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Artículo de investigación

The empirical evidence on the determinants of fiscal decentralization[1]

Abstract

This paper analyzes the main determinants of fiscal decentralization in a sample of eighty-four countries. The empirical findings show that the most consistent variable affecting fiscal decentralization is the size of a country: as land size increases, the level of fiscal decentralization increases as well. Countries with higher income equality, an educated population, more democratic, more urbanized and open to trade are also more likely to be more decentralized, though the findings demonstrate that there are regional and income variations. The most important policy implication is that governments interested in deepening the devolution of fiscal responsibilities to sub-national levels may consider acting to affect those variables that have been shown to exert a positive influence on this process.

Keywords: fiscal decentralization, federalism, regional autonomy.

JEL Classification: H10, H21, H50, H77

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La evidencia empírica sobre las determinantes de la descentralización fiscal

Resumen

Este artículo analiza las principales determinantes de descentralización fiscal en una muestra de 84 países. Los resultados empíricos demuestran que el tamaño geográfico de un país es la variable que con mayor consistencia afecta el nivel de descentralización fiscal. Países con mayor equidad en la distribución del ingreso, con niveles de educación altos, más democráticos, más urbanizados y abiertos al comercio internacional tienden a ser más descentralizados, aunque los resultados demuestran que existen variaciones en el patrón de comportamiento a nivel regional y de ingreso. La implicación de política más importante es que aquellos países interesados en descentralizar funciones gubernamentales deberían considerar actuar sobre aquellas variables que han demostrado tener una influencia positiva sobre este proceso.

Palabras clave: Descentralización fiscal, federalismo, autonomía regional.

INTRODUCTION

Over the last three decades, there has been a significant global movement toward decentralization: institutional, political, and fiscal. The movement is by no means homogeneous, but usually involves substantial changes to institutional structures, including attempts to modify the country's constitution, the introduction of elections at regional levels to encourage local democratization and, from a fiscal perspective, the devolution of greater responsibilities regarding revenue and expenditure administration to sub-national levels of government.

With respect to fiscal decentralization, countries differ significantly in the institutional arrangements of this process, as some move to strengthen decentralization structures without regard to external considerations, while others adjust their decentralization processes in line with those of other countries with whom they have established economic and monetary arrangements. A good example of countries working to harmonize their fiscal arrangement structures are the Member States of the European Union. Another category includes those countries whose fiscal decentralization processes have regressed*, e.g.,* Bolivia and Argentina, in part as a result of government emphasis on central planning and a tighter control of the fiscal purse. This article attempts to identify the different, cross-regional patterns of fiscal decentralization.

The principal objective of this paper is to explain differences between countries regarding the determinants of fiscal decentralization. Though previous attempts have been made in exploring this issue, this paper adds to the current literature on fiscal decentralization in several important ways. First, it uses a large dataset covering a thirty-five-year period (1980-2015), and a sample of 84 countries with differing levels of development. Second, it attempts to identify the reasons for decentralization using the most important variables included in relevant literature and other variables that have not been used before, such as income inequality, level of administrative fragmentation, and human development. Third, it includes a regional analysis of decentralization: Americas, Asia, Europe, and OECD countries, to determine whether significant regional patterns of decentralization exist. Finally, it introduces a simple, but novel approach to address the issue of endogeneity, a common problem in studies concerning fiscal decentralization.

The article's main findings are that the size of a country, as measured by geographical land size, is the most consistent variable affecting the level of fiscal decentralization. Better distribution of income, an educated population,

mature democratic structures, higher urbanization, and greater openness to trade are also positively correlated with greater fiscal decentralization.

The rest of the paper proceeds as follows. After a brief review of the literature in section 2, section 3 describes the data and methodology. Section 4 discusses the empirical results, and section 5 provides some conclusions.

LITERATURE REVIEW

Existing literature on the role of subnational (regional or local) governments is vast, and includes seminal works on the optimal division of powers between central and subnational governments (Musgrave 1959, 1969); the positive welfare effects of interjurisdictional competition (Tiebout, 1956); the meaning and measurement of decentralization (Rodden, 2004); assessments of how the decentralization of government functions influences the size of countries in equilibrium (Alesina & Spolaore, 2003); and Oates' (1972) decentralization theorem, which states that in the absence of spillovers, a decentralized system is preferred because decisions made 'closer to people' allow for a better fit of local preferences. Later, Oates (1999, 2007) expands on his earlier work by analyzing the welfare gains of fiscal decentralization, the utilization of fiscal instruments, and the process of fiscal decentralization in developing and transitional economies. He also questions whether fiscal decentralization is always the preferred option of government, through an analysis of destructive forces that can undermine the economic performance of a relatively decentralized public sector.

More recent contributions on the performance of decentralized governments include those of Fedelino & Smoke (2013), which examines the connection between public financial management and decentralization and finds such a connection to be rare, which creates inconsistencies in government systems and sends mixed signals to key actors. Faguet (2014), considers how decentralization affects governance, political competition, public accountability, and political instability, while Gadenne & Singhal (2014) analyze the trade-offs associated with fiscal federalism in developing countries as well as the reasons for their low levels of decentralization. Faguet & Pöschl (2015) and Grazzi & Jaramillo (2015), offer insights and lessons about when decentralization may contribute to development in emerging economies and highlight institutional incentives that may improve public sector performance and strengthen economies in a way that enhance citizen well-being. Smoke (2015) compares the expectations of decentralization with what it has actually achieved and

identifies factors that support or hinder decentralization. Finally, Channa & Faguet (2016) study the impact of decentralization on preference matching and technical efficiency in the provision of health and education in developing countries.

While the role of subnational governments has been thoroughly analyzed, *why* fiscal decentralization happens in the first place has received less attention. Some notable theoretical contributions on this topic include Panizza (1999), who develops a model for a country with a particular geographical area, population, divided into jurisdictions, and with two levels of government. His principal hypothesis, which his empirical analysis confirms, is that as levels fiscal centralization decrease, so do levels of taste and differentiation, the quality of democracy, income per capita, and country size. Arzaghi and Henderson (2005) present a model of 'separation' or 'internal exit.' Their model is based on a country with two regions: the coastal region and the hinterland, and a unitary government located in the coastal region that provides local public goods to both regions. In a scenario of imperfect population mobility, the authors find a number of variables that promote separation, or adoption of formal federal structures, including income growth, population growth, higher spatial decay of local public services provided to the hinterland by the central government, relative income growth in the hinterland region, and lower costs of government for the hinterland region. Jametti and Joanis (2010) utilize a theoretical political economy framework, thus explicitly introducing the effects of political choices on the degree of decentralization. In a model in which a public good valued by voters in a given jurisdiction is jointly provided by two levels of government – labeled 'federal' and 'provincial' – the degree of decentralization is dependent on the relative political conditions prevailing at each level of government. Finally, building on the works of Panizza (1999) and Arzaghi & Henderson (2005), Canavire-Bacarreza, *et al*., (2017) develop a model that explicitly include geographical fragmentation in the decentralization framework. The principal hypothesis of their exercise is that higher levels of geographical complexity and ethnic diversity are associated with higher relative gains from transitioning to a decentralized system of public good provision.

Other studies that use different angles to understand fiscal decentralization include those by Letelier (2005) and Treisman (2006), which test various decentralization hypotheses; Cai & Treisman (2006), which analyzes the role of decentralization in China's growth in recent decades; and those by Stegarescu (2009), Bodman & Hodge (2010), and Jílek & Milan (2015), which analyze fiscal decentralization in OECD countries.

This paper bridges some of the gaps in the literature summarized above, as it focuses on the determinants of fiscal decentralization in different regions of the world. It utilizes the latest decentralization data and the same set of control variables for each subset of countries to determine whether there are any significant regional patterns in the fiscal decentralization process. Additionally, it incorporates previously unutilized control variables to ascertain how a number of development and institutional factors impact the process of fiscal decentralization.

DATA AND METHODOLOGY

An important challenge in all cross-country studies concerning fiscal decentralization is the selection of an appropriate indicator of fiscal decentralization. The challenge arises from several angles, including how to properly measure the extent of decentralization in various layers of government, and the significant feat of understanding each country's tax system. This requires knowledge of the extent and nature of grant and transfer programs between the central and sub-regional governments, the structure of revenue-sharing mechanisms among regions, and the true level of political autonomy of regions. Here, the article follows the standard practice in the literature, which is to use the ratio of sub-national government revenues to general government revenues (revenue decentralization), and the ratio of sub-national government expenditures to general government expenditures (expenditure decentralization) as proxies for fiscal decentralization,[1] both expressed as a percentage.[2] The principal source of information for both fiscal decentralization indicators is the International Monetary Fund's (IMF) Government Finance Statistics Annual Yearbook (GFS).[3] When possible, data was also obtained from Ministries of Finance responsible for collecting government data,[4] and the Organization for Economic Cooperation and Development (OECD).[5] As these are the primary sources of decentralization data

1 Though there are many limitations with these standard measurements, including their inability to properly measure the level of autonomy of subnational governments; the lack of identification in the sources of tax and non-tax revenues and the lack of a distinction between locally determined own taxes, piggybacked taxes, or shared taxes; and their failure to disclose what proportion of intergovernmental transfers is conditional, hence ignoring the degree of central government control over local tax rates and tax bases, these standard measures are chosen to ensure the number of countries included in the analysis is as large as possible.

