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Is Fiscal Decentralization Harmful for Economic Growth? Evidence from the OECD Countries

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Abstract
The global drive towards decentralization has been increasingly justified on the basis that greater transfers of resources to subnational governments are expected to deliver greater efficiency in the provision of public goods and services and greater economic growth. This paper examines whether this is the case, by analysing the relationship between decentralization and economic growth in 21 OECD countries during the period between 1990 and 2005 and controlling not only for fiscal decentralization, but also for political and administrative decentralization. The results point towards a negative and significant association between fiscal decentralization and economic growth in the sample countries, a relationship which is robust to the inclusion of a series of control variables and to differences in expenditure preferences by subnational governments. The impact of political and administrative decentralization on economic growth is weaker and sensitive to the definition and measurement of political decentralization.

Keywords: Fiscal decentralization, political decentralization, administrative decentralization, economic growth, OECD.

JEL Classifications: H40; H52

1. Introduction

The recent global drive towards fiscal decentralization has often been promoted as a means to achieve greater economic efficiency and growth. From the US to China, from Britain to Spain, greater transfers of resources and powers to subnational tiers of governments have been increasingly justified as a means to improve economic performance, both at the local and at the aggregate level, often sidelining the traditional arguments of safeguarding local identity or culture (Rodríguez-Pose and Sandall, 2008). This economic efficiency discourse has been prevalent both in cases of top-down fiscal decentralization, as in the US (Donohue, 1997) or the UK (Morgan, 2002; Tomaney, 2002), as well as in bottom-up processes, where regions and localities have taken the lead in the process (e.g. Eusko Jauralitza, 2004).

Yet the supposed 'economic dividend' (Morgan, 2002) derived from fiscal decentralization has seldom been tested and the studies which have ventured into exploring this field have come out with varying results. Although it is difficult to generalise from what is a literature that spawns across different countries of the world and uses a wide range of data sets and methods, the results of the studies which have looked into the economic returns of fiscal decentralization range from a positive and significant relationship (Iimi, 2005) to inverted U-shaped relationships (Thieβen, 2003) or neutral or mildly negative impacts (Davoodi and Zou, 1998; Woller and Phillips, 1998; Rodríguez-Pose and Bwire, 2004; Thornton, 2007; Baskaran and Feld, 2009).

However, with few exceptions, this type of research has concentrated on individual countries. Cross-country comparisons are limited and those including a large number of

countries, such as those of the EU or the OECD, are few and far between (e.g.: Thießen, 2003; Thornton, 2007; Baskaran and Feld, 2009). In addition, when testing the relationship between decentralization and growth, most of the literature has dwelt on one type of decentralization – fiscal decentralization – disregarding the fact that other types of decentralization, such as political and administrative decentralization, may also play a non-negligible role in shaping policies, the provision of public goods and services and, eventually, economic outcomes. The interaction between different types of decentralization is also likely to influence the returns of subnational expenditure and revenue efforts.

In this paper we address this gap in the literature by looking at whether levels and changes in the levels of fiscal decentralization across 21 countries of the OECD during the period between 1990 and 2005 have had a positive or a negative effect on aggregate national economic performance. In order to achieve this aim, we not only examine the expenditure and revenue sides of fiscal decentralization, but we control for differences in political and administrative decentralization across countries, as well as for a host of other structural variables which, according to the literature, are considered to have an effect on economic performance. In addition, in order to further check the robustness of our results, we analyse whether the presence or absence of a significant association between fiscal decentralization and economic growth may be a result of differences in expenditure preferences by subnational governments. We specifically assess whether preferences for current or capital expenditures across regions and across countries in the OECD matter for economic growth, focusing later on the precise impact of the decentralization of economic affairs, health, education and social protection expenditure.

The paper is divided according to the following structure. First an overview of the theoretical arguments on the link between fiscal decentralization and growth follows this introduction. Section three weaves fiscal, political and administrative decentralization into a theoretical model. Section four presents the results of the analysis of the impact of decentralization on economic growth across the OECD. The final section introduces the main conclusions.

2. Fiscal decentralization and growth: a theoretical overview.

Most of the theoretical literature on fiscal decentralization has tended to dwell on the supposedly positive impact of granting greater financial autonomy or transferring resources to subnational tiers of government for both allocative and production efficiency and, eventually, economic growth (Tiebout, 1956; Oates, 1972; Brennan and Buchanan, 1980).

The arguments behind this potential positive association between fiscal decentralization and economic performance are based on a series of simple premises. An important, but often forgotten, initial premise is that fiscal decentralization implies a mobilization of resources. Subnational governments, by the simple fact of being granted greater autonomy and funds, are compelled into mobilizing the resources in their own territory, rather than wait for solutions or for the provision of public goods and services to come from a central, more remote, authority. This leads to a greater emphasis on economic efficiency across regions and localities within any given country and to tapping into what otherwise may have been untapped potential.

The best known mechanism through which fiscal decentralization may lead to greater overall economic efficiency is the so-called 'fiscal decentralization' theorem: the fact that, due to informational advantages and a better insight into the preferences of citizens, local governments are more capable than national governments to tailor the provision of public goods and services to the needs of local citizens (Tiebout, 1956; Klugman, 1994). The possible economic advantages linked to the fiscal decentralization theorem increase the larger and the more heterogeneous the country. Whether in small and homogenous countries the informational benefits of conducting policies and providing public goods and services at the local level may be limited, the advantages of fiscal decentralization increase as internal heterogeneity makes individual preferences more diverse (Oates, 1993; Martínez-Vázquez and McNab, 2003). From this perspective, significant benefits from fiscal decentralization can be expected beyond a certain country-size threshold.

Greater production efficiency and growth may also be triggered by the changes in scale for the production of public policies and goods and services that fiscal decentralization entails. The risk of citizens and firms being able to 'vote with their feet' and move to another location drives local governments to compete in order provide better and more efficient policies (Tiebout, 1956; Donahue, 1997; Martínez-Vázquez and McNab 2003). Through competition, local governments are kept on their toes limiting the possibility of inefficiency, rent-seeking and corrupt practices (Breton, 1996). Competition, in turn, is at the heart of policy innovation. The smaller the geographical scale of intervention, the lower the risks involved in – and the aggregate cost of – pursuing innovation in the provision of public goods and services. Successful local policies can then be transferred

from one place to another, possibly leading to significant aggregate efficiency gains (Donohue, 1997). Fiscal decentralization is also frequently considered a means to promote more efficient markets (McKinnon, 1997; Marks and Hooghe, 2004).

Decentralization also brings about important benefits in cases where serious diseconomies of scale exist. It is often the case that the cost of producing certain public goods tends to rise significantly with size. This is particularly true when the delivery of public goods and services is done by large, remote and/or often inefficient central bureaucracies (Klugman 1994). These bureaucracies are frequently less well suited to deliver specific public goods more efficiently than the more supple local governments, as a consequence of their closeness to the people and their better knowledge of their needs. Local delivery also shortens supply chains and reduces costs, potentially generating greater economic efficiency and even reducing the risks associated with the loss of redistributive power by the central government (Ezcurra and Pascual 2008).

Last but not least, fiscal decentralization is often considered as a way to increase participation, transparency and accountability in policy-making (Putnam, 1993; Ebel and Yilmaz, 2002). Because of the enhanced proximity between those governing and those governed, fiscal decentralization empowers individuals and helps to generate institutions, such as greater trust, interaction and networking, which, in turn, contribute to a reduction of transaction costs.

