What leads to the decentralization of the different COFOG spending categories? In this section we study the importance of a large number of demographic, political, macroeconomic and fiscal variables, controlling for the degree of tax decentralization and the weight of intergovernmental grants as financing tools for sub-central government spending. The choice of the sample under investigation is dictated by data availability, particularly because of the lack of fiscal decentralization data after 2006 and of regional economic disparities data before 1980. The empirical results on expenditure decentralization by function are based on the following model:

$$exp\_dec_{i,t} = \alpha_{i,0} + \boldsymbol{\beta}'_{i,j}\mathbf{macro}_{i,t} + \boldsymbol{\beta}'_{i,k}\mathbf{demo}_{i,t} + \boldsymbol{\beta}'_{i,l}\mathbf{pol}_{i,t} + \alpha_{i,1}td_{i,t} + \alpha_{i,2}grants1_{i,t} + \tau_t + u_{i,t}, \quad (1)$$

where $exp\_dec_{i,t}$ stands for local spending (net of intergovernmental grants) as a share of general government expenditure within a certain COFOG category. Using this general definition, we estimate eight different specifications, starting from aggregate local expenditure (*tot_dec*) and following with the main public functions: 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*). We treat the first case in order to make our study consistent with the standard approach adopted by the existing literature, which mainly deals with spending decentralization as a whole, without differentiating among expenditure functions.

The explanatory variables are divided into three main groups. *macro* is a set of macroeconomic and fiscal indicators: a) $gdppc_{i,t}$ is the logarithm of real GDP per capita; b) $regdisp_{i,t}$ is regional

economic disparities measured by the population-weighted coefficient of variation (calculated as the standard deviation of per capita regional GDP within a country divided by the country's per capita GDP level); c) $govsize_{i,t}$ is the government consumption share of GDP; d) $open_{i,t}$ is trade openness measured by the sum of imports and exports divided by GDP; e) $debt_{i,t}$ is gross public debt divided by GDP. The inclusion of the **macro** variables builds on the theoretical and empirical literature on the determinants of fiscal decentralization (e.g., Wagner's Law; the globalisation theory of Rodrik (1998); the Bolton and Roland's (1997) 'political factor' arising from differences in income distribution across regions).

The set labelled **demo** contains the following demographic variables: a) $urb_{i,t}$ stands for urbanization (measured by the percentage of urban population over the total); b) $popdens_{i,t}$ is population density; c) $pop14_{i,t}$ is the percentage of population below age 15; d) $pop65_{i,t}$ is the percentage of population above age 65; e) $popgr_{i,t}$ is the growth rate of the total population; f) $lifexp_{i,t}$ is life expectancy at birth; g) $educ_{i,t}$ is tertiary school enrolment. In this case, we take advantage of the empirical literature on the role of demand and supply for specific expenditure categories (e.g., Panizza 1999; Letelier 2005; Shelton 2007).

Finally, **pol** is a set of political and institutional variables: a) $party\_1,2,4,5_{i,t}$ 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); b) $plural_{i,t}$ is a variable accounting for political pluralism and for the quality of national institutions; c) $elect_{i,t}$ is a variable indicating if local governments are directly elected by the local population that they govern, indicating a sort of "legitimacy" of sub-central governments within the institutional system. More generally, these variables represent the degree of political (in)stability and capture the heterogeneity of individual preferences reflected in the voting results, all of which can differently affect different public spending programs (Persson and Tabellini 1999, 2003; Milesi-Ferretti et al. 2002; Brender and Drazen 2009).

Beyond this, it is important to control for the financing sources of sub-national governments. We do it by distinguishing the way through which local governments finance their expenditures, i.e. common pool *versus* own resources. This may affect the expenditure side (see, for example, Ashworth *et al.* 2012a), although tax and spending decentralization decisions are not necessarily taken together.

More generally, the need to take into account the "nature" of fiscal decentralization is also envisaged by previous scholars such as Rodden (2003) affirming that it is not decentralization that matters per se but what form it takes. Accordingly, the basic idea of the 'Second Generation Theory' of fiscal federalism is that a decentralization process with local governments relying on their own resources would be more efficient than one based on transfers. However, practice suggests that reforms conferring more tax autonomy to sub-central governments are particularly difficult from a political economy perspective (OECD 2012).

Therefore, we add as controls an index measuring tax decentralization ($td_{i,t}$ - sub-national revenue minus grants from other levels of government, divided by general government revenue)[2], and the ratio between transfers received by sub-national governments from upper levels and general government revenue minus intergovernmental grants ($grants1_{i,t}$). This has rarely been done before, although it is consistent with the prescriptions of McLure 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 empirical literature does not add much to these guidelines.