2 Revenues (expenditures) at regional, state, and local levels are added to obtain the measures of sub-national government revenues (expenditures).

3 data.imf.org/?sk=E86E9088-3830-4CA3-B240-1B0EC5E15221

4 Data for Argentina were obtained from the Federal Tax Commission (www.cfi.gov.ar) and the Treasury and Ministry of Finance (www.economia.gob.ar).

5 www.oecd.org/ctp/federalism/fiscal-decentralisation-database.htm

for this study, it is important to note the limitations of this data; they do not include information on the nature of government transfers or what level of government controls transfer and grants.

Eighty-four countries are included in the analysis. Of these, eleven are African countries, fourteen are from America,[6] nineteen from Asia,[7] thirty-seven from Europe, and three from Oceania. Additionally, thirty-five of these countries are part of the OECD, a group that comprises some of the wealthiest countries in the world. Yearly observations range from 1980 to 2015, though the dates of available data for all countries do not necessarily coincide. Conditional on: (i) the specific methodology utilized in estimating a regression; (ii) whether the full sample of countries or only countries from a particular region or group are being considered; (iii) the regressors being utilized; and (iv) the dependent variable of the model – either revenue decentralization or expenditure decentralization – the number of observations in all specifications varies from a 102 to 1,159. Considering all countries, the data consists of an unbalanced panel with the number of observations ranging from 736 to 1,159.[8]

Consistent with previous studies, control variables utilized in the base specifications are the land area; GDP per capita (measured at purchasing power parity); an index of democracy (0 = poor democracy; 10 = highest democracy), to account for the ways in which a representative democracy affects devolving fiscal responsibilities to lower levels of government);[9] the share of total trade on GDP ((exports+imports)/GDP), to measure the impact of openness; the share of urban population (% of total);[10] and the Gini index (0 = perfect equality; 100 = perfect inequality), to consider how the level of inequality affects fiscal decentralization.[11] Additional control variables added to the base specifications include a fragmentation index, to measure the

6 Countries from America include those in North, Central, South America and the Caribbean.

7 Countries from Asia include those in the continental landmass known as Eurasia.

8 The appendix reports summary statistics and the specific time periods of available decentralization data for each of the countries included in the study. The unbalanced panel for America includes data for fourteen countries, and the number of observations varies between 151-230. For Asia, there are nineteen countries, whose number of observations range from 102 to 137. For Europe, the unbalanced panel consists of thirty-seven countries with 450 to 751 numbers of observations. Finally, the study includes thirty-five OECD countries with the number of observations ranging between 414 and 770. Though there are significant gaps in all data sets, the researchers opted to let the existing data speak for itself, and thus, the paper does not use averages or linear approximations to fill gaps in the data. Due the limited amount of observations, results for Africa and Oceania are not reported, though they are available upon request.

9 Source: Polity IV Project: Center for Systemic Peace: www.systemicpeace.org/inscrdata.html.

10 Source for land area, the share of total trade on GDP, and urban population is The World Bank, World Development Indicators: https://data.worldbank.org/indicator/.

11 Source: The World Bank: https://data.worldbank.org/data-catalog/all-the-ginis.

Table 1:

Principal determinants of decentralization, all countries

Independent variable	Dependent variable: Sub-national revenues to general revenues						Dependent variable: Sub-national expenditures to general expenditures					
	GLS	GLS(+1)	GLS(+2)	Tobit	Two-stage GLS	GLS (fixed)	GLS	GLS(+1)	GLS(+2)	Tobit	Two-stage GLS	GLS (fixed)
Land area (square kilometers), in logs	5.909*** (0.180)	5.785*** (0.206)	5.828*** (0.211)	5.909*** (0.241)	5.902*** (0.156)	5.811*** (0.188)	5.500*** (0.210)	5.368*** (0.236)	5.410*** (0.238)	5.500*** (0.229)	5.585*** (0.212)	5.470*** (0.208)
Real GDP per capita, at PPP (1000s US Dollars)	0.087*** (0.032)	0.094*** (0.033)	0.104*** (0.034)	0.087*** (0.033)	0,038 (0.034)	0.188*** (0.038)	0.089*** (0.026)	0.095*** (0.027)	0.092*** (0.028)	0.089*** (0.030)	0.056** (0.027)	0.208*** (0.032)
Democracy index (0 = poor democracy; 10 = highest democracy)	0,414 (0.276)	0,326 (0.266)	0.330* (0.266)	0.414** (0.192)	0,324 (0.251)	0,203 (0.274)	0.502** (0.200)	0.410** (0.201)	0.493** (0.201)	0.502*** (0.186)	0,187 (0.151)	0,210 (0.192)
Share of total trade on GDP (%)	0.050*** (0.009)	0.042*** (0.010)	0.040*** (0.011)	0.050*** (0.014)	0.059*** (0.009)	0.073*** (0.009)	0.058*** (0.000)	0.051*** (0.010)	0.051*** (0.010)	0.058*** 0.013)	0.063*** (0.010)	0.084*** (0.010)
Urban population (% of total)	0.280*** (0.031)	0.271*** (0.031)	0.258*** (0.032)	0.280*** (0.035)	0.363*** (0.033)	0.253*** (0.032)	0.388*** (0.028)	0.379*** (0.029)	0.375*** (0.029)	0.388*** (0.033)	0.454*** (0.031)	0.356*** (0.030)
Gini index (0 = perfect equality; 100 = perfect inequality)	-0.436*** (0.053)	-0.401*** (0.053)	-0.386*** (0.054)	-0.436*** (0.049)	-0.471*** (0.062)	-0.313*** (0.062)	-0.409*** (0.049)	-0.386*** (0.050)	-0.382*** (0.052)	-0.409*** (0.047)	-0.485*** (0.052)	-0.276*** (0.057)
Adj. R2	0,45	0,45	0,45	-	0,50	0,45	0,48	0,49	0,49	-	0,53	0,49
number of observations	1159	1155	1128	1159	1003	1159	1118	1117	1092	1118	985	1118

Notes:

1) GLS, GLS(+1), GLS(+2), Tobit, and Two-Stage GLS specifications estimated utilizing period random effects and the Cross-Section SUR (PCSE) coefficient covariance method.

2) GLS (fixed) estimated with period fixed effects and Cross-Section SUR (PCSE) coefficient covariance method.

3) GLS(+1) and GLS(+2) estimated with the dependent variable one and two periods ahead, respectively

4) All regressions include an intercept term (not shown in table)

5) Standard errors in parentheses

6) * significant at 10%; ** significant at 5%; *** significant at 1%

impact of regional divisions from the central government;[12] general government debt (percentage of GDP), to account for the level of indebtedness; the inflation rate (percentage) to account for macroeconomic stability; the unemployment rate (percentage), to measure the impact of labor markets;[13] and the Human Development Index (HDI) (0 = lower development; 1 = higher development), to account for how key dimensions of human development affect fiscal decentralization.[14]

Based on previous research on the determinants of fiscal decentralization described in section 2 and the variables described in this section, the estimated model is thus:

$$\Delta_{it+2} = \beta_0 + \sum_{i=0}^{n} \beta_1 Y_{it} + \beta_2 Z_{it} + \varepsilon_{it} \qquad [1]$$

where $\Delta = \delta \bullet 100$ is the two-period lead measure of fiscal decentralization (revenue- or expenditure-based), in percentages; Y represents conventional variables in the base specification; Z represents additional control variables, and; ε is a standard error term. The two-period lead feature of the dependent variable is utilized to avoid endogeneity problems: the value of explanatory variables in time t cannot be affected by the value of the dependent variable two years into the future.[15]

Equation (1) was estimated with random effects because even if there are omitted variables, it is unlikely that they will have time-invariant values and time-invariant effects on the dependent variable.[16] Three additional reasons for utilizing random effects are (i) they allow to estimate the effects of time-invariant variables,

12 Source: Polity IV Project: Center for Systemic Peace: www.systemicpeace.org/inscrdata.html. The index can take on four possible values: 0 = no overt fragmentation; 1 = slight fragmentation, whereby less than 10% of the country's territory is effectively under local authority and actively separated from the central authority of the regime; 2 = moderate fragmentation, whereby 10 to 25 percent of the country's territory is under local authority and actively separated from the central authority; and 3 = serious fragmentation, whereby more than 25% (and up to 50%) of the country is effectively under local authority and actively separated from the central authority of the country.

13 Source for GDP per capita, general government debt, the inflation rate, and the unemployment rate is the International Monetary Fund (IMF): https://www.imf.org/external/pubs/ft/weo/2017/01/weodata/index.aspx.

14 Source: United Nations Development Programme, Human Development Reports. Available at: http://hdr.undp.org/en/content/human-development-index-hdi. The HDI is a summary measure of average achievement in key dimensions of human development: a long and healthy life, being knowledgeable, and a decent standard of living. The HDI is the geometric mean of normalized indices for each of the dimensions.

15 Other leads were used and the results were generally consistent with the ones reported here. The two-lead feature was chosen because it seemed rational to assume two years was long enough to ensure regressors today would be unaffected by the dependent variable two years into the future, hence ensuring endogeneity is not a problem – i.e., fiscal decentralization and the regressors in specification (1) are not jointly determined.