While, from a theoretical perspective, there may be significant benefits associated with fiscal decentralization, many authors have tended to focus on the other side of the coin: that of the potential risks of decentralization for economic performance. First of all,

certain strands of research have cast doubt on the validity of the 'fiscal decentralization theorem'. Needs and wants for public goods and services may not differ significantly across jurisdictions. Prud'homme argues that more than responding to "fine differences in preferences between jurisdictions [governments have] to satisfy basic needs, which are – at least in principle – quite well known" (1995: 208). These basic needs of access to food, to decent education, to safety, to health care, to basic infrastructure, and to other basic services are universal and do not differ greatly from one region to another and the central government may be better suited to deliver these goods. Second, even if we accept that needs vary across territories, capacity constraints may limit the potential of subnational governments to make the most from fiscal autonomy (Rodríguez-Pose and Gill, 2005). It is far from proven that local and regional governments have a clear comparative advantage with respect to national governments in uncovering those differences (Prud'homme, 1995).

Poorer localities and regions may also be at a further disadvantage in delivering efficient policies and strategies. Often times subnational governments – especially in the less developed regions – lack the adequate expertise and human resources to put in place viable policies and strategies, let alone to tailor those policies to the specific needs of their citizens (Rodríguez-Pose and Gill 2004; Sapir et al. 2005). Because of the generally greater salaries and the greater possibilities for promotion they offer, central governments may have better and more efficient administrations than local and regional governments, especially if these governments are poor, distant and strapped for cash (Prud'homme 1995). Moreover, richer and more dynamic regions can generally extract greater resources, either through the taxation of their own citizens or through a greater political leverage to negotiate with the central government (Rodríguez-Pose and Gill

2004). Limited local institutional capabilities may even undermine the capacity to assimilate and adopt best practices (Oates, 1993; Odero, 2004). Local governments may also fall prey to elite and special-interest capture (Inman and Rubinfeld, 2000; Storper, 2005) and may be likely to breed greater corruption, nepotism and clientelism.

Scale arguments may also be reversed. When large economies of scale and scope are involved, local and regional governments often lack the necessary size to deliver public goods and services efficiently – with the provision of transport infrastructure or utilities being most at risk to fall into inefficiencies (Prud'homme, 1995). The benefits of central government delivery are thus likely to be greater for capital intensive goods, where a critical mass of investment is needed in order to reduce the per-unit cost of delivery (Frenkel, 1986).

Given the points above, the possibility of matching policies to the specific needs of the population may simply be a pipedream, as local and regional governments often do not have the necessary powers, resources, capacity and capabilities to be able to adequately address local problems. Inadequate or unfunded mandates are common in processes of decentralization and tend to seriously compromise the potential of subnational governments to deliver better targeted and more efficient policies than those of national governments (Rodríguez-Pose and Gill, 2003).

Whether the positive or the negative economic effects of fiscal decentralization prevail cannot be established using theory alone. The empirical work on the economic effects of decentralization has been limited and, as mentioned earlier, generally reaches diverging conclusions. The reasons for this diversity are that determining the impact of

decentralization on local and regional development empirically is difficult. There is no clear agreement about how to best measure decentralization (Ebel and Yilmaz 2002: 6-7) and, even when the same indicators are used, the methods and approaches vary enormously. In addition, there is hardly ever a counterfactual, making it impossible to discern what would have happened to local and regional growth trajectories in the absence of decentralization.

As a consequence, the question of whether decentralization promotes or deters economic efficiency across the world is far from settled and available empirical analyses virtually fit every possible position. Some studies have found that there is a positive association between decentralization and economic performance (Lin and Liu, 2000; Akai and Sakata, 2002; Iimi, 2005). Others, in contrast, indicate that the relationship can be negative (e.g. Davoodi and Zou 1998; Zhang and Zou 1998 and 2001). While most tend to highlight that the link between decentralization and economic growth varies from one region and one country to another and, in most cases, tends to be either neutral or insignificant (Davoodi and Zou, 1998; Woller and Phillips, 1998; Rodríguez-Pose and Bwire, 2004) or far from linear [e.g. Thießen (2003) uncovers a hump-shaped relationship between decentralization and development, indicating the potential existence of an optimal level of decentralization across countries] (Table 1).

INSERT TABLE 1 AROUND HERE

3. Fiscal, political and administrative decentralization: the model.

The aim of this section is to test empirically the practical relevance of the contrasting theoretical arguments on the link between the degree of fiscal decentralization from central to subnational governments and economic performance for 21 OECD countries during the period between 1990 and 2005.

The first feature that strikes about fiscal decentralization in the OECD is its diversity. If we take two widely used standard measures of fiscal decentralization – the subnational share in total government expenditure and the subnational share in total government revenue (e.g. Oates, 1985, 1993; Davoodi and Zou, 1998; Woller and Philips, 1998; Thießen; 2003; Iimi, 2005)[1] – the degree of fiscal decentralization varies considerably across the different countries in the sample. The most fiscally decentralized countries are Switzerland, Germany and Canada, while at the opposite end of the scale, we find Portugal, Luxembourg and the United Kingdom. The relative gap in the degree of fiscal decentralization between Switzerland, the most decentralised country in the OECD, and Portugal, the most centralised in the sample, is of an order of 4.6 times in terms of expenditure and 3.9 times in terms of revenue (Table 2). Moreover, the level of fiscal

[1] All the measures of fiscal decentralization used in the paper are based on time series data gathered by the International Monetary Fund in its Government and Finance Statistics database. It should be noted that none of these indicators perfectly reflects all the dimensions and the complexity of the processes of fiscal decentralization. Specifically, both expenditure and revenue indicators have been criticized for failing to identify the degree of expenditure autonomy of subnational governments, for failing to differentiate between tax and non-tax revenue sources, and for not determining what proportion of intergovernmental transfers are discretionary or conditional (Ebel and Yilmaz, 2002; Rodden, 2004; Stegarescu, 2005). Nevertheless, lack of detailed information on the exact nature of the relations between the different government levels in each country leaves us with no reliable alternative for large cross-country comparisons (Thießen, 2003; Rodríguez-Pose and Gill, 2004).

decentralization from central to subnational governments did not remain stable over the period of analysis. Although there is no uniform pattern in this context, most of the sample countries experienced an increase in their degree of fiscal decentralization between 1990 and 2005, which is in line with the devolutionary trend observed worldwide since the late 1970s (Dillinger, 1994; Woller and Phillips, 1998; World Bank, 2000; Rodríguez-Pose and Gill, 2005). Notable examples of this trend are Spain and Mexico. In these two countries the decentralization processes were particularly intense, with increases in subnational expenditure of more than 20 percent in both cases and of almost 11 percent in Spain and 36 percent in Mexico in terms of subnational revenue (Table 2), continuing the devolutionary tendency already observed during the 1980s (Rodríguez-Pose and Gill, 2004). However, the trend towards greater fiscal decentralization has not been universal. Six of the 21 countries included in the sample witnessed a relative reduction in subnational expenditure – with a particularly strong incidence in the case of Norway – while seven countries experienced a contraction in the relative weight of subnational revenue (Table 2). The process of marginal recentralization was dominant in Scandinavian countries, and in particular in Norway and Finland.

INSERT TABLE 2 AROUND HERE

Has the tendency towards greater fiscal decentralization been associated with economic growth across the OECD? Figures 1 and 2 plot the average growth rate of real GDP per capita over the study period on the average values of the two measures of fiscal decentralization considered and give an initial assessment of the main research question

driving the paper. The simple linear association between both phenomena seems to show the existence of a negative relationship between the degree of fiscal decentralization and the economic growth in OECD countries between 1990 and 2005. The corresponding correlation coefficients, with values of 0.436 (p-value = 0.048) and 0.472 (p-value = 0.031), for expenditure and revenue respectively, confirm this impression. Neither of the plots is affected by significant outliers which may be behind this pattern.

INSERT FIGURE 1 AROUND HERE

INSERT FIGURE 2 AROUND HERE

The information provided by Figures 1 and 2 should, in any case, be interpreted with caution, as economic growth does not depend exclusively on the degree of fiscal decentralization of a country (Davoodi and Zou, 1998; Akai and Sakata, 2002; Iimi, 2005; Thornton, 2007) and omitted variables may ultimately lie behind the observed negative relationship. In addition, the transfer of power and resources from central to subnational governments is a multidimensional process (Ebel and Yilmaz, 2002; Stegarescu, 2005) and the potential influence of the degree of fiscal decentralization on economic performance may be affected by country differences in political and administrative decentralization.