Before getting to the analysis, it is worth spending a few words on the IMF-GFS data. GFS data suffer from well-known limitations, the most relevant concerning the overestimation of the real autonomy of sub-central governments over their expenditure and tax decisions. Unfortunately, even though improved tax decentralization indices have been constructed by researchers starting from this source (Stegarescu 2005; Gemmell *et al.* 2009), on the expenditure side it is yet impossible to find higher quality data.[3] However, the COFOG disaggregation of local expenditure offers the advantage

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[2] We use the "own revenue" tax decentralisation 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.

[3] 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.

of being homogeneous across the various countries of the sample. It also avoids large aggregates such as government consumption (used in Fiva 2006) or redistributive spending (in Persson and Tabellini 2003).

We estimate the model in equation (1) with a few different estimators. We use as benchmark fixed effects (FE) estimations that control for country-specific time-invariant factors such as country size and institutional factors (e.g., whether the country is federal, or the degree of political decentralization or of ethnic fragmentation[4]); period dummies are also included (τ_t), and $u_{i,t}$ is the disturbance term. Additionally, we also offer estimates obtained with the Feasible Generalized Least Squares (FGLS) estimator, which is considered to be efficient for sample dimensions that we are handling here (Beck and Katz 1995). Finally, the empirical analysis is completed by an Error Correction Model (ECM) used to identify short- and long-run responses of the explanatory variables to expenditure decentralization. Indeed, such processes may normally need many years to be effective (a notable examples is represented by the ongoing institutional reforms in Italy) and before arriving at the long-run equilibrium one can expect that each factor potentially involved in such process (i.e. macroeconomics, demographics, and politics) may cause both short- and long-term effects which deserve some attention.

In all cases, equation (1) is estimated using annual frequency data from 1980 to 2006 on a sample of 19 OECD countries (listed in Table A1 of Web Appendix). The general-to-specific approach implies that each one of the eight specifications will only include the set of explanatory variables with a *t*-statistic above a certain threshold (set equal to 1.00 in our case). Table A1 of the Web Appendix contains some descriptive statistics of the variables used in the analysis, and the detailed definitions and sources.

3. The decentralization of the COFOG expenditures

3.1 Panel results

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[4] Actually, the degree of ethnic fragmentation may change over time, although slowly. However, the only available data (see Alesina *et al.* 2003) are time-invariant.

Table 1 reports the results for the eight different specifications of equation (1) using the FE panel estimator. The results of Sargan tests reported in the last row support the choice of this estimator over the random effects one.

Insert Table 1 about here

Among the many results, it clearly emerges the role of regional economic disparities (*regdisp*) that, when included, are always associated with negative and highly statistically significant coefficients. This indicates that higher regional inequality contributes to reduce the incentives for expenditure decentralization both in aggregate terms and for specific items such as social and transport spending. The result for *tot_dec* is consistent with previous findings by Stegarescu (2009) and Sacchi and Salotti (2013). According to our estimates, differences in regional disparities alone explain a 7% higher expenditure decentralization in Austria with respect to Belgium, the latter being characterized by much higher regional economic inequality. The intuition lies in the fact that higher levels of inequality across territories are likely to increase demand for inter-regional redistribution that could be better satisfied by the central government's intervention (Wibbels 2005). The larger coefficient in the case of social welfare than in the aggregate expenditure case (32.59 *versus* 22.37) implies an even greater effect that is consistent with our interpretation.

As for the rest of the variables in the macroeconomic set (**macro**), higher real GDP per capita does not favour decentralized expenditure for health and public order purposes, while it leads to more decentralized education and defence spending. The latter result can be justified by considering education spending at the local level as a desirable but expensive and superior good that can only be afforded by affluent societies (as put forward by Tanzi 2000, although referred to fiscal decentralization in general), while decentralized public order and safety can be treated as "normal" goods (whose decentralization should not necessarily increase with per capita income). For instance, the higher French GDP per capita over the Spanish one justifies a 10% lower health expenditure decentralization and a 5% higher education decentralization in France, all else equal. An inverse relationship between income and health decentralization is also empirically found by Letelier (2005)

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and theoretically supported by Oates (1972) and Gordon (1983). More generally, the positive relationship between the level of income and fiscal decentralization in developed countries has been already documented by some previous studies (e.g., Wallis and Oates 1988; Panizza 1999), once again without considering decentralization of single expenditure functions.