16 Fixed-effects specifications were also estimated and the results were very similar and consistent with those reported here.

like land area; (ii) this is the most common approach used in other studies on fiscal decentralization, including, for instance, Arzaghi & Henderson (2005) and Jílek (2015), and; (iii) the Hausman test showed a random effects specification was the appropriate methodology.[17] All specifications were estimated via Generalized Least Squares (GLS). Additionally, to correct for intra-sectional and cross-sectional autocorrelation, all specifications were estimated with the Prais-Winsten Panel Corrected Standard Error (PCSE) procedure.

Given that the dependent variables are non-negative censored variables (cannot exceed 100 percent), equation (1) was also estimated with the use of a Tobit model. Finally, instrumental variables (two-stage GLS)[18] and fixed effects GLS were used as additional robustness checks. Section 4 shows that regardless of the estimation technique, the results are consistently similar.

EMPIRICAL RESULTS

The empirical results are reported for different subsets of nations. Table 1 presents the principal determinants of both revenue and expenditure decentralization for the full sample of countries considering only the base specification.

The impact of the explanatory variables on both revenue and expenditure decentralization is consistent with theoretical expectations and findings from previous studies. The results indicate that geographically bigger countries, with higher per capita income, more open to trade, and with greater shares of urban population, are likely to be more fiscally decentralized, as evidenced by consistently positive and statistically significant coefficients for Land Area, Real GDP per Capita, Share of Total Trade on GDP, and Urban Population. The results also show that as countries achieve greater income equality, they will tend to be more decentralized, evidenced by consistently negative and statistically significant Gini Index coefficients. Finally, with decentralization on the expenditure side, the results seem to indicate that mature, representative democracies are also more conducive to greater fiscal decentralization.[19]

17 Given a *p*-value of 0.60, the null hypothesis that the preferred model is random effects cannot be rejected.

18 Instruments are one-lagged values of each explanatory variable.

19 The interpretation of results should be done with caution as the empirical analysis does not take into consideration whether the countries analyzed here are constitutionally decentralized federations or unitary states with some fiscal decentralization. Controlling for whether a given country is formally fiscally decentralized would require a thorough understanding of each country's fiscal arrangements since 1980, and this is a formidable task even for those countries for which information is available.

An important aspect of the results reported in Table 1 is that they are quite consistent regardless of whether the base specification is estimated with random or fixed effects, with the contemporaneous value of the dependent variable, or with the one-period lead (GLS(+1)) or the two-period lead (GLS(+2)), and irrespective of whether a Tobit model or instrumental variables are utilized. Based on these findings, from this point forward, the results reported here are for specifications using the two-period lead and estimated with random effects; and the results for specifications using contemporaneous dependent variables and estimated with the Tobit model.

Table 2 reports estimation results for the full sample of countries when the dependent variable is revenue decentralization and with additional explanatory variables added to the base specification.

The results are consistent with those found for the base specification: geographically large, urbanized, economically growing countries, with mature democracies, open to the outside world, and with significant income equality, are more likely to be decentralized on the revenue side. Concerning the additional variables added to the base specification, the results show that as countries become more fragmented, the incentives for greater revenue decentralization increase. This outcome makes sense, as the incentives for greater decentralization must be in part the result of differences, cultural, economic, social differences, between regions of a country, which may lead central governments to increase devolution of fiscal responsibilities to prevent further fragmentation of the country. The estimates also show that as unemployment decreases and human development improves, the level of revenue decentralization increases as well. It is reasonable to expect that a well-educated population, with a decent standard of living and low levels of unemployment is likely to demand greater responsibilities from the central government. On the other hand, government debt and macroeconomic stability – reflected in the inflation rate – do not seem to have any impact on revenue decentralization.

Table 3 reports the same set of regressions for the full set of countries but when the dependent variable is expenditure decentralization.

The estimate results mirror those obtained when the dependent variable is revenue decentralization. One important difference is that decentralization on the expenditure side seems to be negatively affected by the level of government debt: as the ratio of government debt to GDP increases, the level of expenditure decentralization decreases – reflected in negative and statistically significant (Tobit estimate) coefficients for this variable. This highlights the importance of the size

Table 2:

Additional determinants of revenue decentralization, all countries

Independent variable	Sub-national revenues to general revenues									
	GLS(+2)	Tobit	GLS(+2)	Tobit	GLS(+2)	Tobit	GLS(+2)	Tobit	GLS(+2)	Tobit
Land area (square kilometers), in logs	5.920*** (0.234)	5.877*** (0.298)	6.078*** (0.237)	6.136*** (0.253)	5.880*** (0.212)	5.964*** (0.242)	5.940*** (0.193)	5.937*** (0.241)	5.672*** (0.222)	5.737*** (0.258)
Real GDP per capita, at PPP (1000s US Dollars)	0.186*** (0.046)	0.189*** (0.041)	0.101*** (0.034)	0.092*** (0.035)	0.097*** (0.034)	0.083** (0.033)	0.080** (0.034)	0.076** (0.034)	0.087** (0.040)	0,680 (0.048)
Democracy index (0 = poor democracy; 10 = highest democracy)	-0.222 (0.270)	-0.192 (0.221)	0,122 (0.270)	0,188 (0.212)	0,366 (0.251)	0.446** (0.195)	0.501** (0.245)	0.515*** (0.199)	-0.011 (0.273)	0,047 (0.212)
Share of total trade on GDP (%)	0.062*** (0.012)	0.068*** (0.016)	0.055*** (0.011)	0.065*** (0.014)	0.044*** (0.010)	0.054*** (0.014)	0.043*** (0.010)	0.049*** (0.014)	0.046*** (0.010)	0.056*** (0.014)
Urban population (% of total)	0.222*** (0.042)	0.232*** (0.041)	0.231*** (0.035)	0.256*** (0.037)	0.263*** (0.032)	0.287*** (0.035)	0.223*** (0.034)	0.243*** (0.037)	0.210*** (0.040)	0.227*** (0.039)
Gini index (0 = perfect equality; 100 = perfect inequality)	-0.240*** (0.077)	-0.234*** (0.068)	-0.426*** (0.061)	-0.442*** (0.055)	-0.401*** (0.056)	-0.446*** (0.050)	-0.405*** (0.053)	-0.443*** (0.050)	-0.229*** (0.072)	-0.261*** (0.063)
Fragmentation index (0 = no fragmentation; 3 = serious fragmentation)	1.024** (0.543)	0,923 (0.692)	-	-	-	-	-	-	-	-
General government debt as a share of GDP (%)	-	-	0,020 (0.014)	0,018 (0.014)	-	-	-	-	-	-
Inflation rate (%)	-	-	-	-	-0.002 (0.002)	-0.003 (0.003)	-	-	-	-
Unemployment rate (%)	-	-	-	-	-	-	-0.216** (0.084)	-0.181** (0.091)	-	-
Human development index (0 = lower development; 1 = higher development)	-	-	-	-	-	-	-	-	21.752** (10.323)	24.655** (10.570)
Adj. R2	0,45	-	0,47	-	0,46	-	0,46	-	0,45	-
number of observations	744	794	970	1009	1098	1130	1097	1130	1014	1048

Notes:

1) All specifications estimated utilizing period random effects and the Cross-Section SUR (PCSE) coefficient covariance method.

2) All regressions include an intercept term (not shown in table)

3) Standard errors in parentheses

4) * significant at 10%; ** significant at 5%; *** significant at 1%

Table 3:

Additional determinants of expenditure decentralization, all countries

Independent variable	Sub-national expenditures to general expenditures									
	GLS(+2)	Tobit	GLS(+2)	Tobit	GLS(+2)	Tobit	GLS(+2)	Tobit	GLS(+2)	Tobit
Land area (square kilometers), in logs	5.664*** 5.664***	5.780*** (0.281)	5.664*** (0.215)	5.731*** (0.239)	5.440*** (0.233)	5.546*** (0.233)	5.502*** (0.227)	5.465*** (0.231)	5.506*** (0.223)	5.617*** (0.241)
Real GDP per capita, at PPP (1000s US Dollars)	0.143*** (0.036)	0.156*** (0.039)	0.090*** (0.029)	0.093*** (0.033)	0.092*** (0.029)	0.090*** (0.031)	0.075*** (0.028)	0.078** (0.031)	0.072** (0.035)	0,067 (0.044)
Democracy index (0 = poor democracy; 10 = highest democracy)	0,136 (0.217)	0,188 (0.215)	0.420* (0.225)	0.499** (0.203)	0.437** (0.203)	0.442** (0.190)	0.595*** (0.190)	0.524*** (0.193)	0,241 (0.226)	0,249 (0.204)
Share of total trade on GDP (%)	0.062*** (0.012)	0.069*** (0.015)	0.058*** (0.011)	0.064*** (0.013)	0.050*** (0.010)	0.058*** (0.013)	0.052*** (0.010)	0.053*** (0.013)	0.056*** (0.010)	0.064*** (0.013)
Urban population (% of total)	0.323*** (0.033)	0.328*** (0.038)	0.358*** (0.031)	0.383*** (0.034)	0.379*** (0.030)	0.394*** (0.033)	0.362*** (0.028)	0.369*** (0.034)	0.342*** (0.035)	0.354*** (0.036)
Gini index (0 = perfect equality; 100 = perfect inequality)	-0.350*** (0.070)	-0.359*** (0.065)	-0.429*** (0.054)	-0.434*** (0.052)	-0.389*** (0.053)	-0.413*** (0.048)	-0.388*** (0.053)	-0.397*** (0.048)	-0.288*** (0.064)	-0.304*** (0.060)
Fragmentation index (0 = no fragmentation; 3 = serious fragmentation)	0,587 (0.508)	0,594 (0.653)	-	-	-	-	-	-	-	-
General government debt as a share of GDP (%)	-	-	-0.004 (0.014)	-0.026** (0.013)	-	-	-	-	-	-
Inflation rate (%)	-	-	-	-	-0.000 (0.001)	-0.002 (0.002)	-	-	-	-
Unemployment rate (%)	-	-	-	-	-	-	-0.138* (0.076)	-0.216*** (0.083)	-	-
Human development index (0 = lower development; 1 = higher development)	-	-	-	-	-	-	-	-	15.845* (8.843)	17.760* (9.886)
Adj. R2	0,50	-	0,51	-	0,49	-	0,49	-	0,50	-
number of observations	736	785	950	985	1064	1091	1067	1096	1002	1035

Notes:
1) All specifications estimated utilizing period random effects and the Cross-Section SUR (PCSE) coefficient covariance method.
2) All regressions include an intercept term (not shown in table)
3) Standard errors in parentheses
4) * significant at 10%; ** significant at 5%; *** significant at 1%

of government debt on the extent of expenditure decentralization. By contrast, the level of fragmentation does not seem to exert any statistically significant impact on the dependent variable.