In view of this, and in order to really test whether fiscal decentralization matters for economic growth, we estimate of the following econometric model:

$$g^{c}_{(t+5)-t} = \alpha + \beta FD^{c}_{t} + \delta PD^{c} + \gamma AD^{c} + \boldsymbol{\theta}\mathbf{X}^{c}_{t} + \varepsilon^{c}_{t} \qquad (1)$$

where g is the average growth rate of real GDP per capita in country c; *FD*, *PD* and *AD* are respectively the measures of fiscal, political and administrative decentralization; **X** is a vector of variables that control for other factors that are assumed to influence growth; and finally ε is the corresponding disturbance term. Our main interest lies in the coefficient of the variable capturing the effect of the degree of fiscal decentralization (FD) – both on the expenditure and the revenue side – of the sample countries. As this variable is not expected to affect year-to-year fluctuations in growth, we work with growth rates averaged over five-year periods, as is usual in the literature. All the estimations of model (1) carried out in this section are based on heteroskedasticity and autocorrelation consistent standard errors (Newey and West, 1987, 1994).

Fiscal decentralization is, however, not the only type of decentralization that may have some bearing on economic performance. Processes of decentralization are not limited to the transfer of resources to subnational tiers of government (fiscal decentralization), but also include varying degrees of transfers of powers (political decentralization) and the granting of autonomy to subcentral entities relative to central government (administrative decentralization). No two processes of decentralization are equal and there is often a mismatch between the levels of fiscal, political and administrative decentralization. Differences in legitimacy between subnational actors, on the one hand, and the central or federal state, on the other, are often at the root of huge cross-country variations in transfers of political power and economic resources to subnational

governments (Donohue, 1997). Top-down processes of decentralization are, in particular, characterised by a mismatch between a significant transfer of powers and an often limited transfer of resources to subnational tiers of government (Rodríguez-Pose and Gill, 2003). OECD countries are no exception and the majority of the countries included in the sample register significant differences between their degree of fiscal, political and administrative decentralization (Schneider, 2003).

As in the case of fiscal decentralization, measurements of political and administrative decentralization are not without controversy. Virtually every individual or group of researchers who have looked into this question have come out with a different index for these two types of decentralization. Two well-known sources of indicators of political decentralization are Schneider (2003) and Hooghe et al. (2008). Schneider's (2003) indices have the advantage of a greater territorial breadth of coverage, including all 21 countries in our sample, and make an explicit distinction between political and administrative decentralization. The main drawback is that Schneider's (2003) index is only available for 1996, which limits the potential to apply certain econometric models. Hooghe et al. (2008) indices are richer and cover a relatively large number of political, fiscal and institutional aspects of decentralization – including, among others, aspects such as institutional depts., policy scope, fiscal autonomy, representation or executive control – for 42 countries during the period between 1950 and 2006. They also allow for a limited variation over time. Measures of administrative decentralization are, however, less explicitly covered than in Schneider's (2003) index and one of the countries in our sample (Mexico) is not included. None of the two sets of indicators is exempt from criticism and there is significant variation in the results. Consequently, the use of one or the other set of indicators implies considerable risks and may bias the results. We are

therefore resorting to both Schneider's (2003) and Hooghe et al.'s[2] (2008) indices as our proxies for political decentralization.

The **X** vector includes different variables identified in the literature as potentially important determinants of economic growth (Sala-i-Martin *et al.*, 2004). In addition to the initial GDP per capita of every country, we consider the level of physical and human capital, measured respectively as the net capital stock per unit of GDP and the average years of schooling of the total population aged 15 and over. We also include the average population growth rate and the degree of trade openness, calculated following standard practice as the ratio between total trade (exports and imports) and GDP. As the observed link between fiscal decentralization and economic growth may be a spurious correlation resulting from ignoring existing differences in the size of the public sector in the various countries (Ram, 1986; Mo, 2007), we introduce the public sector size as our final control variable. Public sector size is measured as the share of total public expenditure in national GDP[3].

With the only exception of the population growth rate and the time-invariant measures of political – Schneider's (2003) index – and administrative decentralization, all the explanatory variables were measured at the beginning of the corresponding five-year

[2] In the case of Hooghe et al.'s (2008) indices, we resort to their *policy scope* indicator as the measure of political decentralization. The policy scope indicator "taps regional authority over policy making" (Hooghe et al., 2008: 125). In this index these authors estimate "the range of policies over which governments make authoritative decisions" in areas related to economic, cultura-educational and welfare policies, as well as over aspects of constitutive or coercive authority and over membership of the community (Hoogher et al., 2008: 125-126).

[3] The data for these variables are drawn from different sources, which include the World Development Indicators (World Bank), AMECO (European Commission), Barro and Lee (2000), and the International Monetary Fund's Government and Finance Statistics.

period in order to minimize any potential endogeneity problem. Table 3 provides different descriptive statistics for the different variables employed in our analysis.

INSERT TABLE 3 AROUND HERE

4. The relationship between fiscal decentralization and growth in the OECD.

Table 4 presents the results obtained when different versions of model (1) are estimated by OLS using the subnational share in total government expenditure as the measure of fiscal decentralization. As can be observed, the inclusion of this indicator in our reduced-form growth model yields interesting results. First and foremost, the coefficient of the measure of fiscal decentralization is in all cases negative and statistically significant. This indicates that the subnational share in total government expenditure is negatively associated with economic growth in the sample countries, which is consistent with the preliminary evidence provided by Figure 1. The different specifications estimated in Table 4 show that this finding is robust to the inclusion of additional explanatory variables in the analysis (Regressions 4.2 to 4.7) and to differences in the measurement of political decentralization (Regressions 4.2, 4.5 and 4.7). Accordingly, decentralization of public expenditure has a negative and robust impact on national economic performance across the OECD between 1990 and 2005.

INSERT TABLE 4 AROUND HERE

Considering the possibility of a non-linear inverted U-shaped relationship between fiscal decentralization and economic growth (Thießen, 2003), we incorporated the square of the measure of fiscal decentralization employed as an additional regressor. However, as the results in regressions 4.4 and 4.6 of Table 4 indicate, the corresponding coefficient was not statistically significant.

Administrative decentralization, as measured by Schneider (2003), also matters for growth. The association between both variables is negative and significant (Regression 4.2). Nevertheless, some caution is required when interpreting this result, since in the full model the coefficient of the indicator of the level of administrative decentralization is statistically significant only at the 10% level (Regression 4.6) and the variable is non-significant when introducing Hooghe et al.'s (2008) index of political decentralization (Regression 4.7). The impact of political decentralization on national economic performance is affected by the choice of variable. When using Schneider's (2003) political decentralization index, the coefficient is not statistically significant in any case, which appears to suggest that the degree to which the central government allows subcentral entities to carry out the political functions of governance does not affect economic growth (Regressions 4.2, 4.5 and 4.6). If we resort to Hooghe et al.'s (2008) political decentralization indicator (Regression 4.7), the coefficient in contrast points to – as in the case of fiscal and administrative decentralization – a negative and statistically significant relationship with economic growth, reinforcing the view that decentralization seems to have a detrimental effect on economic performance.

The various variables included in vector **X** tend to display the expected coefficients. The coefficient of initial GDP per capita is negative and statistically significant in all the specifications considered, indicating the existence of a process of conditional convergence across the sample countries (Barro, 1991; Barro and Sala-i-Martin, 1992). The analysis carried out also reveals that the stock of physical and human capital, and the degree of trade openness are positively correlated with the dependent variable, while the population growth rate is not statistically significant, with the exception of regression 4.7 (Table 4). Finally, the negative relationship observed between the subnational share in total government expenditure and economic performance is not affected by the inclusion of public sector size in the analysis. This variable is not statistically significant when the indicators of the degree of political and administrative decentralization are taken into account in the estimation of the model (Table 4).