The higher the importance of the government in the economy, measured by *govsize*, the lower the pressure for total expenditure decentralization (for example, the higher importance of public spending in Greece with respect to Ireland implies a 2% less decentralized structure, *ceteris paribus*), as well as for specific spending items such as health and defence. The positive sign of trade openness in the case of decentralized education spending seems to contrast with the globalization theory according to which more economic integration may call for more central government expenditure for redistributive and stabilization purposes. However, under the "efficiency hypothesis" (Gemmell *et al.* 2009) globalization can foster competition between countries to attract FDI leading to a reduction in taxation (particularly capital taxes), and so the size of the public sector, and a restructuring in the composition of government expenditure towards privately productive public inputs. This supports the finding of a positive impact of trade openness on the decentralization of spending items such as transport (which includes communication) and education. As for the transport expenditure decentralization, a 5% difference between Ireland and the UK is implied by the sole higher trade openness of the former (the openness index is also inversely - and inevitably - related to country size).

The demographic variables (***demo***) prove to be particularly relevant for the decentralization of all the different spending categories, being mostly associated with negative coefficients across the various spending categories. For instance, the proportion of people aged 14 years old or less always shows negative coefficients, when statistically significant, highlighting that the presence of this kind of citizens call for more centralisation, particularly in the case of housing policies. For instance, this variable alone may explain a 5% more centralized housing expenditure in Denmark versus Switzerland. Similarly, the share of elderly population demands less decentralization for welfare-related spending (and housing), while it positively influences transport and defence expenditure decentralization. Population density and population growth show mixed effects, as in most of the existing literature. Panizza (1999), for example, demonstrates that a lower population density leads to

a higher ideological distance from the median voter, lowering the demand for centrally provided public goods. In addition, low density countries are likely to be more costly and logistically difficult to administer from the centre (Bodman and Hodge 2010). On the other hand, Prud'homme (1995) argues that decentralization is more warranted in a densely populated country - where secondary sub-national units are still large - as to make the decentralization process successful, local governments should have the critical mass required to use their powers effectively. As an example, in our sample countries like Denmark, Finland and Sweden do not have intermediate levels of governments (e.g., regions) due to their small size or low population density.

Finally, the proportion of population living in urban areas is always associated with negative coefficients (when included in the model). Hence, urbanization is likely to induce more fiscal centralization for aggregate, healthcare and defence spending. This may be due to the fact that the central government can autonomously improve public urban facilities, and this improved urban infrastructure could attract the population from the non-urbanized part of the country. The tertiary school enrolment (*educ*), included to proxy for public awareness shows a negative (when statistically significant) coefficient, which is consistent across specifications.

Among the ***pol*** variables, the political party dummies do shape the expenditure decentralization processes, but again results vary widely. Having left dominance in the cabinet (*party_5*) is associated with lower expenditure decentralization in education and public order. On the other side, right-wing hegemony in the cabinet (*party_1* and *party_2*) positively affects decentralization of specific functions such as housing, defence and public order, while it negatively affects it on the aggregate. In turn, political pluralism (*plural*) shows positive (when statistically significant) coefficients, suggesting that a higher quality of government and institutions leads to more fiscal decentralization mainly of health spending. This positive link is consistent with recent results obtained by Kyriacou and Roca-Sagalés (2011) for total expenditure decentralization.

As for the revenue-side controls, tax decentralization positively correlates with healthcare, education, housing, and transports expenditure decentralization. This suggests that tax decentralization is likely to accompany expenditure decentralization, increasing consistency between those that benefit from the programs and those who end up financing and paying for them, through

charges and user fees for example. On the other hand, tax decentralization is not correlated to defence spending. In this respect, it is worth saying that this function is normally very hard to decentralize (and actually the bulk of this kind of spending is done at the central government level in most of the countries of the sample) given its nature of purely "national" public good. Therefore, it is generally difficult to draw meaningful conclusions regarding it, i.e. the lack of clear evidence is not surprising.

The second revenue-side control, *grants1*, is positively and highly correlated with decentralization of social spending. It is common practice for central governments to finance this type of function through intergovernmental grants, even when it is assigned to sub-central governments (OECD 2006, 2009). This also reflects, to some extent, the normative prescriptions of the 'First Generation Theory' of fiscal federalism on avoiding decentralization of redistributive functions. A positive relationship between grants and decentralization also emerges for health expenditure (but at a lower significance level) confirming that even though this spending item can be decentralized, it may still be mandated by the central government or spent on behalf of it - given the collective interest for healthcare - revealing the importance of intergovernmental transfers as a financing tool combined with local taxation.