The same set of specifications are now reported for specific sub-groups of countries. Table 4 shows the determinants of revenue decentralization for countries in the Americas.

The results demonstrate that as land area and income equality increase, revenue decentralization tends to intensify, in line with the results of the full sample of countries. However, unlike what was found with the full set of countries, economic growth does not seem to enhance decentralization, nor does better democracy, more open markets, or higher levels of urbanization. With respect to the additional variables added to the base specification, the results indicate that higher fragmentation, government debt, and unemployment rates, as well as lower inflation promote greater revenue decentralization. Surprisingly, higher human development is not correlated with decentralization. Thus, with the exception of country size and income inequality, the reasons for revenue decentralization in the Americas are markedly different from those observed in the full sample of countries.

Table 5 presents the determinants for expenditure decentralization in America.

Consistent with findings for revenue decentralization, expenditure decentralization also increases as the size of a country increases, democracy deteriorates, income inequality abates, government debt increases, and unemployment worsens. However, the results also indicate more open trade and higher levels of urbanization are conducive to expenditure decentralization, and highlight that different variables exert different effects on the type of fiscal decentralization countries experience. Furthermore, economic growth, the level of fragmentation, macroeconomic stability, and human development do not seem to have any statistically significant impact on the dependent variable.

The findings for the Asia region are first reported in table 6, where the determinants for revenue decentralization are analyzed.

The results indicate a positive correlation between the size of Asian countries and the level of revenue decentralization, consistent with results for the Americas and the full set of countries. There is also some indication that as democracy worsens, countries become less open to trade, and as they become less urbanized, the level of revenue decentralization increases. Lower levels of unemployment and higher

Table 4:

Determinants of revenue decentralization, America

Independent variable	Sub-national revenues to general revenues									
	GLS(+2)	Tobit	GLS(+2)	Tobit	GLS(+2)	Tobit	GLS(+2)	Tobit	GLS(+2)	Tobit
Land area (square kilometers), in logs	8.561*** (0.485)	9.080*** (0.518)	8.459*** (0.338)	8.708*** (0.422)	8.938*** (0.460)	9.251*** (0.502)	9.091*** (0.426)	9.350*** (0.458)	8.790*** (0.465)	9.165*** (0.519)
Real GDP per capita, at PPP (1000s US Dollars)	-0.081 (0.095)	-0.087 (0.103)	-0.221** (0.079)	-0.287*** (0.071)	-0.070 (0.061)	-0.071 (0.080)	0,026 (0.057)	0,024 (0.076)	0,132 (0.138)	0,149 (0.157)
Democracy index (0 = poor democracy; 10 = highest democracy)	-1.523** (0.593)	-1.590** (0.757)	-1.670*** (0.442)	-1.285** (0.567)	0,295 (0.414)	0,304 (0.426)	0,077 (0.427)	0,052 (0.407)	0,076 (0.531)	-0.041 (0.565)
Share of total trade on GDP (%)	-0.132*** (0.035)	-0.092** (0.042)	-0.159*** (0.032)	-0.096*** (0.036)	-0.053 (0.035)	-0.007 (0.035)	-0.026 (0.031)	0,012 (0.035)	-0.087** (0.035)	-0.037 (0.039)
Urban population (% of total)	-0.299*** (0.095)	-0.306*** (0.102)	-0.358*** (0.108)	-0.283*** (0.091)	-0.248*** (0.088)	-0.224*** (0.084)	-0.421*** (0.094)	-0.434*** (0.085)	-0.175 (0.160)	-0.125 (0.141)
Gini index (0 = perfect equality; 100 = perfect inequality)	-1.025*** (0.175)	-1.023*** (0.148)	-1.101*** (0.086)	-0.995*** (0.090)	-0.795*** (0.098)	-0.852*** (0.098)	-0.852*** (0.092)	-0.899*** (0.091)	-0.965*** (0.190)	-1.094*** (0.149)
Fragmentation index (0 = no fragmentation; 3 = serious fragmentation)	1.775*** (0.599)	1.832** (0.856)	-	-	-	-	-	-	-	-
General government debt as a share of GDP (%)	-	-	0.158*** (0.030)	0.218*** (0.031)	-	-	-	-	-	-
Inflation rate (%)	-	-	-	-	-0.061*** (0.017)	-0.009 (0.007)	-	-	-	-
Unemployment rate (%)	-	-	-	-	-	-	1.202*** (0.243)	1.362*** (0.246)	-	-
Human development index (0 = lower development; 1 = higher development)	-	-	-	-	-	-	-	-	-42.619 (36.664)	-51.842* (29.836)
Adj. R2	0,85	-	0,90	-	0,84	-	0,86	-	0,83	-
number of observations	152	156	188	187	230	226	222	218	204	201

Notes:
1) All specifications estimated utilizing period random effects and the Cross-Section SUR (PCSE) coefficient covariance method.
2) All regressions include an intercept term (not shown in table)
3) Standard errors in parentheses
4) * significant at 10%; ** significant at 5%; *** significant at 1%

Table 5:

Determinants of expenditure decentralization, America

Independent variable	Sub-national expenditures to general expenditures									
	GLS(+2)	Tobit	GLS(+2)	Tobit	GLS(+2)	Tobit	GLS(+2)	Tobit	GLS(+2)	Tobit
Land area (square kilometers), in logs	8.003*** (0.554)	8.619*** (0.479)	7.415*** (0.327)	8.046*** (0.365)	8.212*** (0.460)	8.619*** (0.462)	8.476*** (0.361)	8.798*** (0.439)	8.244*** (0.401)	8.562*** (0.449)
Real GDP per capita, at PPP (1000s US Dollars)	-0.111 (0.105)	-0.147 (0.095)	-0.248*** (0.075)	-0.211*** (0.065)	-0.043 (0.079)	-0.056 (0.078)	-0.062 (0.068)	-0.016 (0.076)	-0.150 (0.129)	-0.011 (0.133)
Democracy index (0 = poor democracy; 10 = highest democracy)	-2.697*** (0.684)	-2.914*** (0.710)	-2.926*** (0.397)	-3.277*** (0.475)	-1.004** (0.444)	-1.539*** (0.415)	-1.327*** (0.465)	-1.780*** (0.414)	-1.925*** (0.595)	-2.156*** (0.481)
Share of total trade on GDP (%)	-0.002 (0.052)	0,058 (0.038)	0,029 (0.025)	0.084*** (0.029)	0.067* (0.039)	0.108*** (0.032)	0.082** (0.034)	0.119*** (0.033)	0,045 (0.044)	0.108*** (0.033)
Urban population (% of total)	0,145 (0.113)	0.213** (0.090)	0.275*** (0.066)	0.330*** (0.072)	0.227** (0.095)	0.295*** (0.076)	0,018 (0.097)	0,106 (0.084)	0,180 (0.170)	0.371*** (0.118)
Gini index (0 = perfect equality; 100 = perfect inequality)	-1.119*** (0.221)	-1.240*** (0.140)	-1.066*** (0.094)	-1.038*** (0.088)	-0.804*** (0.122)	-0.867*** (0.104)	-0.972*** (0.112)	-1.009*** (0.100)	-0.944*** (0.196)	-1.052*** (0.126)
Fragmentation index (0 = no fragmentation; 3 = serious fragmentation)	0,446 (0.712)	0,830 (0.796)	-	-	-	-	-	-	-	-
General government debt as a share of GDP (%)	-	-	0.210*** (0.021)	0.169*** (0.021)	-	-	-	-	-	-
Inflation rate (%)	-	-	-	-	-0.000 (0.002)	-0.002 (0.002)	-	-	-	-
Unemployment rate (%)	-	-	-	-	-	-	1.051*** (0.214)	0.837*** (0.182)	-	-
Human development index (0 = lower development; 1 = higher development)	-	-	-	-	-	-	-	-	12,170 (36.326)	-17.434 (25.114)
Adj. R2	0,86	-	0,93	-	0,84	-	0,87	-	0,85	-
number of observations	151	153	178	174	213	205	205	197	202	199

Notes:

1) All specifications estimated utilizing period random effects and the Cross-Section SUR (PCSE) coefficient covariance method.