In order to confirm whether the negative link between fiscal decentralization and economic growth is robust, the analysis presented in Table 4 is repeated using the subnational share in total government revenue as the proxy for the degree of fiscal decentralization across the OECD. The results are shown in Table 5. In all cases higher levels of decentralized revenues are associated with lower growth rates in the ensuing years, which is in line with the empirical evidence provided by Table 4. Likewise, the coefficients of the remaining explanatory variables are basically a carbon copy of those presented in Table 4. Administrative decentralization is negatively connected with economic performance and the relationship between political decentralization and growth is affected by the choice of indicator: Schneider's (2003) political decentralization index is completely dissociated from economic performance, while Hooghe et al.'s (2008) indicator displays, once again, a negative and significant

coefficient (Table 5). The control variables included in the analysis have similar coefficients to those discussed in Table 4, the only exception being the coefficient of the indicator of the public sector size, which is now positive and statistically significant in the full model, but not in regression 5.7 (Table 5).

INSERT TABLE 5 AROUND HERE

This negative association between fiscal decentralization and economic performance may be the consequence, as stated in the theoretical section, of differences in policy preferences by subnational governments, which may undermine overall growth potential. In order to test whether this is the case, we investigate, following Rodríguez-Pose et al. (2009), the role played in this context by current and capital expenditures. We estimate model (1) again, replacing the measures of fiscal decentralization employed so far with the subnational share in total government current expenditure and the subnational share in total government capital expenditure. Preferences for capital expenditure to the detriment of current expenditure are expected to have a higher impact on subsequent growth. Conversely, preferences for current expenditure may be detrimental for growth (Devrajan et al., 1996; Kneller et al., 1999). As shown in Table 6, the results of this analysis allow us to partially qualify our previous findings. With respect to the degree of decentralization of current expenditure, our estimates reveal the presence of an inverted U-shaped link between this variable and economic growth. Accordingly, the relationship under study is positive when the level of decentralization of current expenditure is increasing from relatively low levels, but beyond a certain threshold it turns negative. This raises the possibility of using the decentralization of

current expenditure as a means to increase economic growth in relatively centralized countries, but also highlights the economic risks associated with increases in current expenditure in highly decentralized countries. By contrast, the results for the degree of decentralization of capital expenditure do not provide any evidence of a non-linear link with growth. The coefficient of this variable is in all cases negative and statistically significant, as occurs with the measures of fiscal decentralization employed in Tables 4 and 5.

The division of subnational expenditure between current and capital expenditure affects the coefficients of political and administrative decentralization (Table 6). Using Schneider's (2003) index, the degree of political decentralization now seems to exert a positive influence on economic growth, while the degree of administrative decentralization is not statistically significant in most cases. But this association of political decentralization with economic growth is sensitive to the choice of index used. When resorting to Hooghe at al.'s (2008) index, the impact of political decentralization is marginally negative and significant, when controlling for the fiscal decentralization of current expenditures, and negative but not significant, when controlling for capital expenditures (Table A1 in Appendix). As in the case of the results reported in Tables 4 and 5, the effect of these variables on economic growth is contingent on the measure of decentralization used.

INSERT TABLE 6 AROUND HERE

By threading at a finer level and considering the impact of the subnational share in total government expenditure on economic affairs, health, education and social protection, we aim to complete the picture and further analyse the robustness of our previous findings. These four decentralization indicators are included as explanatory variables in model (1). The results of this analysis are presented in Tables 7 and 8. The estimates carried out reveal that the coefficients of these variables are negative and statistically significant in all cases, regardless of the controls used in the analysis. This confirms the existence of a negative relationship between the level of the decentralization of these types of expenditure and the dependent variable. That is, the level of decentralization of expenditure on economic affairs, health, education and social protection is negatively correlated with economic growth. Likewise, the empirical evidence supplied by Tables 7 and 8 does not suggest the presence of a non-linear link between these measures of fiscal decentralization and economic performance in the sample countries.

Finally, it is worth noting that different preferences for expenditure among subnational governments affect the link between political and fiscal decentralization and economic growth and that this relationship is, once again, contingent on the choice of indicator. When resorting to Schneider's (2003) index, political decentralization is positively and significantly associated with growth in the cases of territories with a preference for expenditure on economics affairs and education, but not in the case of health and social protection (Tables 7 and 8). Using Hooghe et al.'s (2008) index, political decentralization is negatively connected to economic performance in the cases of preferences for health, education and social protection expenditure, but not in cases of preferences for economic affairs expenditure (Tables A2 and A3 in Appendix).

INSERT TABLE 7 AROUND HERE

INSERT TABLE 8 AROUND HERE

5. Concluding remarks

The aim of the paper has been to tackle the question of whether fiscal decentralization is beneficial for economic growth or not. The often positive way in which fiscal decentralization has been portrayed by proponents of devolution – almost as a solution to the economic ills of well-off and lagging-behind regions alike – has for long contrasted with the contradicting results of the scholarly analyses which have delved into the question from different perspectives and in different parts of the world. We have hence sought to revisit this matter from a somewhat distinct angle to that of previous studies. First, we have concentrated our analysis on a group of relatively wealthy nations belonging to the OECD for the period 1990 to 2005. While this sort of approach is not new (Thießen, 2003; Thornton, 2007; Baskaran and Feld, 2009), it has the advantage of reducing the noise that the comparison of countries with widely diverse starting points and levels of wealth would introduce. Second and perhaps most importantly, we have approached fiscal decentralization not as a unique, self-standing phenomenon, but one which is inserted in a broader process of decentralization. Decentralization is by no means dominated by revenue and expenditure issues and it is often the case that political and administrative decisions play an equal, if not more important role, in decisions about whether to decentralize further or not. As a consequence, we have introduced a number of measures of political and administrative

decentralization into the analysis, in order to unveil the interaction among these three types of decentralization and between them and economic performance. Third, as a means to check the robustness of the results, the paper considers both the expenditure and the revenue side of decentralization, as well as, within the expenditure side, how different the various expenditure preferences of subnational governments – ranging from current to capital expenditure and more specifically focusing on preference by subnational governments for economic affairs, health, education or welfare expenditure – affect the relationship between fiscal decentralization and economic performance. Finally, as an additional robustness test, we control for a series of structural factors which have traditionally been regarded as influencing economic performance.

The results of the analysis highlight that, given the recent levels of fiscal decentralization of the countries of the OECD, fiscal decentralization seems to be causing more harm than good from a growth perspective. The connection between fiscal decentralization and economic performance is negative, significant and robust to the inclusion of measurements of political and administrative decentralization and of a number of control variables. It is also not affected by whether we are looking at the expenditure or the revenue side of decentralization or by preferences for specific types of expenditure by subnational governments. The association also seems to be linear, with little indication of an inverted U-shaped relationship: the negative impact of decentralization on economic growth rises as countries in the OECD intensify the fiscal decentralization process. And this negative relationship happens regardless of whether decentralized governments display preferences for capital or current expenditure or feel more inclined to promote health, education, welfare expenditure or choose expenditure in economic affairs. The only exception to this trend happens in cases of preferences for

current expenditure in relatively low levels of fiscal decentralization. In these cases there is some margin of manoeuvre for governments, as moderate increases in fiscal decentralization may have a positive impact on economic growth.

The negative association between fiscal decentralization and growth is more robust than that between other types of decentralization and growth. Administrative decentralization also tends to display a negative connection to economic performance, although this connection is weaker and less robust than that of fiscal decentralization. Political decentralization exhibits a relationship with economic growth that is highly sensitive to the choice of measurement of political decentralization. With some types of indicators political decentralization has a positive impact on economic growth, while, with others, the connection is negative. But these differences linked to the choice of indicators of political decentralization do not in any case affect the robustness of the negative association between fiscal decentralization and growth.