To check the robustness of all these results, we re-estimated the model described by equation (1) using the FGLS estimator with fixed effects and controlling for heteroskedasticity in order to take into account possible cross-sectional correlation. Table A2 (in the Web Appendix) shows that practically all the benchmark results hold. In particular, the important role of regional economic disparities and of most of the other macroeconomic variables is still evident, as well as the mostly negative role played by demographic developments in shaping decentralization of most spending categories. Moreover, the statistical significance of the **demo** variables coefficients is higher in the cases of social spending and housing decentralization, while the **pol** variables lose their explanatory power in the case of decentralized public order expenditure. Finally, these new estimates also confirm the positive correlation between tax and expenditure decentralization.

3.2 ECM results

This section enriches the benchmark findings by estimating a dynamic error correction model (ECM). This feature is particularly interesting, as it is likely that the degree of expenditure decentralization is affected by previous decisions about it: explanatory variables can thus be expected to exert both short- and long-term effects. In other words, there may be a long run position of a desired level of expenditure decentralization relative to the socio-economic, institutional, and demographic characteristics of the country. In this framework, short-run (mainly political) decisions may cause temporary deviations from this long-run target. All these aspects can be captured through an ECM as it has been done in a number of previous studies analyzing aggregate fiscal decentralization (e.g., Rattsø and Tovmo 2002; Rodden 2003; Liberati and Sacchi 2012).

To deal with an ECM, we need to ensure the non-stationarity of the dependent and of the explanatory variables, as the distinction between long- and short-term relationships would become superfluous and meaningless with stationary variables. The results of the stationarity tests (Im *et al.* 2003) show that the vast majority of the variables are I(1);[5] the exceptions being *pop14* and political variables (**pol**). The latter are dummy (*party_1,2,4,5*) and ordinal-scaled (*plural* and *elect*) variables. In general, the stationarity of the political factors is not surprising since these variables change only infrequently and often in a series of breaks.[6]

Given the results of the tests, we transform equation (1) into an ECM by including the levels of the dependent variable and those of the explanatory variables at the right-hand side of the equation. Assuming one year as the timing of adjustment, a disequilibrium relationship involving first-order lags of both endogenous and exogenous variables yields the following model:

$$\Delta exp\_dec_{i,t} = \alpha_{i,0} + \lambda'_{i,j}\Delta\mathbf{macro}_{i,t} + \lambda'_{i,k}\Delta\mathbf{demo}_{i,t} + \varphi'_{i,j}\mathbf{macro}_{i,t-1} + \varphi'_{i,k}\mathbf{demo}_{i,t-1} + \beta'_{i,l}\mathbf{pol}_{i,t} +$$
$$+\theta'_{i,j}\exp\_dec_{i,t-1} + \eta_{i,1}\Delta td_{i,t} + \eta_{i,2}\Delta grants1_{i,t} + \mu_{i,1}td_{i,t-1} + \mu_{i,2}grants1_{i,t-1} + \omega_t + \psi_{i,t}, \tag{2}$$

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[5] The results of the tests are not reported in the paper only for the sake of brevity but are available upon request.
[6] Previous works of Perron (1988) on individual time series and Ashworth et al. (2012a) on panel series confirm that these variables were considered to be I(0).

where *pop14* (within **demo**) is treated as I(1) in the initial estimation,[7] while **pol** is a vector of I(0) variables. In the case of small samples (Wickens and Breusch 1988) and for multivariate models (Banjeree *et al.* 1986), the direct estimation of equation (2) provides short-run responses given by the λ's, while the estimated long-run responses for each variable I(1) can be recovered by calculating the ratio $-\varphi/\theta$, where the estimated coefficient of the lagged dependent variable (θ) represents the speed of adjustment towards the long-run equilibrium. A FE panel estimator is used for equation (2) where period dummies are also included (ω_t), and ψ_i,t is the error term; country-specific time-invariant factors are also controlled for.[8]

Insert Table 2 about here

Estimation results are reported in Table 2. The negative effect of regional economic inequality is confirmed in the short- as well as in the long-run for aggregate expenditure and also for decentralized social expenditure in the short-run. The short-term responses are lower in magnitude. As for the rest of the **macro** variables, government size also exerts a negative and statistically significant impact in the long-run on expenditure decentralization as a whole and on specific policy areas such as health, thus confirming previous panel results.

The ECM results mostly support the negative relationships between the demographic variables and expenditure decentralization. Their effects are stronger in the long-run, even though in some cases short-run responses are also statistically significant (e.g. *pop14* for housing and *urb* for defence decentralization). The impact of the political variables is again positive in most cases as it would be expected given the fact that the political variables are I(0) and enter, indeed, the model in the same way of those in equation (1). In general, the fact that estimated long-run coefficients are highly statistically significant suggests that demographics, politics and macroeconomic factors exert permanent effects on the structure of expenditure decentralization.