2) All regressions include an intercept term (not shown in table)

3) Standard errors in parentheses

4) * significant at 10%; ** significant at 5%; *** significant at 1%

Table 6:

Determinants of revenue decentralization, Asia

Independent variable	Sub-national revenues to general revenues									
	GLS(+2)	Tobit	GLS(+2)	Tobit	GLS(+2)	Tobit	GLS(+2)	Tobit	GLS(+2)	Tobit
Land area (square kilometers), in logs	3.777*** (0.664)	3.750*** (1.101)	4.973*** (0.598)	5.258*** (0.954)	5.307*** (0.539)	5.289*** (0.747)	3.455*** (0.449)	2.807*** (0.785)	7.032*** (0.548)	7.087*** (0.744)
Real GDP per capita, at PPP (1000s US Dollars)	0.989*** (0.164)	0.933*** (0.283)	0.867*** (0.195)	0.666** (0.344)	0.661*** (0.164)	0.583** (0.251)	0,233 (0.181)	0,255 (0.290)	-0.860*** (0.239)	-0.877*** (0.338)
Democracy index (0 = poor democracy; 10 = highest democracy)	-1.133** (0.575)	-0.838 (0.530)	-1.117 (0.745)	-0.919 (0.594)	-0.799 (0.526)	-0.627 (0.449)	-1.175** (0.535)	-1.237*** (0.467)	-0.502 (0.473)	-0.353 (0.403)
Share of total trade on GDP (%)	-0.202*** (0.053)	-0.179*** (0.071)	-0.185*** (0.063)	-0.126* (0.074)	-0.153*** (0.046)	-0.127** (0.058)	-0.291*** (0.046)	-0.339*** (0.062)	-0.188*** (0.045)	-0.184*** (0.052)
Urban population (% of total)	-0.204** (0.103)	-0.197 (0.156)	-0.164 (0.119)	-0.087 (0.163)	0,037 (0.095)	0,054 (0.124)	-0.152** (0.064)	-0.214 (0.135)	-0.438*** (0.091)	-0.430*** (0.129)
Gini index (0 = perfect equality; 100 = perfect inequality)	0,565 (0.465)	0,425 (0.351)	0,286 (0.435)	0,123 (0.360)	0,002 (0.336)	-0.122 (0.291)	-0.134 (0.288)	-0.056 (0.289)	-0.193 (0.306)	-0.372 (0.264)
Fragmentation index (0 = no fragmentation; 3 = serious fragmentation)	-2.673 (1.723)	-2.389 (2.104)	-	-	-	-	-	-	-	-
General government debt as a share of GDP (%)	-	-	0,059 (0.032)	0,084 (0.050)	-	-	-	-	-	-
Inflation rate (%)	-	-	-	-	-0.071 (0.050)	-0.090 (0.086)	-	-	-	-
Unemployment rate (%)	-	-	-	-	-	-	-1.062*** (0.249)	-1.309*** (0.361)	-	-
Human development index (0 = lower development; 1 = higher development)	-	-	-	-	-	-	-	-	236.255*** (30.562)	232.925*** (38.416)
Adj. R2	0,46	-	0,46	-	0,47	-	0,56	-	0,60	-
number of observations	113	107	118	108	137	127	123	113	133	123

Notes:
1) All specifications estimated utilizing period random effects and the Cross-Section SUR (PCSE) coefficient covariance method.
2) All regressions include an intercept term (not shown in table)
3) Standard errors in parentheses
4) * significant at 10%; ** significant at 5%; *** significant at 1%

levels of human development are also correlated with greater levels of revenue decentralization. Last, income inequality, fragmentation level, government debt, economic growth, and the inflation rate do not have a statistically significant impact on the decentralization.

Regarding expenditure decentralization, table 7 reports the findings for this region of the world.

The geographical size of a country, once again, has a positive impact on expenditure decentralization, as do greater income equality and human development. There is some indication that more mature, developed democracies exert a positive influence on the dependent variable, but the findings are not statistically consistent across all specifications. Higher government debt and more open economies lead to lower levels of expenditure decentralization, but the level of fragmentation, macroeconomic stability and the state of labor markets do not seem to have any significant impact on decentralization. Finally, the impact of economic growth and urbanization are unclear.

Table 8 reports the determinants of revenue decentralization in Europe.

Replicating previous findings, the size of a country exerts a positive influence on revenue decentralization. Additionally, the results suggest that more developed democracies that are open to international trade, are highly urbanized, with low levels of income inequality and shrinking public debt, with an educated populace, and with low levels of unemployment, are also more likely to experience greater revenue decentralization. The impact of economic growth is indeterminate, and macroeconomic stability and the level of fragmentation do not seem to have any statistical impact on the dependent variable.

With respect to expenditure decentralization, table 9 reports the findings for the European continent.

The impact of all variables on the dependent variable mirrors how they affect revenue decentralization, highlighting that revenue or expenditure fiscal decentralization in Europe is consistently the result of similar forces, unlike in other regions of the world.

A final sub-group of countries includes Member States of the Organization for Economic Co-operation and Development (OECD), an organization of some of the

Table 7:

Determinants of expenditure decentralization, Asia

Independent variable	Sub-national expenditures to general expenditures									
	GLS(+2)	Tobit	GLS(+2)	Tobit	GLS(+2)	Tobit	GLS(+2)	Tobit	GLS(+2)	Tobit
Land area (square kilometers), in logs	5.009*** (0.688)	4.872*** (0.801)	5.555*** (0.468)	5.466*** (0.631)	5.285*** (0.462)	5.109*** (0.555)	4.762*** (0.445)	4.350*** (0.590)	6.825*** (0.441)	6.605*** (0.563)
Real GDP per capita, at PPP (1000s US Dollars)	0.642*** (0.178)	0.729*** (0.206)	0.326** (0.149)	0,350 (0.231)	0.560*** (0.157)	0.617*** (0.184)	0.542*** (0.178)	0.813*** (0.224)	-0.684*** (0.228)	-0.507** (0.257)
Democracy index (0 = poor democracy; 10 = highest democracy)	0,165 (0.528)	0,302 (0.423)	1.253** (0.559)	1.460*** (0.463)	0,202 (0.454)	0,355 (0.361)	0,104 (0.487)	0,024 (0.398)	0,369 (0.420)	0,453 (0.322)
Share of total trade on GDP (%)	-0.087* (0.052)	-0.076 (0.052)	-0.007 (0.054)	0,020 (0.051)	-0.063 (0.047)	-0.058 (0.044)	-0.112** (0.050)	-0.133*** (0.050)	-0.077* (0.046)	-0.083** (0.039)
Urban population (% of total)	0,018 (0.097)	-0.052 (0.113)	0.209** (0.084)	0.195* (0.109)	0,079 (0.086)	0,011 (0.095)	-0.088 (0.071)	-0.219** (0.101)	-0.207** (0.092)	-0.240** (0.095)
Gini index (0 = perfect equality; 100 = perfect inequality)	-0.787** (0.396)	-0.892*** (0.291)	-1.283*** (0.307)	-1.458*** (0.281)	-0.859*** (0.260)	-0.987*** (0.236)	-0.956*** (0.255)	-0.934*** (0.240)	-1.043*** (0.261)	-1.207*** (0.214)
Fragmentation index (0 = no fragmentation; 3 = serious fragmentation)	0,096 (1.541)	0,399 (1.538)	-	-	-	-	-	-	-	-
General government debt as a share of GDP (%)	-	-	-0.065*** (0.022)	-0.066** (0.034)	-	-	-	-	-	-
Inflation rate (%)	-	-	-	-	-0.039 (0.039)	-0.028 (0.062)	-	-	-	-
Unemployment rate (%)	-	-	-	-	-	-	-0.164 (0.159)	0,010 (0.291)	-	-
Human development index (0 = lower development; 1 = higher development)	-	-	-	-	-	-	-	-	180.983*** (29.240)	163.555*** (29.070)
Adj. R2	0,57	-	0,64	-	0,61	-	0,64	-	0,72	-
number of observations	107	102	112	103	127	117	117	108	125	115

Notes:
1) All specifications estimated utilizing period random effects and the Cross-Section SUR (PCSE) coefficient covariance method.
2) All regressions include an intercept term (not shown in table)
3) Standard errors in parentheses
4) * significant at 10%; ** significant at 5%; *** significant at 1%

Table 8:

Determinants of revenue decentralization, Europe

Independent variable	Sub-national revenues to general revenues									
	GLS(+2)	Tobit	GLS(+2)	Tobit	GLS(+2)	Tobit	GLS(+2)	Tobit	GLS(+2)	Tobit
Land area (square kilometers), in logs	5.151*** (0.321)	5.130*** (0.447)	4.487*** (0.457)	4.619*** (0.374)	3.948*** (0.569)	4.118*** (0.374)	4.302*** (0.536)	4.383*** (0.366)	4.021*** (0.528)	4.021*** (0.406)
Real GDP per capita, at PPP (1000s US Dollars)	0,041 (0.034)	0.075* (0.045)	0,004 (0.033)	0,023 (0.037)	-0.042 (0.031)	-0.031 (0.035)	-0.124*** (0.030)	-0.099*** (0.036)	-0.142*** (0.037)	-0.151*** (0.057)
Democracy index (0 = poor democracy; 10 = highest democracy)	-0.069 (0.105)	-0.090 (0.350)	0.590*** (0.170)	0.582* (0.340)	0.548*** (0.188)	0.677** (0.315)	1.270*** (0.178)	1.283*** (0.307)	0,092 (0.205)	0,083 (0.338)
Share of total trade on GDP (%)	0.069*** (0.012)	0.069*** (0.018)	0.055*** (0.013)	0.053*** (0.015)	0.052*** (0.013)	0.053*** (0.015)	0.061*** (0.013)	0.058*** (0.014)	0.055*** (0.013)	0.051*** (0.015)
Urban population (% of total)	0.371*** (0.029)	0.341*** (0.053)	0.402*** (0.030)	0.391*** (0.045)	0.451*** (0.037)	0.441*** (0.044)	0.470*** (0.039)	0.458*** (0.043)	0.397*** (0.039)	0.372*** (0.046)
Gini index (0 = perfect equality; 100 = perfect inequality)	-0.213** (0.098)	-0.202 (0.139)	-0.385*** (0.090)	-0.429*** (0.107)	-0.442*** (0.089)	-0.509*** (0.100)	-0.230** (0.090)	-0.311*** (0.102)	-0.277*** (0.093)	-0.334*** (0.106)
Fragmentation index (0 = no fragmentation; 3 = serious fragmentation)	0,694 (0.567)	0,282 (1.056)	-	-	-	-	-	-	-	-
General government debt as a share of GDP (%)	-	-	-0.054*** (0.012)	-0.057*** (0.016)	-	-	-	-	-	-
Inflation rate (%)	-	-	-	-	-0.002 (0.002)	-0.002 (0.003)	-	-	-	-
Unemployment rate (%)	-	-	-	-	-	-	-0.698*** (0.103)	-0.610*** (0.107)	-	-
Human development index (0 = lower development; 1 = higher development)	-	-	-	-	-	-	-	-	45.562*** (8.570)	55.408*** (14.448)
Adj. R2	0,31	-	0,29	-	0,28	-	0,33	-	0,31	-
number of observations	451	507	625	679	688	738	702	751	635	686

Notes:

1) All specifications estimated utilizing period random effects and the Cross-Section SUR (PCSE) coefficient covariance method.

2) All regressions include an intercept term (not shown in table)

3) Standard errors in parentheses

4) * significant at 10%; ** significant at 5%; *** significant at 1%

Table 9:

Determinants of expenditure decentralization, Europe

Independent variable	Sub-national expenditures to general expenditures									
	GLS(+2)	Tobit	GLS(+2)	Tobit	GLS(+2)	Tobit	GLS(+2)	Tobit	GLS(+2)	Tobit
Land area (square kilometers), in logs	5.309*** (0.307)	5.305*** (0.453)	4.736*** (0.413)	4.839*** (0.372)	4.134*** (0.534)	4.297*** (0.375)	4.462*** (0.504)	4.584*** (0.364)	4.194*** (0.493)	4.187*** (0.408)
Real GDP per capita, at PPP (1000s US Dollars)	0.066** (0.034)	0.101** (0.045)	0,044 (0.032)	0.064* (0.037)	-0.006 (0.031)	0,014 (0.035)	-0.081*** (0.030)	-0.062* (0.035)	-0.103*** (0.033)	-0.097* (0.057)
Democracy index (0 = poor democracy; 10 = highest democracy)	0,041 (0.091)	0,050 (0.354)	0.661*** (0.157)	0.682** (0.338)	0.553*** (0.159)	0.615** (0.316)	1.199*** (0.151)	1.258*** (0.305)	0,115 (0.186)	0,087 (0.341)
Share of total trade on GDP (%)	0.067*** (0.012)	0.066*** (0.018)	0.055*** (0.012)	0.052*** (0.015)	0.054*** (0.013)	0.054*** (0.015)	0.062*** (0.012)	0.059*** (0.014)	0.058*** (0.013)	0.053*** (0.015)
Urban population (% of total)	0.417*** (0.030)	0.384*** (0.053)	0.445*** (0.030)	0.434*** (0.045)	0.488*** (0.037)	0.468*** (0.044)	0.503*** (0.038)	0.484*** (0.043)	0.432*** (0.038)	0.403*** (0.046)
Gini index (0 = perfect equality; 100 = perfect inequality)	-0.274** (0.114)	-0.278** (0.142)	-0419*** (0.095)	-0.440*** (0.107)	-0.470*** (0.092)	-0.525*** (0.101)	-0.275*** (0.094)	-0.295*** (0.102)	-0.317*** (0.101)	-0.377*** (0.108)
Fragmentation index (0 = no fragmentation; 3 = serious fragmentation)	0,649 (0.557)	0,192 (1.079)	-	-	-	-	-	-	-	-
General government debt as a share of GDP (%)	-	-	-0.066*** (0.014)	-0.085*** (0.016)	-	-	-	-	-	-
Inflation rate (%)	-	-	-	-	-0.003 (0.002)	-0.003 (0.003)	-	-	-	-
Unemployment rate (%)	-	-	-	-	-	-	-0.656*** (0.103)	-0.721*** (0.107)	-	-
Human development index (0 = lower development; 1 = higher development)	-	-	-	-	-	-	-	-	44.159*** (8.570)	50.679*** (14.651)
Adj. R2	0,33	-	0,33	-	0,32	-	0,35	-	0,34	-
number of observations	450	506	621	673	681	730	695	743	633	683

Notes:
1) All specifications estimated utilizing period random effects and the Cross-Section SUR (PCSE) coefficient covariance method.
2) All regressions include an intercept term (not shown in table)
3) Standard errors in parentheses
4) * significant at 10%; ** significant at 5%; *** significant at 1%

wealthiest countries in the world. Table 10 reports on the determinants of revenue decentralization for this group of countries.

Not surprisingly, the results are similar to those found for the European continent, with some important differences. Again, geographically bigger countries, with more developed democracies, open to international trade, urban, low income inequality, unemployment and growth, and high human development, are more likely to enjoy greater levels of revenue decentralization, consistent with the results for Europe. However, in OECD countries, lower levels of fragmentation and greater macroeconomic stability, reflected in lower inflation, are also conducive to greater revenue decentralization, underlining perhaps the heterogeneity of nations grouped under the OECD umbrella.

Regarding the determinants of expenditure decentralization in OECD countries – shown in Table 11 – the results are similar to the ones found for revenue decentralization, with some key differences.

Again, land area, the share of total trade on GDP, urban population, income inequality, level of fragmentation, inflation rate, unemployment rate, and the human development index all have similar impacts on expenditure decentralization. However, there is a strong statistical indication that the level of democracy is not as important for expenditure decentralization as for revenue decentralization. Furthermore, unlike the results obtained with revenue decentralization, government debt, specifically, low levels of public debt, are positively correlated with expenditure decentralization.

Table 12 summarizes the most relevant findings for each of the groups analyzed here.

As the table shows, the determinants of fiscal decentralization vary significantly across groups. Only one variable is consistently correlated with both fiscal decentralization indicators across all groups: country size. Additionally, higher human development rating is correlated with higher levels of decentralization in all groups except the Americas, where the relationship is unclear. Similarly, low income inequality is also positively correlated with both decentralization indicators in all regions except Asia, where the relationship between low inequality and fiscal decentralization is unclear.

Table 10:

Determinants of revenue decentralization, OECD

Independent variable	Sub-national revenues to general revenues									
	GLS(+2)	Tobit	GLS(+2)	Tobit	GLS(+2)	Tobit	GLS(+2)	Tobit	GLS(+2)	Tobit
Land area (square kilometers), in logs	4.995*** (0.388)	4.858*** (0.486)	5.612*** (0.331)	5.495*** (0.363)	5.523*** (0.245)	5.411*** (0.330)	5.414*** (0.234)	5.291*** (0.320)	5.062*** (0.309)	4.931*** (0.381)
Real GDP per capita, at PPP (1000s US Dollars)	-0.020 (0.041)	0,015 (0.055)	-0.008 (0.032)	-0.004 (0.041)	-0.028 (0.031)	-0.033 (0.038)	-0.058** (0.028)	-0.056 (0.037)	-0.111*** (0.042)	-0.115** (0.057)
Democracy index (0 = poor democracy; 10 = highest democracy)	-0.089 (0.769)	-0.047 (1.131)	1.638*** (0.624)	2.000** (0.781)	1.316*** (0.504)	1.648*** (0.563)	1.942*** (0.441)	2.211*** (0.521)	1.138** (0.563)	1.331** (0.668)
Share of total trade on GDP (%)	0.031** (0.013)	0.035* (0.021)	0.070*** (0.014)	0.066*** (0.017)	0.052*** (0.011)	0.049*** (0.016)	0.059*** (0.010)	0.054*** (0.016)	0.048*** (0.012)	0.044*** (0.017)
Urban population (% of total)	0.455*** (0.045)	0.414*** (0.064)	0.423*** (0.039)	0.417*** (0.053)	0.417*** (0.034)	0.419*** (0.048)	0.383*** (0.035)	0.387*** (0.047)	0.385*** (0.040)	0.371*** (0.053)
Gini index (0 = perfect equality; 100 = perfect inequality)	-0.910*** (0.145)	-0.737*** (0.138)	-0.896*** (0.101)	-0.844*** (0.097)	-0.896*** (0.088)	-0.865*** (0.088)	-0.816*** (0.086)	-0.795*** (0.086)	-0.780*** (0.101)	-0.732*** (0.099)
Fragmentation index (0 = no fragmentation; 3 = serious fragmentation)	-3.389*** (0.533)	-3.467** (1.775)	-	-	-	-	-	-	-	-
General government debt as a share of GDP (%)	-	-	0,013 (0.015)	0,005 (0.015)	-	-	-	-	-	-
Inflation rate (%)	-	-	-	-	-0.112*** (0.034)	-0.113** (0.055)	-	-	-	-
Unemployment rate (%)	-	-	-	-	-	-	-0.539*** (0.108)	-0.464*** (0.115)	-	-
Human development index (0 = lower development; 1 = higher development)	-	-	-	-	-	-	-	-	44.349*** (13.595)	48.860*** (16.302)
Adj. R2	0,37	-	0,43	-	0,45	-	0,46	-	0,43	-
number of observations	414	463	630	675	703	747	727	770	622	666