Overall, the analysis shows that, at least in the case of OECD countries, the potential economic benefits of fiscal decentralization in terms of economic performance are more than counterweighed by the potential economic pitfalls of transferring ever greater resources to subnational tiers of government. Political and administrative measures of decentralization seem to be unable to offset this trend. Hence, in the case of the OECD, while fiscal decentralization may still be an adequate way to preserve and promote regional identity and culture, the claim that it will also bring about some sort of economic dividend can be considered as questionable.

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Tables and Figures

Table 1: The link between decentralisation and economic performance.

Author (year)	Sample	Period	Findings
Akai and Sakata (2002)	USA	1988-1996	Positive and significant
Baskaran and Feld (2009)	23 OECD countries	1975-2001	Negative, but not robust
Davoodi and Zou (1998)	46 countries	1970-1989	Developing: negative, but not significant OECD: no relationship
Iimi (2005)	51 countries	1997-2001	Positive and significant
Lin and Liu (2000)	China	1970-1993	Positive and significant
Rodríguez-Pose and Bwire (2004)	Germany, India, Italy, Mexico, Spain and US	Different periods until 2001	Mostly insignificant, with the exceptions of Mexico, the US, and, partially, India, where it becomes negative
Stansel (2005)	US metropolitan areas	1960-1990	Positive and significant
Thießen (2003)	26 countries	1973-1998	Hump-shaped relationship
Thornton (2007)	19 OECD countries	1980-2000	Not statistically significant
Woller and Phillips (1998)	23 LDC's	1974-1991	No relationship
Zhang and Zou (1998)	China	1980-1992	Negative and significant
Zhang and Zou (2001)	China	1987-1993	Negative and significant

Source: Adapted and updated from Rodríguez-Pose et al. (2009).

Table 2: Fiscal decentralization trends in the OECD countries, 1990-2005.

Decentralization	Total expenditure			Total revenue		
Country	Mean	Std. Dev.	Δ (%)	Mean	Std. Dev.	Δ (%)
Australia	0.383	0.012	-0.88	0.400	0.016	0.10
Austria	0.416	0.013	-1.15	0.463	0.023	-4.35
Belgium	0.437	0.022	4.56	0.455	0.013	3.89
Canada	0.603	0.019	6.34	0.626	0.009	0.91
Denmark	0.509	0.014	0.08	0.501	0.009	0.48
Finland	0.480	0.026	-6.06	0.532	0.071	-7.52
France	0.301	0.013	0.13	0.334	0.015	5.36
Germany	0.608	0.075	13.67	0.680	0.024	5.99
Iceland	0.265	0.044	11.18	0.291	0.037	13.18
Ireland	0.274	0.025	7.26	0.293	0.036	-7.88
Italy	0.328	0.055	14.92	0.394	0.030	4.03
Luxembourg	0.204	0.012	-5.11	0.216	0.008	-0.88
Mexico	0.332	0.077	28.29	0.380	0.102	35.98
Netherlands	0.374	0.021	5.35	0.427	0.035	-5.94
Norway	0.349	0.062	-21.73	0.250	0.020	-5.34
Portugal	0.149	0.015	2.24	0.179	0.028	10.11
Spain	0.452	0.072	21.03	0.529	0.036	10.98
Sweden	0.422	0.031	2.05	0.461	0.034	-4.71
Switzerland	0.687	0.035	10.51	0.711	0.021	4.73
United Kingdom	0.232	0.018	-4.37	0.244	0.017	1.21
United States	0.563	0.031	8.55	0.623	0.019	1.95

Figure 1: Decentralization of total expenditure and economic growth in the OECD.

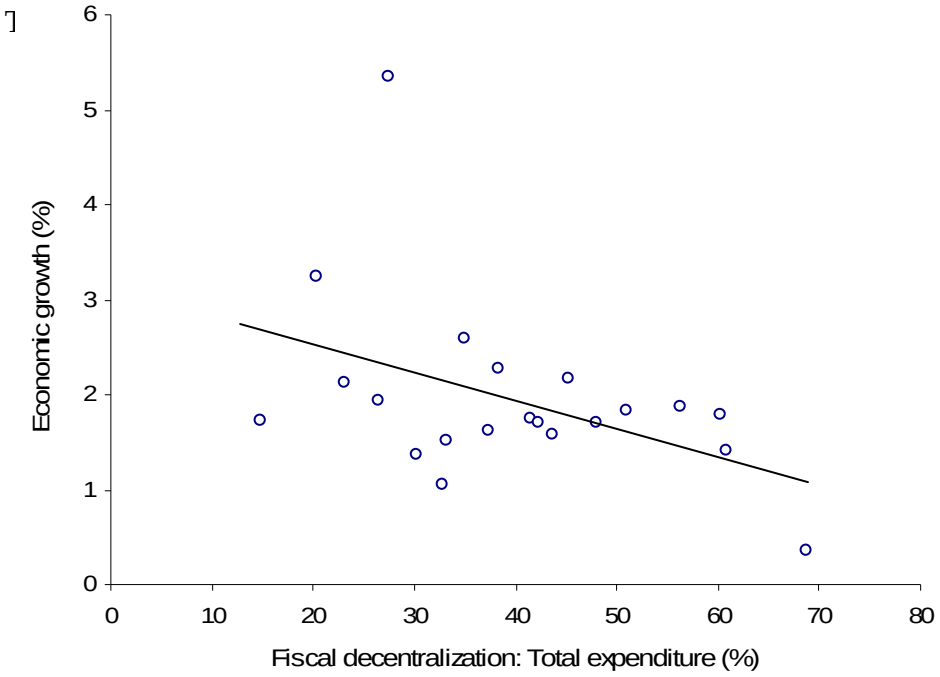

Figure 2: Decentralization of total revenue and economic growth in the OECD.

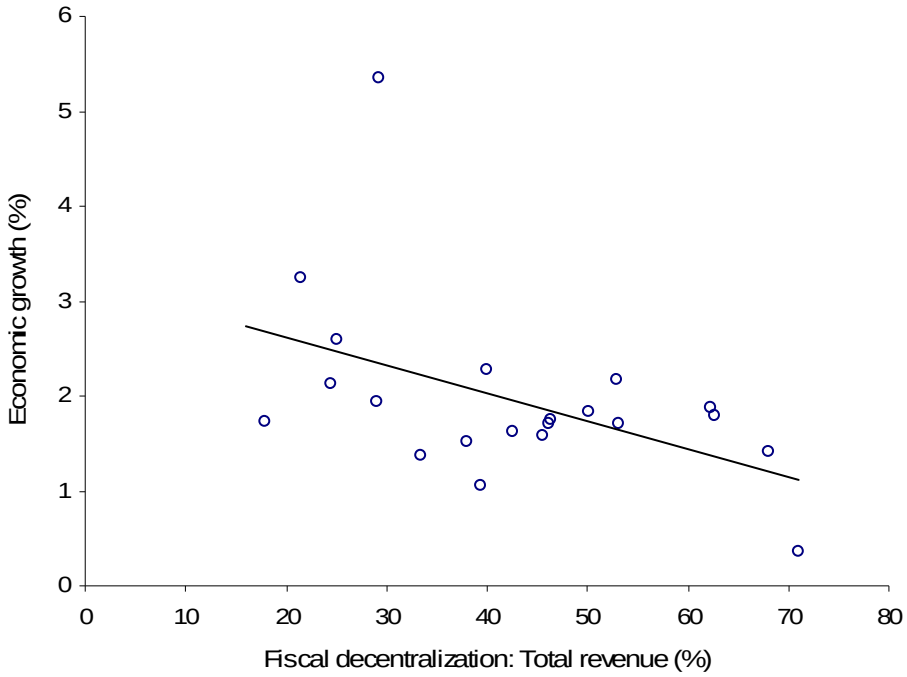

Table 3: Descriptive statistics.