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[7] See Ashworth *et al.* (2012a) for a similar approach and Keele and De Boef (2004) for the use of ECM with stationary data.
[8] We also estimated the ECM model by using a FGLS panel estimator with fixed effects and controlling for cross-sectional correlation. Results are consistent with those obtained in the case of ECM-FE estimator and with the previous panel results shown in section 3.1 The FGLS output (Table A3) is reported in the Web Appendix.

Likewise, the role played by the financing mechanisms in the decentralization process is mainly relevant in the long-run, with positive coefficients for both *grants1* and *td*. The persistence of the positive sign of grants highlights that this method of financing decentralization was - and is - actually important for many countries (e.g., Germany, Italy, Spain and the Netherlands). This is true especially for those expenditures that should be provided at a minimum level according to a general public interest (e.g., healthcare).

The importance of considering some dynamics in analyzing the processes of expenditure decentralization by function is proved by the high significance of the lagged dependent variable in all regressions, pointing out that the influence of history on specific decentralized spending matters. In detail, the speed of adjustment (i.e. the coefficient of the lagged dependent variable) is less than one in absolute terms, as needed to guarantee the stability of the system and, being it referred to variables under the control of the public sector, it is relatively high (around 0.4 in all cases). This means that 40% of the adjustment towards the long-run equilibrium occurs every year. This seems to reflect the scale of decentralization reforms put in place in the countries under analysis over the entire sample period.

4. The local budget composition

In this section we further exploit our dataset to analyze what affects the local expenditure composition when a country "chooses" to adopt decentralization for different spending programs. The theoretical literature on the issue only provides some normative prescriptions (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, e.g., Sanz and Velázquez 2002). The few existing studies on the subject only consider limited decompositions of the public budget, like investment *versus* current

expenditure (Alegre 2010), or different types of public investment (Faguet 2004; Kappeler and Valila 2008), or pork barrelling *versus* different expenditures (Diaz-Cayeros *et al.* 2002). The COFOG definition has only been used in some decentralization studies such as Arze del Granado *et al.* (2005), testing whether higher levels of fiscal decentralization increase the shares of consumption expenditures in the public budget. Similarly, Ashworth *et al.* (2012b) study the effects of fiscal decentralization on the composition of government growth, 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.[9]

Mimicking the analysis of Section 3, we estimate the following model to investigate what affects the composition of the local budget:

$$exp\_comp_{i,t} = \xi_{i,0} + \boldsymbol{\chi}'_{i,j}\mathbf{macro}_{i,t} + \boldsymbol{\chi}'_{i,k}\mathbf{demo}_{i,t} + \boldsymbol{\chi}'_{i,l}\mathbf{pol}_{i,t} + \xi_{i,1}td_{i,t} + \xi_{i,2}grants1_{i,t} + \varsigma_t + \upsilon_{i,t}, \quad (3)$$

where $exp\_comp_{i,t}$ denotes eight different indices gauging the importance of each spending item (i.e. the seven COFOG categories plus one obtained as a residual component - *res_comp*) over aggregate sub-national expenditures (excluding intergovernmental grants). The explanatory variables are those of equation (1), except $grants2_{i,t}$ that stands for the weight of transfers (from other government levels) received by sub-central units, normalized on the basis of aggregate local revenues.[10]

Insert Table 3 about here

Table 3 reports the results of the different specifications of equation (3) using a FE panel estimator (these are consistent with the FGLS results are reported in Table A4 of the Web Appendix).

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[9] 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 decentralisation leads to larger shares of GDP spending on education, while for healthcare and social security the opposite pattern is true.

[10] Aggregate local revenues are defined as the sum of local tax revenues and grants from other government levels. Local non-tax revenues and local capital revenues are excluded from this definition as they are recorded irregularly.

Most of the variables that proved to be important in shaping the process of expenditure decentralization also affect local spending composition. In general, the ***macro*** variables mainly affect the shares of the budget pertaining to health, transports and public order. Additionally, the positive impact of trade openness on education at the local level reflects a result in line with the globalization effect on certain spending items (mainly those with redistributive and risk sharing purposes) as suggested by Rodrik (1998).

In turn, both positive and negative signs of per capita GDP on different functions reveal different income sensitiveness of these government expenditures also at the local level. A higher level of income per capita increases the share of education, defence and public order expenditures, while it decreases that of healthcare spending. This can indicate, to some extent, the items where new resources are spent first and it is consistent with previous results on expenditure decentralization by function (at least for health).