Notes:
1) All specifications estimated utilizing period random effects and the Cross-Section SUR (PCSE) coefficient covariance method.
2) All regressions include an intercept term (not shown in table)
3) Standard errors in parentheses
4) * significant at 10%; ** significant at 5%; *** significant at 1%

Table 11:

Determinants of expenditure decentralization, OECD

Independent variable	Sub-national expenditures to general expenditures									
	GLS(+2)	Tobit	GLS(+2)	Tobit	GLS(+2)	Tobit	GLS(+2)	Tobit	GLS(+2)	Tobit
Land area (square kilometers), in logs	5.114*** (0.399)	5.074*** (0.494)	5.433*** (0.288)	5.266*** (0.379)	5.272*** (0.302)	5.056*** (0.359)	5.163*** (0.316)	4.913*** (0.341)	5.399*** (0.306)	5.276*** (0.392)
Real GDP per capita, at PPP (1000s US Dollars)	0,012 (0.039)	0,055 (0.056)	0,044 (0.032)	0,055 (0.042)	0,026 (0.032)	0,025 (0.040)	-0.016 (0.029)	-0.022 (0.038)	-0.018 (0.046)	-0.002 (0.059)
Democracy index (0 = poor democracy; 10 = highest democracy)	-0.542 (0.716)	-0.402 (1.150)	0,980 (0.651)	0,994 (0.788)	-0.084 (0.652)	0,443 (0.678)	0,708 (0.549)	1.047* (0.625)	-0.079 (0.635)	0,072 (0.688)
Share of total trade on GDP (%)	0.034*** (0.013)	0.038* (0.022)	0.069*** (0.013)	0.061*** (0.017)	0.052*** (0.013)	0.049*** (0.017)	0.061*** (0.012)	0.055*** (0.016)	0.059*** (0.013)	0.056*** (0.017)
Urban population (% of total)	0.476*** (0.042)	0.430*** (0.065)	0.446*** (0.040)	0.432*** (0.053)	0.433*** (0.037)	0.436*** (0.051)	0.398*** (0.038)	0.397*** (0.049)	0.400*** (0.046)	0.394*** (0.055)
Gini index (0 = perfect equality; 100 = perfect inequality)	-0.961*** (0.138)	-0.797*** (0.141)	-0.822*** (0.110)	-0.714*** (0.107)	-0.826*** (0.103)	-0.729*** (0.101)	-0.712*** (0.101)	-0.618*** (0.096)	-0.752*** (0.110)	-0.669*** (0.109)
Fragmentation index (0 = no fragmentation; 3 = serious fragmentation)	-3.943*** (0.546)	-3.805** (1.806)	-	-	-	-	-	-	-	-
General government debt as a share of GDP (%)	-	-	-0.009 (0.015)	-0.031** (0.015)	-	-	-	-	-	-
Inflation rate (%)	-	-	-	-	-0.143*** (0.047)	-0.119** (0.057)	-	-	-	-
Unemployment rate (%)	-	-	-	-	-	-	-0.656*** (0.117)	-0.726*** (0.117)	-	-
Human development index (0 = lower development; 1 = higher development)	-	-	-	-	-	-	-	-	29.787** (15.429)	27.233* (16.905)
Adj. R2	0,38	-	0,40	-	0.40	-	0,42	-	0,41	-
number of observations	414	463	613	652	672	708	696	731	615	656

Notes:

1) All specifications estimated utilizing period random effects and the Cross-Section SUR (PCSE) coefficient covariance method.

2) All regressions include an intercept term (not shown in table)

3) Standard errors in parentheses

4) * significant at 10%; ** significant at 5%; *** significant at 1%

Table 12:

Summary Results - Determinants of Fiscal Decentralization

	Revenue Decentralization					Expenditure Decentralization				
	All countries	America	Asia	Europe	OECD	All countries	America	Asia	Europe	OECD
Land area	+	+	+	+	+	+	+	+	+	+
Real GDP per capita	+	~	~	~	–	+	~	~	~	~
Democracy index	+	–	–	+	+	+	–	+	+	~
Share of total trade on GDP	+	–	–	+	+	+	+	–	+	+
Urban population	+	–	–	+	+	+	+	~	+	+
Gini index	–	–	~	–	–	–	–	–	–	–
Fragmentation index	+	+	~	~	–	~	~	~	~	–
General government debt as a share of GDP	~	+	~	–	~	–	+	–	–	–
Inflation rate	~	–	~	~	–	~	~	~	~	–
Unemployment rate	–	+	–	–	–	–	+	~	–	–
Human development index	+	–	+	+	+	+	~	+	+	+

Nomenclature: + means 'consistent statistically significant positive correlation'; - 'consistent statistically significant negative correlation'; ~ 'inconsistent statistically significant correlation'

CONCLUSIONS

This paper analyzes the empirical determinants of fiscal decentralization in a sample of eighty-four countries and subsets of countries according to geographical regions and level of wealth. The main findings are as follows: the land area of countries is always an important determinant of fiscal decentralization, irrespective of the country group under analysis. Additionally, high levels of human development seem to be an important driver of decentralization, although this relationship is not as clear in the Americas. Higher real GDP per capita levels are also conducive for greater levels of fiscal decentralization in the full sample of countries, but its impact varies between country groups. Likewise, mature and developed democracies seem to facilitate expenditure and revenue decentralization in Europe and OECD countries and expenditure decentralization in Asia. Greater openness to trade and higher levels of urbanization also promote both expenditure and revenue decentralization in Europe and in OECD countries, and expenditure decentralization in America. High levels of income equality seem to be conducive for greater decentralization in all groups but Asia, where the effect on revenue decentralization is unclear. High fragmentation is an important determinant of decentralization in the full sample of countries and the Americas specifically, but in other groups the impact of this variable is less clear. Finally, higher levels of government debt and unemployment affect decentralization more in the Americas than in other regions, and the impact of the inflation rate is, for the most part, indeterminate.

The most important policy implication is the importance of the general context of fiscal decentralization, and certain variables will exert different effects on this process depending on the stage of development of the country in question. For the most part, bigger, urbanized countries, with more equitable income distribution, high levels of human capital formation, open to the outside world, are more likely to exhibit greater fiscal decentralization. Fiscal decentralization is rarely a goal in itself; rather, decentralization is used as a tool to achieve a more efficient distribution of public funds or a fairer distribution of national income. Thus, if devolving fiscal responsibilities to lower levels of government is a government objective, countries should act to affect those variables that will increase the likelihood of establishing an effective fiscal decentralization regime: strengthen democracy and democratic institutions, improve education quality, refine income redistribution policies, and open the economy to the outside world.