Variable	Mean	Std. Dev.	Minimum	Maximum	Observations	Comments
Economic growth	0.022	0.014	-0.013	0.087	231	Time varying (annual)
Fiscal decen.: Total expenditure	0.387	0.139	0.123	0.672	231	Time varying (annual)
Fiscal decen.: Total revenue	0.423	0.155	0.124	0.723	231	Time varying (annual)
Fiscal decen.: Current expenditure	0.597	0.182	0.140	0.857	209	Time varying (annual)
Fiscal decen.: Capital expenditure	0.611	0.183	0.018	0.869	176	Time varying (annual)
Fiscal decen.: Economic affairs expenditure	0.413	0.190	0.053	0.755	198	Time varying (annual)
Fiscal decen.: Health expenditure	0.541	0.319	0.015	0.990	198	Time varying (annual)
Fiscal decen.: Education expenditure	0.559	0.275	0.086	0.978	198	Time varying (annual)
Fiscal decen.: Social protection expenditure	0.363	0.208	0.031	0.733	198	Time varying (annual)
Political decentralization (Schneider)	0.710	0.205	0.290	0.930	21	Time invariant
Political decentralization (Hooghe et al)	2.507	1.614	0.000	5.000	209	Time varying (annual)
Administrative decentralization	0.512	0.188	0.120	0.830	21	Time invariant
GDP per capita	21792.6	7761.8	4891.6	46277.6	231	Time varying (annual)
Physical capital	2.743	0.422	1.744	3.597	231	Time varying (annual)
Human capital	9.001	1.889	4.330	12.250	220	Time varying (annual)
Population growth	0.006	0.004	0.000	0.018	231	Time varying (annual)
Trade openness	0.751	0.434	0.205	2.790	231	Time varying (annual)
Public sector size	0.426	0.134	0.144	0.849	231	Time varying (annual)

Table 4: The impact of the degree of decentralization of total expenditure on economic growth.

Explanatory variables	(4.1)	(4.2)	(4.3)	(4.4)	(4.5)	(4.6)	(4.7)
Constant	0.034***	0.044***	0.058	0.067*	0.069*	0.080**	0.219***
	(0.004)	(0.006)	(0.038)	(0.039)	(0.038)	(0.040)	(0.043)
Fiscal decentralization: Total expenditure	-0.029***	-0.019**	-0.052***	-0.090*	-0.051***	-0.092*	-0.031***
	(0.009)	(0.009)	(0.011)	(0.049)	(0.012)	(0.048)	(0.011)
(Fiscal decentalization: Total expenditure)^2				0.045		0.049	
				(0.052)		(0.051)	
Political decentralization (Schneider)		-0.004			0.006	0.006	
		(0.006)			(0.007)	(0.007)	
Political decentralization (Hooghe et al)							-0.002**
							(0.001)
Administrative decentralization		-0.022**			-0.011*	-0.011*	-0.010
		(0.009)			(0.006)	(0.006)	(0.006)
GDP per capita (log)			-0.009**	-0.010**	-0.010**	-0.011**	-0.026***
			(0.004)	(0.004)	(0.004)	(0.004)	(0.005)
Physical capital			0.009**	0.009**	0.008**	0.009**	0.008**
			(0.004)	(0.004)	(0.004)	(0.004)	(0.003)
Human capital			0.004***	0.004***	0.004***	0.004***	0.005***
			(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Population growth			0.489	0.501	0.317	0.332	0.701**
			(0.380)	(0.388)	(0.336)	(0.344)	(0.309)
Trade openness			0.012***	0.012***	0.011**	0.011***	0.009***
			(0.005)	(0.005)	(0.004)	(0.004)	(0.003)
Public sector size			0.016**	0.019**	0.012	0.015*	0.003
			(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
F-test	10.50***	5.65***	6.56***	5.57***	5.88***	5.08***	8.62***
Adjusted R^2	0.078	0.145	0.315	0.316	0.336	0.338	0.457
Countries	21	21	20	20	20	20	19
Observations	231	231	220	220	220	220	209

Notes: The dependent variable is in all cases the average growth of real per capita GDP over five-year periods. Heteroskedasticity and autocorrelation consistent standard errors in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 5: The impact of the degree of decentralization of total revenue on economic growth.

Explanatory variables	(5.1)	(5.2)	(5.3)	(5.4)	(5.5)	(5.6)	(5.7.)
Constant	0.033***	0.045***	0.061	0.070*	0.075*	0.087**	0.236***
	(0.004)	(0.006)	(0.041)	(0.042)	(0.040)	(0.042)	(0.043)
Fiscal decentralization: Total revenue	-0.025***	-0.017**	-0.031***	-0.064	-0.029***	-0.072*	-0.019**
	(0.008)	(0.008)	(0.009)	(0.043)	(0.009)	(0.039)	(0.008)
(Fiscal decentralization: Total revenue)^2				0.037		0.050	
				(0.048)		(0.042)	
Political decentralization (Schneider)		-0.005			0.002	0.002	
		(0.007)			(0.007)	(0.007)	
Political decentralization (Hooghe et al)							-0.003***
							(0.001)
Administrative decentralization		-0.023**			-0.015**	-0.016**	-0.011*
		(0.009)			(0.006)	(0.006)	(0.006)
GDP per capita (log)			-0.009**	-0.009**	-0.010**	-0.010**	-0.027***
			(0.004)	(0.004)	(0.005)	(0.005)	(0.005)
Physical capital			0.009**	0.009***	0.008**	0.007**	0.008**
			(0.004)	(0.003)	(0.004)	(0.004)	(0.003)
Human capital			0.002**	0.002*	0.003***	0.003***	0.005***
			(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Population growth			0.576	0.602*	0.439	0.474	0.721**
			(0.401)	(0.362)	(0.348)	(0.358)	(0.314)
Trade openness			0.011**	0.012***	0.009**	0.009**	0.008**
			(0.005)	(0.004)	(0.004)	(0.004)	(0.003)
Public sector size			0.020**	0.022*	0.015**	0.018**	0.002
			(0.008)	(0.012)	(0.007)	(0.008)	(0.008)
Adjusted R^2	0.070	0.146	0.258	0.258	0.285	0.288	0.444
F test	9.67***	5.75***	5.31***	6.22***	4.98***	4.21***	7.82***
Countries	21	21	20	20	20	20	19
Observations	231	231	220	220	220	220	209

Notes: See Table 4.

Table 6: The impact of the degree of decentralization of current and capital expenditures on economic growth.

Explanatory variables	(6.1)	(6.2)	(6.3)	(6.4)	(6.5)	(6.6)	(6.7)	(6.8)
Constant	0.243***	0.269***	0.300***	0.352***	0.253***	0.251***	0.350***	0.350***
	(0.045)	(0.042)	(0.047)	(0.049)	(0.053)	(0.053)	(0.064)	(0.064)
Fiscal decent.: Current expenditure	-0.045***	0.072**	-0.052***	0.088**				
	(0.009)	(0.030)	(0.009)	(0.035)				
(Fiscal decent.: Current expenditure) ^{2}		-0.109***		-0.132***				
		(0.028)		(0.033)				
Fiscal decent.: Capital expenditure					-0.031***	-0.027	-0.036***	-0.004
					(0.008)	(0.030)	(0.007)	(0.030)
(Fiscal decent.: Capital expenditure) ^{2}						-0.004		-0.030
						(0.026)		(0.027)
Political decentralization (Schneider)			0.021***	0.023***			0.024***	0.027***
			(0.007)	(0.007)			(0.008)	(0.008)
Administrative decentralization			-0.002	0.014**			0.005	0.009
			(0.005)	(0.006)			(0.006)	(0.006)
GDP per capita (log)	-0.031***	-0.035***	-0.039***	-0.048***	-0.031***	-0.031***	-0.044***	-0.045***
	(0.005)	(0.005)	(0.006)	(0.006)	(0.006)	(0.006)	(0.008)	(0.008)
Physical capital	0.010***	0.008**	0.011***	0.009***	0.013***	0.013***	0.013***	0.011***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.004)	(0.004)	(0.003)	(0.004)
Human capital	0.006***	0.006***	0.008***	0.008***	0.004***	0.004***	0.006***	0.006***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Population growth	0.889***	0.622**	0.582*	0.390	1.215***	1.219***	1.006***	1.052***
	(0.344)	(0.298)	(0.305)	(0.273)	(0.380)	(0.380)	(0.378)	(0.389)
Trade openness	0.017***	0.018***	0.020***	0.025***	0.016***	0.016***	0.021***	0.022***
	(0.005)	(0.004)	(0.004)	(0.005)	(0.005)	(0.005)	(0.005)	(0.004)
Public sector size	0.021***	0.008	0.016**	0.004	0.021**	0.021**	0.016*	0.012
	(0.007)	(0.008)	(0.007)	(0.008)	(0.009)	(0.010)	(0.009)	(0.010)
Adjusted R^2	0.433	0.496	0.496	0.558	0.420	0.417	0.494	0.497
F test	9.47***	9.36***	9.14***	8.91***	6.24***	5.40***	6.35***	5.51***
Countries	19	19	19	19	16	16	16	16
Observations	209	209	209	209	176	176	176	176