The ***pol*** variables (with the exception of *party_1*) play an even more important role. In detail, right dominance in the cabinet (*party_2*) politics contributes to increase the share of education and social welfare items, while left dominance (*party_5*) is associated with lower local spending on education. Hence, education and social welfare appear to be the spending programs most sensitive to political issues. On the other hand, local decisions on health expenditure seem to be not affected by political coalitions but more driven by other forces.

Among the ***demo*** variables, population density developments concur to decrease the share of spending devoted to social welfare and housing, but raise the importance of education and public order expenditure components. On the other hand, we note a negative effect of non-working population (mainly *pop65*) on local education and housing policies, possibly due to the fact that this kind of population basically asks for greater demand for redistribution and health care. More generally, if the size of the non-working population increases (*pop14* and *pop65*), the complementary share of working individuals shrink and less tax revenues are probably available to finance many kind of public expenditure also at the local level. This contributes to explain why the negative estimated coefficient of some demographic variables (see also Ashworth et al. 2012b).

Finally, we also estimate significant coefficients for the two revenue-side controls. Intergovernmental grants accompany all spending components of the budget (with the exception of defence). To some extent, the positive sign is consistent with a "common pool" hypothesis (see Weingast 2009 for a survey) according to which local governments favour the growth of local expenditure in general terms, instead of, for example, lowering the tax burden on their residents. As for health care (reporting the highest level of significance), it can be justified by the nature of such program that is usually spent locally but funded by the central government (e.g., with block grants) in many developed countries (e.g., Denmark, Italy, Sweden).

Likewise, the negative sign of the tax decentralization coefficient on the social welfare share of the budget proves that sub-central governments do not devote many resources for these spending programs even when higher degrees of tax autonomy and own resources are allowed. They prefer, instead, to invest in other sectors such as housing policies where the linkages between taxing and benefit areas are more effective and visible typically at the local level, even some positive spillovers to non-residents justifying the channel of intergovernmental grants. The rest of the functions, such as education and health, seem to be unaffected by tax decentralization (in the remaining specifications it is excluded from the model according to the general-to-specific methodology). 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.

5. Summary and conclusions

In this paper we study the determinants of expenditure decentralization analyzing seven different COFOG functions in 19 developed countries over the period 1980-2006. The research question is of particular importance given the ongoing fiscal decentralization processes experienced by most industrialized countries with different trends and implementation strategies. We offer evidence on how political, demographic, macroeconomic and fiscal variables affect expenditure decentralization,

controlling for the different financing mechanisms, i.e. taxes and grants. In the second part of the empirical investigation, we analyze the determinants of the local budget composition.

We obtain the following results. First, even if it is possible to find a unique set of variables to explain cross-country differences in fiscal decentralization as already argued by Panizza (1999), the analysis of different expenditure functions calls for different explanations, as our general-to-specific approach suggests. Second, demographic developments contribute to lowering the decentralization levels of several spending components. A similarly negative influence on decentralization attitudes is found to be linked to regional economic disparities, with more unevenly distributed regional resources calling for more centralization of spending, especially those with redistributive purposes. Therefore, the reasons behind the increasing decentralization levels observed in recent decades are traced back to macroeconomic and political determinants. The latter in particular are found to be strongly and positively linked to expenditure decentralization.

Third, ECM results show the importance of historical developments in explaining the dynamics of the expenditure decentralization process, something that has been somehow overlooked in the previous literature. Our results prove the existence of long-run objectives, and countries adjust towards them with a reasonably high yearly speed. Finally, political variables play a key role for the spending allocation at the local level, while macroeconomic variables seem to matter less. Demographic developments also concur in shaping the composition of the local budget.

In general, some of our results better qualify existing theoretical prescriptions. For example, those of the fiscal federalism mainstream on limiting decentralized redistribution are supported by our findings on the negative relationship between regional economic disparities and expenditure decentralization as a whole and, in particular, of social welfare. On the other hand, some of the evidence offered in this paper suggests that other generally accepted 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 sub-national authorities can be classified either as low-tax–low services or high-tax–high-services (e.g., Bardhan 2002). However, this effective correspondence may be undermined by demographic changes affecting the population structure and the labour force, resulting in diverse local tax bases and revenues. All in all, this evidence calls for a

better understanding of the decentralization reforms in countries where linkages between local tax autonomy and spending responsibility show a different strength degree, which is also a common feature in our sample.

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Tables

Table 1 - *Expenditure decentralization by function, FE estimation*

Dep. Var.	tot_dec		hea_dec		edu_dec		soc_dec		hou_dec		tra_dec		def_dec		ord_dec	
Indep. Var.	*Coeff.*	*Sig.*	*Coeff.*	*Sig.*	*Coeff.*	*Sig.*	*Coeff.*	*Sig.*	*Coeff.*	*Sig.*	*Coeff.*	*Sig.*	*Coeff.*	*Sig.*	*Coeff.*	*Sig.*
macro																
gdppc			-2.269	(***)	1.093	(**)							0.216	(**)	-3.212	(***)
regdisp	-22.367	(***)					-32.594	(***)			-56.500	(***)				
govsize	-0.705	(**)	-3.652										-0.221			
openc					0.247	(***)			-0.501	(***)	0.071	(**)			-0.542	(**)
debt	-0.060	(***)			0.186	(**)							0.004			
demo																
urb	-0.219	(**)	-1.921	(**)									-0.245	(***)		
popdens			0.442		0.937	(***)	-0.174	(*)	0.491		-0.869	(***)	0.035	(**)		
pop14	-0.535	(***)					-0.170		-7.358	(***)						
pop65							-1.002	(*)	-5.729	(***)	3.959	(***)	0.264	(*)		
popgr			5.002	(**)			1.543	(*)	-8.846	(***)			-0.283	(**)		
lifexp	-1.359	(***)	2.108		3.461	(**)	-0.719		5.528		1.754		-0.252			
educ	-0.061	(***)	-0.213	(**)	-0.101	(***)	0.026		0.092							
pol																
party_1									6.489	(***)			0.155	(*)		
party_2	-0.590	(**)			1.822				4.254	(***)			0.168		4.365	(*)
party_4	-0.616		2.649	(*)					4.303		-2.239	(*)	-0.198			
party_5					-4.791	(***)									-5.026	(**)
plural			1.307	(***)	0.691		0.158		-0.892				-0.059		0.985	(*)
elect			-17.972	(***)			-3.616	(***)	7.943						7.259	(***)
controls																
td	0.836	(***)	1.157	(*)	1.119	(***)			1.041	(***)	0.287	(*)	0.016			
grants1	0.613	(***)	0.949	(*)	-0.291	(*)	0.448	(***)	0.513							
No. of obs.	380		310		320		317		315		235		350		294	
R squared	0.86		0.45		0.49		0.64		0.44		0.45		0.54		0.53	
Sargan test	<0.01		<0.01		<0.01		0.07		<0.01		<0.01		<0.01		<0.01	

Note - (***), (**), (*) denote significance at 1%, 5% and 10%, respectively. Country dummies, time fixed effects and a constant are included but not reported. R-squared is the within component.