Notes: See Table 4.

Table 7: The impact of the degree of decentralization of economic affairs and health expenditures on economic growth.

Explanatory variables	(7.1)	(7.2)	(7.3)	(7.4)	(7.5)	(7.6)	(7.7)	(7.8)
Constant	0.323***	0.333***	0.372***	0.378***	0.159***	0.156***	0.182***	0.199***
	(0.050)	(0.049)	(0.052)	(0.052)	(0.050)	(0.050)	(0.056)	(0.060)
Fiscal decent.: Economic affairs expenditure	-0.038***	0.019	-0.043***	0.007				
	(0.007)	(0.035)	(0.007)	(0.032)				
(Fiscal decent.: Economic affairs expenditure) ^{2}		-0.067*		-0.059*				
		(0.038)		(0.035)				
Fiscal decent.: Health expenditure					-0.012**	0.006	-0.011**	0.016
					(0.005)	(0.013)	(0.005)	(0.016)
(Fiscal decent.: Health expenditure) ^{2}						-0.017		-0.024*
						(0.011)		(0.013)
Political decentralization (Schneider)			0.016**	0.016**			0.008	0.012
			(0.006)	(0.006)			(0.008)	(0.008)
Administrative decentralization			-0.010*	-0.010*			-0.004	0.004
			(0.006)	(0.006)			(0.007)	(0.008)
GDP per capita (log)	-0.036***	-0.039***	-0.042***	-0.044***	-0.021***	-0.021***	-0.024***	-0.026***
	(0.006)	(0.005)	(0.006)	(0.006)	(0.006)	(0.005)	(0.007)	(0.007)
Physical capital	0.007**	0.004	0.005*	0.003	0.010**	0.009**	0.009**	0.007**
	(0.003)	(0.003)	(0.003)	(0.003)	(0.004)	(0.004)	(0.004)	(0.003)
Human capital	0.004***	0.005***	0.006***	0.006***	0.002**	0.002**	0.003**	0.002**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Population growth	1.420***	1.427***	1.058***	1.070***	1.443***	1.388***	1.244***	1.241***
	(0.351)	(0.351)	(0.333)	(0.334)	(0.465)	(0.453)	(0.437)	(0.432)
Trade openness	0.017***	0.017***	0.017***	0.017***	0.013***	0.012***	0.013**	0.015***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.005)	(0.005)	(0.005)	(0.005)
Public sector size	-0.006	0.005	-0.014	-0.004	0.035***	0.035***	0.032***	0.032***
	(0.009)	(0.012)	(0.009)	(0.011)	(0.010)	(0.009)	(0.010)	(0.010)
Adjusted R^2	0.486	0.496	0.540	0.547	0.346	0.353	0.352	0.362
F test	8.96***	8.69***	8.89***	8.79***	5.79***	5.36***	4.93***	4.74***
Countries	18	18	18	18	18	18	18	18
Observations	198	198	198	198	198	198	198	198

Notes: See Table 4.

Table 8: The impact of the degree of decentralization of education and social protection expenditures on economic growth.

Explanatory variables	(8.1)	(8.2)	(8.3)	(8.4)	(8.5)	(8.6)	(8.7)	(8.8)
Constant	0.254***	0.244***	0.354***	0.370***	0.213***	0.181***	0.247***	0.220***
	(0.045)	(0.044)	(0.053)	(0.052)	(0.050)	(0.050)	(0.055)	(0.056)
Fiscal decent.: Education expenditure	-0.029***	-0.053*	-0.040***	-0.020				
	(0.005)	(0.030)	(0.007)	(0.025)				
(Fiscal decent.: Education expenditure)^2		0.020		-0.017				
		(0.023)		(0.020)				
Fiscal decent.: Social protection expenditure					-0.008	-0.051*	-0.010*	-0.055*
					(0.005)	(0.028)	(0.006)	(0.030)
(Fiscal decent.: Social protection expenditure)^2						0.057		0.059
						(0.037)		(0.038)
Political decentralization (Schneider)			0.028***	0.030***			0.013	0.014*
			(0.008)	(0.008)			(0.008)	(0.008)
Administrative decentralization			0.012*	0.013*			-0.002	0.004
			(0.007)	(0.007)			(0.007)	(0.007)
GDP per capita (log)	-0.030***	-0.029***	-0.045***	-0.047***	-0.025***	-0.022***	-0.029***	-0.027***
	(0.005)	(0.005)	(0.007)	(0.007)	(0.006)	(0.006)	(0.007)	(0.007)
Physical capital	0.004	0.004	0.004	0.003	0.004	0.005	0.003	0.005
	(0.003)	(0.003)	(0.003)	(0.003)	(0.004)	(0.004)	(0.003)	(0.004)
Human capital	0.007***	0.007***	0.010***	0.010***	0.002**	0.003**	0.003***	0.003***
	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Population growth	0.637**	0.640*	0.190	0.154	1.117**	1.127***	0.869**	0.945**
	(0.321)	(0.329)	(0.326)	(0.326)	(0.435)	(0.419)	(0.414)	(0.400)
Trade openness	0.014***	0.014***	0.021***	0.022***	0.014***	0.015***	0.015***	0.018***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.005)	(0.005)	(0.005)	(0.006)
Public sector size	0.000	0.005	-0.010	-0.015	0.021**	0.019**	0.018**	0.017**
	(0.009)	(0.010)	(0.010)	(0.012)	(0.008)	(0.008)	(0.008)	(0.008)
Adjusted R^2	0.438	0.440	0.521	0.522	0.325	0.334	0.345	0.352
F test	8.74***	8.49***	9.59***	9.49***	5.21***	4.73***	4.40***	4.26***
Countries	18	18	18	18	18	18	18	18
Observations	198	198	198	198	198	198	198	198

Notes: See Table 4.

Table A1: The impact of the degree of decentralization of current and capital expenditures on economic growth (using Hooghe et al., 2008).