Table 2 - *Expenditure decentralization by function, ECM with FE estimator*

Dep. Var.	**tot_dec**		**hea_dec**		**edu_dec**		**soc_dec**		**hou_dec**		**def_dec**		**ord_dec**	
Indep. Var.	*Coeff.*	*Sig.*	*Coeff.*	*Sig.*	*Coeff.*	*Sig.*	*Coeff.*	*Sig.*	*Coeff.*	*Sig.*	*Coeff.*	*Sig.*	*Coeff.*	*Sig.*
Dep. Var.$_{t-1}$	-0.330	(***)	-0.242	(***)	-0.199	(***)	-0.249	(**)	-0.424	(***)	-0.144	(***)	-0.126	(**)
macro (short-run)														
$\Delta gdppc$			-0.907		-0.349						-0.062		0.525	
$\Delta regdisp$	-18.554	(*)					-17.722	(*)						
$\Delta govsize$	-0.384		0.663								-0.105			
$\Delta openc$					0.043				-0.197				0.014	
$\Delta debt$	-0.070	(**)			0.015						-0.003			
macro (long-run)														
$gdppc_{t-1}$			-3.522	(*)	1.983	(**)					0.134		-2.378	(**)
$regdisp_{t-1}$	-22.310	(*)					-19.506							
$govsize_{t-1}$	-1.046	(*)	-11.460	(**)							-0.241			
$openc_{t-1}$					0.337	(*)			-0.552	(**)			-0.448	
$debt_{t-1}$	-0.010				0.245						0.010			
demo (short-run)														
Δurb	-0.014		-4.503								0.294	(*)		
$\Delta popdens$			-0.074		0.046		-0.219		-1.665		0.023			
$\Delta pop14$	-0.309						-0.350		-10.936	(**)				
$\Delta pop65$							-1.481		-0.052		0.021			
$\Delta popgr$			0.958				0.327		-1.542		-0.061			
$\Delta lifexp$	-0.499		0.283		1.022		-0.169		-0.116		0.007			
$\Delta educ$	0.029		0.012		0.050		0.037		0.022					
demo (long-run)														
urb_{t-1}	-0.027		-2.107								-0.278	(**)		
$popdens_{t-1}$			0.332		0.822	(*)	-0.213		0.531		0.041	(**)		
$pop14_{t-1}$	-0.497	(**)					0.647		-7.401	(***)				
$pop65_{t-1}$							0.446		-6.262	(*)	-0.142			
$popgr_{t-1}$			-4.256				0.410		-7.509		-0.510			
$lifexp_{t-1}$	-1.699	(*)	5.027		5.643	(**)	1.000		2.222		-0.094			
$educ_{t-1}$	-0.016		-0.276		-0.031		0.020		0.238					
pol														
party_1									2.480	(*)	0.042	(*)		
party_2	-0.352				1.073	(*)			3.419	(***)	0.032		0.652	(*)
party_4	-0.265		-0.571						3.505	(*)	-0.006			
party_5					-1.348	(***)							0.018	
plural			0.470	(**)	0.073		0.020		-0.722	(**)	0.002		-0.125	
elect			-7.218	(**)			-0.651		4.505				4.161	(***)
controls (short-run)														
Δtd	0.626	(***)	2.231	(***)	-0.031				0.823		0.008			
$\Delta grants1$	0.718	(***)	1.323	(**)	-0.076		0.219	(**)	-0.819	(*)				
controls (long-run)														
td_{t-1}	0.269	(***)	2.627	(**)	1.265	(***)			1.139	(**)	0.006			
$grants1_{t-1}$	0.222	(***)	2.374	(***)	-0.673		0.245		0.337					
No. of obs.	348		277		287		286		283		320		270	
R squared	0.630		0.361		0.198		0.344		0.359		0.320		0.192	

Note - (***), (**), (*) denote significance at 1%, 5% and 10%, respectively. Country dummies, time fixed effects and a constant are included but not reported. R-squared is the within component. It should be noted that estimations for transport decentralization are not reported given the high number of missing values by implementing the ECM.

Table 3 - *Sub-national expenditure composition, FE estimation*

Dep. Var.	hea_comp	edu_com	soc_comp	hou_comp	tra_comp	def_comp	ord_comp	res_comp
Indep. Var.	*Coeff. Sig.*	*Coeff. Sig.*	*Coeff. Sig.*	*Coeff. Sig.*	*Coeff. Sig.*	*Coeff. Sig.*	*Coeff. Sig.*	*Coeff. Sig.*
macro								
gdppc	-0.571 (**)	0.679 (**)		-0.190		0.056 (*)	0.096 (*)	
regdisp				-21.386 (**)		-1.288	-6.094 (**)	
govsize	-2.180 (**)			1.181 (**)	-1.814 (***)	-0.034		2.806 (*)
openc		0.067 (*)			0.085 (***)		-0.005	-0.111
debt	-0.078	0.137 (***)	0.066					
demo								
urb	-0.409					-0.041 (***)	-0.040	-0.449
popdens	-0.117	0.558 (***)	-0.257 (**)	-0.483 (***)			0.067 (***)	
pop14				-1.012 (***)		0.042 (*)		2.706 (**)
pop65		-1.297 (***)		-1.528 (**)	-0.398	0.063	0.252	3.853 (**)
popgr		-1.667 (***)	2.912 (**)	-0.856		-0.050 (**)		
lifexp	1.118	1.458 (*)		1.283 (**)				
educ		-0.020	0.114 (**)	-0.050 (**)	0.051 (**)			-0.096 (**)
pol								
party_1	1.249	0.735				0.040		
party_2		1.566 (***)	1.473 (**)			0.040 (*)		
party_4	0.855		2.088 (***)		0.524		-0.181 (**)	-1.504
party_5		-1.141 (*)				0.043	-0.301	2.691 (**)
plural		0.569 (***)			0.279 (**)	-0.020 (*)		-0.781 (*)
elect	-3.463		-11.847				1.330 (*)	
controls								
td	0.368	0.164	-0.758 (***)	0.249 (**)				-0.632 (*)
grants2	0.392 (***)	-0.097		0.104 (**)		-0.005 (***)		-0.218
No. of obs.	357	334	342	325	307	353	329	244
R squared	0.23	0.49	0.47	0.59	0.41	0.59	0.50	0.42

Note - (***), (**), (*) denote significance at 1%, 5% and 10%, respectively. Country dummies, time fixed effects and a constant are included but not reported. R-squared is the within component.