Explanatory variables	(A1.1)	(A1.2)	(A1.3)	(A1.4)	(A1.5)	(A1.6)	(A1.7)	(A1.8)
Constant	0.243***	0.269***	0.243***	0.278***	0.253***	0.251***	0.220***	0.223***
	(0.045)	(0.042)	(0.042)	(0.040)	(0.053)	(0.053)	(0.052)	(0.051)
Fiscal decent.: Current expenditure	-0.045***	0.072**	-0.031***	0.085**				
	(0.009)	(0.030)	(0.009)	(0.034)				
(Fiscal decent.: Current expenditure) ^{2}		-0.109***		-0.110***				
		(0.028)		(0.031)				
Fiscal decent.: Capital expenditure					-0.031***	-0.027	-0.021**	-0.044
					(0.008)	(0.030)	(0.010)	(0.032)
(Fiscal decent.: Capital expenditure) ^{2}						-0.004		0.025
						(0.026)		(0.029)
Political decentralization (Hooghe et al.)			-0.002**	-0.002**			-0.002	-0.002
			(0.001)	(0.001)			(0.001)	(0.001)
Administrative decentralization			-0.012**	0.000			-0.009	-0.012*
			(0.006)	(0.006)			(0.006)	(0.007)
GDP per capita (log)	-0.031***	-0.035***	-0.029***	-0.036***	-0.031***	-0.031***	-0.026***	-0.026***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.006)	(0.006)	(0.006)	(0.006)
Physical capital	0.010***	0.008**	0.009***	0.008***	0.013***	0.013***	0.012***	0.013***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.004)	(0.004)	(0.004)	(0.004)
Human capital	0.006***	0.006***	0.006***	0.006***	0.004***	0.004***	0.004***	0.004***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Population growth	0.889***	0.622**	0.705**	0.575**	1.215***	1.219***	1.027***	0.948***
	(0.344)	(0.298)	(0.301)	(0.275)	(0.380)	(0.380)	(0.355)	(0.343)
Trade openness	0.017***	0.018***	0.013***	0.016***	0.016***	0.016***	0.013***	0.012***
	(0.005)	(0.004)	(0.004)	(0.004)	(0.005)	(0.005)	(0.004)	(0.004)
Public sector size	0.021***	0.008	0.010	0.001	0.021**	0.021**	0.012	0.014
	(0.007)	(0.008)	(0.007)	(0.008)	(0.009)	(0.010)	(0.010)	(0.010)
Adjusted R^2	0.433	0.495	0.469	0.511	0.420	0.417	0.429	0.430
F test	9.47***	9.36***	8.36***	8.10***	6.24***	5.40***	5.16***	4.83***
Countries	19	19	19	19	16	16	16	16
Observations	209	209	209	209	176	176	176	176

Notes: See Table 4.

Table A2: The impact of the degree of decentralization of economic affairs and health expenditures on growth (using Hooghe et al., 2008).

Explanatory variables	(A2.1)	(A2.2)	(A2.3)	(A2.4)	(A2.5)	(A2.6)	(A2.7)	(A2.8)
Constant	0.323***	0.333***	0.320***	0.332***	0.159***	0.156***	0.179***	0.180***
	(0.050)	(0.049)	(0.049)	(0.049)	(0.050)	(0.050)	(0.043)	(0.043)
Fiscal decent.: Economic affairs expenditure	-0.038***	0.019	-0.042***	0.014				
	(0.007)	(0.035)	(0.010)	(0.033)				
(Fiscal decent.: Economic affairs expenditure) ^{2}		-0.067*		-0.067*				
		(0.038)		(0.039)				
Fiscal decent.: Health expenditure					-0.012**	0.006	-0.013***	-0.005
					(0.005)	(0.013)	(0.004)	(0.013)
(Fiscal decent.: Health expenditure) ^{2}						-0.017		-0.007
						(0.011)		(0.011)
Political decentralization (Hooghe et al.)			0.000	0.000			-0.004***	-0.004***
			(0.001)	(0.001)			(0.001)	(0.001)
Administrative decentralization			-0.016**	-0.015**			-0.014**	-0.012
			(0.007)	(0.007)			(0.007)	(0.008)
GDP per capita (log)	-0.036***	-0.039***	-0.035***	-0.037***	-0.021***	-0.021***	-0.022***	-0.022***
	(0.006)	(0.005)	(0.005)	(0.005)	(0.006)	(0.005)	(0.005)	(0.005)
Physical capital	0.007**	0.004	0.005*	0.003	0.010**	0.009**	0.010***	0.010***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.004)	(0.004)	(0.004)	(0.003)
Human capital	0.004***	0.005***	0.005***	0.005***	0.002**	0.002**	0.004***	0.004***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Population growth	1.420***	1.427***	1.201***	1.235***	1.443***	1.388***	0.962***	0.978***
	(0.351)	(0.351)	(0.374)	(0.378)	(0.465)	(0.453)	(0.336)	(0.334)
Trade openness	0.017***	0.017***	0.014***	0.014***	0.013***	0.012***	0.008**	0.008**
	(0.004)	(0.004)	(0.004)	(0.004)	(0.005)	(0.005)	(0.003)	(0.003)
Public sector size	-0.006	0.005	-0.011	-0.000	0.035***	0.035***	0.019**	0.019**
	(0.009)	(0.012)	(0.008)	(0.011)	(0.010)	(0.009)	(0.008)	(0.008)
Adjusted R^2	0.486	0.495	0.506	0.515	0.346	0.352	0.457	0.455
F test	8.96***	8.69***	7.87***	7.94***	5.79***	5.36***	6.68***	6.12***
Countries	18	18	18	18	18	18	18	18
Observations	198	198	198	198	198	198	198	198

Notes: See Table 4.

Table A3: The impact of the degree of decentralization of education and social protection expenditures on growth (using Hooghe et al., 2008).

Explanatory variables	(A3.1)	(A3.2)	(A3.3)	(A3.4)	(A3.5)	(A3.6)	(A3.7)	(A3.8)
Constant	0.254***	0.244***	0.252***	0.243***	0.213***	0.181***	0.234***	0.214***
	(0.045)	(0.044)	(0.042)	(0.041)	(0.050)	(0.050)	(0.043)	(0.046)
Fiscal decent.: Education expenditure	-0.029***	-0.053*	-0.019***	-0.041				
	(0.005)	(0.030)	(0.005)	(0.030)				
(Fiscal decent.: Education expenditure)^2		0.020		0.018				
		(0.023)		(0.023)				
Fiscal decent.: Social protection expenditure					-0.008	-0.051*	-0.003	-0.034
					(0.005)	(0.028)	(0.006)	(0.030)
(Fiscal decent.: Social protection expenditure)^2						0.057		0.040
						(0.037)		(0.040)
Political decentralization (Hooghe et al.)			-0.002**	-0.002**			-0.003***	-0.003***
			(0.001)	(0.001)			(0.001)	(0.001)
Administrative decentralization			-0.007	-0.007			-0.014*	-0.010
			(0.007)	(0.007)			(0.007)	(0.008)
GDP per capita (log)	-0.030***	-0.029***	-0.029***	-0.028***	-0.025***	-0.022***	-0.026***	-0.024***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.006)	(0.006)	(0.005)	(0.005)
Physical capital	0.004	0.004	0.005	0.005*	0.004	0.005	0.005	0.006*
	(0.003)	(0.003)	(0.003)	(0.003)	(0.004)	(0.004)	(0.003)	(0.004)
Human capital	0.007***	0.007***	0.006***	0.006***	0.002**	0.003**	0.004***	0.004***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Population growth	0.637**	0.640*	0.601*	0.602*	1.117**	1.127***	0.735**	0.797**
	(0.321)	(0.329)	(0.322)	(0.327)	(0.435)	(0.419)	(0.349)	(0.357)
Trade openness	0.014***	0.014***	0.011***	0.011***	0.014***	0.015***	0.009**	0.010***
	(0.004)	(0.004)	(0.004)	(0.003)	(0.005)	(0.005)	(0.004)	(0.004)
Public sector size	0.000	0.005	-0.000	0.004	0.021**	0.019**	0.007	0.006
	(0.009)	(0.010)	(0.008)	(0.010)	(0.008)	(0.008)	(0.008)	(0.008)
Adjusted R^2	0.438	0.440	0.453	0.453	0.325	0.334	0.425	0.427
F test	8.74***	8.50***	7.73***	7.78***	5.21***	4.73***	6.21***	5.38***
Countries	18	18	18	18	18	18	18	18
Observations	198	198	198	198	198	198	198	198

Notes: See Table 4.

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