Appendix: Decentralization Indicators and Summary Statistics

Region	Country	Sub-national government revenues to general government revenues (%)				Sub-national government expenditures to general government expenditures (%)			
		Period	Period Average	Highest (year)	Lowest (year)	Period	Period Average	Highest (year)	Lowest (year)
Africa	Cape Verde	2008-2009	11.53	12.29 (2008)	10.78 (2009)	2008-2009	10.96	11.26 (2009)	10.67 (2008)
	Republic of Congo	2003-2012	1.71	2.16 (2003)	1.25 (2010)	2003-2012	2.37	3.23 (2012)	0.63 (2009)
	Kenya	2014-2015	10.88	12.50 (2015)	9.25 (2014)	2014-2015	19.93	20.85 (2014)	19.00 (2015)
	Lesotho	2003-2007	1.49	2.75 (2006)	0.54 (2004)	2003-2007	0.84	1.61 (2007)	0.49 (2004-05)
	Mauritius	2002-2014	6.47	7.66 (2004)	5.05 (2002-03)	2002-2014	5.40	6.47 (2005)	2.98 (2002-03)
	Morocco	2002-2011	11.19	12.84 (2010)	10.30 (2008)	2002-2011	6.88	7.58 (2007)	4.91 (2008)
	Rwanda	2014-2015	19.90	20.28 (2015)	19.52 (2014)	2014-2015	24.58	24.72 (2015)	24.44 (2014)
	South Africa	1980-2015	45.59	63.84 (1996)	20.78 (1989)	1980-2015	39.96	55.69 (2004)	18.24 (1986)
	Tanzania	2014	21.76	21.76 (2014)	21.76 (2014)	2014	16.00	16.00 (2014)	16.00 (2014)
	Tunisia	2008-2012	5.38	6.44 (2010)	1.99 (2008)	2008-2012	2.32	2.56 (2010)	1.80 (2008)
	Uganda	2015	24.58	24.58 (2015)	24.58 (2015)	2015	23.42	23.42 (2015)	23.42 (2015)
America	Argentina	1990, 00, 05, 2007-2015	37.35	45.59 (2015)	21.17 (2005)	1980-2013	42.52	51.51 (2006)	24.05 (1982)
	Bolivia	1985-2014	31.95	47.62 (2002)	15.14 (1985)	1986-2014	24.69	39.11 (2007)	10.05 (1992)
	Brazil	2000-2015	51.98	56.27 (2009)	49.19 (2005)	2006-2015	48.87	53.91 (2008)	44.05 (2015)
	Canada*	1980-2015	72.13	79.74 (2010)	66.36 (2000)	1990-2015	71.35	75.97 (2014)	66.17 (1990)
	Chile*	1980-2015	9.81	15.52 (2015)	3.49 (1980)	2000-2015	12.72	14.41 (2015)	9.60 (2008)
	Colombia	1998-2015	39.31	45.79 (2000)	25.00 (2001)	1998-2015	31.58	36.60 (2015)	22.65 (2002)
	Costa Rica	2000-2015	4.73	6.83 (2007)	3.19 (2000)	2002-2015	3.69	6.14 (2005)	2.89 (2002)
	El Salvador	2002-2015	10.06	13.53 (2005)	4.82 (2002)	2002-2015	6.80	9.55 (2005)	3.30 (2002)
	Honduras	2003-2015	11.32	15.22 (2005)	7.78 (2015)	2003-2015	7.48	13.73 (2005)	3.86 (2015)
	Jamaica	2003-2005	1.14	1.23 (2003)	0.95 (2005)	2003-2005	1.18	1.43 (2003)	0.96 (2005)
	Mexico*	1980-2013	31.75	44.76 (2009)	19.07 (1989)	1990-2013	44.58	59.66 (1997)	27.60 (1990)
	Paraguay	2005-2015	9.04	11.01 (2013)	7.58 (2010)	2005-2015	8.60	10.09 (2012)	7.58 (2014)
	Peru	1995-2015	31.48	39.60 (2009)	21.67 (1998)	1995-2015	25.59	30.92 (2012	18.71 (1998)
	United States*	1980-2015	54.87	60.83 (1993)	47.98 (2001)	1990-2015	48.83	58.19 (2000)	43.08 (2011)

Region	Country	Sub-national government revenues to general government revenues (%)				Sub-national government expenditures to general government expenditures (%)			
		Period	Period Average	Highest (year)	Lowest (year)	Period	Period Average	Highest (year)	Lowest (year)
Asia	Afghanistan	2006-2013	0.85	2.36 (2006)	0.37 (2008)	2006-2013	0.62	1.16 (2006)	0.37 (2011)
	Armenia	2004-2015	7.91	9.96 (2015)	5.04 (2008)	2004-2015	7.50	9.13 (2015)	5.12 (2008)
	Azerbaijan	2008-2015	1.65	2.43 (2009)	1.29 (2011)	2008-2015	3.11	3.45 (2009)	2.65 (2012)
	China	2005-2014	86.79	95.09 (2013)	71.51 (2007)	na	na	na	na
	Georgia	2003-2015	24.54	35.67 (2003)	19.45 (2007)	2003-2015	20.08	33.33 (2003)	13.03 (2008)
	Indonesia	2008-2015	41.94	51.66 (2015)	34.54 (2008)	2008-2015	34.44	41.22 (2015)	29.01 (2008)
	Iran	1980-1989, 2001-2009	42.86	96.55 (1988)	5.26 (2005)	2001-2009	3.33	4.50 (2001)	2.59 (2006)
	Israel*	1980-2015	13.79	19.28 (1999)	9.79 (1983)	1980-2015	11.21	13.23 (2015)	7.02 (1983)
	Japan*	1994-2015	48.63	53.21 (2009)	43.68 (2015)	1994-2015	40.97	44.52 (1994)	37.96 (1998)
	Jordan	2008-2013	6.56	8.18 (2008)	5.49 (2011)	2008-2013	4.15	4.47 (2009)	3.93 (2012)
	Kazakhstan	2000-2015	44.05	55.05 (2000)	33.58 (2011)	2000-2015	44.84	53.43 (2001)	38.55 (2015)
	Malaysia	1996-2001	15.41	17.17 (2000)	11.89 (2001)	1996-2001	12.86	14.21 (1996)	11.23 (2001)
	Mongolia	1992-2013	25.00	50.41 (1992)	5.54 (2006)	1992-2013	27.32	51.37 (1993)	7.97 (2006)
	Russia	2000-2015	47.18	59.18 (2009)	37.97 (2003)	2000-2015	49.30	59.78 (2012)	36.33 (2000)
	South Korea*	2007-2015	48.59	54.10 (2009)	42.53 (2012)	2007-2015	45.16	51.72 (2008)	34.18 (2007)
	Thailand	1980-2015	13.03	23.81 (1980)	6.63 (1995)	1995-2015	9.93	14.94 (2008)	5.10 (1999)
	Turkey*	2008-2015	11.39	12.29 (2011)	10.19 (2008)	2008-2015	9.28	10.31 (2014)	8.31 (2009)
	United Arab Emirates	2011-2015	87.51	88.93 (2013)	83.57 (2015)	2011-2015	87.53	88.98 (2014)	85.58 (2012)
	Uzbekistan	2011-2015	33.02	35.21 (2015)	29.05 (2012)	2011-2015	41.61	42.86 (2012)	39.62 (2015)

Region	Country	Sub-national government revenues to general government revenues (%)				Sub-national government expenditures to general government expenditures (%)			
		Period	Period Average	Highest (year)	Lowest (year)	Period	Period Average	Highest (year)	Lowest (year)
Europe	Albania	2011-2015	15.74	16.95 (2013)	14.75 (2012)	2011-2015	12.62	12.86 (2014)	12.30 (2015)
	Austria*	1980-2015	35.90	37.68 (1994)	34.10 (2007)	1980-2015	32.29	34.88 (2015)	29.20 (1987)
	Belarus	2003-2015	39.39	43.69 (2013)	34.53 (2009)	2003-2015	36.66	39.35 (2011)	32.79 (2008)
	Belgium*	1980-2015	30.59	48.72 (2015)	12.29 (1990)	1980-2015	28.69	42.97 (2008)	9.66 (1994)
	Bosnia and Herzegovina	2005-2015	11.34	13.14 (2007)	9.84 (2013)	2005-2015	9.86	11.08 (2006)	9.05 (2013)
	Bulgaria	1990-2015	20.63	28.63 (1993)	15.38 (2001)	1990-2015	21.20	26.58 (1998)	17.43 (1994)
	Croatia	2002-2014	11.93	12.66 (2009)	10.97 (2002)	2002-2014	9.80	10.50 (2009)	8.85 (2002)
	Cyprus	1995-2015	4.49	5.71 (2011)	3.65 (1995)	1995-2015	3.52	3.97 (2011)	2.89 (2014)
	Czech Republic*	2000-2015	26.10	29.38 (2010)	21.24 (2001)	2000-2015	20.38	22.69 (2003)	16.25 (2001)
	Denmark*	1980-2015	59.44	67.01 (1980)	51.46 (1986)	1980-2015	59.05	65.67 (2006)	53.91 (1985)
	Estonia*	1995-2015	24.96	27.67 (2008)	22.28 (2000)	1995-2015	25.84	30.62 (1995)	22.22 (2000)
	Finland*	1980-2015	41.74	50.44 (1992)	32.41 (2000)	1980-2015	40.63	45.82 (1986)	33.11 (1995)
	France*	1980-2015	19.80	23.39 (2009)	16.35 (1981)	1990-2015	17.91	20.07 (2013)	14.87 (1990)
	Germany*	1980-2015	45.22	47.69 (1980)	42.89 (2003)	1980-2015	44.18	47.42 (2014)	38.86 (1995)
	Greece*	1995-2015	8.88	11.44 (1997)	7.50 (2011)	1995-2015	6.66	9.00 (1998)	5.69 (2013)
	Hungary*	1981-2015	25.38	31.12 (1992)	16.56 (2015)	1981-2015	22.99	31.92 (2015)	15.40 (2013)
	Iceland*	1980-2015	26.55	31.42 (2011)	22.54 (1982)	1980-2015	23.80	29.76 (2015)	18.26 (1990)
	Ireland*	1980-2015	27.28	41.62 (2003)	8.50 (2014)	1980-2015	23.94	38.73 (2004)	7.36 (2010)
	Italy*	1985-2015	31.20	35.08 (2009)	28.11 (1997)	1995-2015	28.91	31.55 (2009)	23.74 (1995)
	Latvia*	1995-2015	27.84	32.50 (2010)	23.08 (1995)	1995-2015	27.45	30.25 (2007)	24.66 (2010)
	Lithuania	1995-2015	25.78	31.64 (2010)	22.08 (1997)	1995-2015	25.36	28.16 (2001)	18.99 (1997)
	Luxembourg*	1990-2015	13.61	16.07 (1991)	11.66 (2015)	1990-2015	12.08	14.11 (1990)	10.28 (2012)
	Malta	1995-2015	1.74	2.16 (1996)	1.31 (2008)	1995-2015	1.28	1.50 (2011)	0.97 (1995)
	Moldova	2002-2015	26.71	33.03 (2002)	23.89 (2008)	2003-2015	22.88	30.55 (2003)	21.20 (2013)
	Netherlands*	1980-2015	33.56	47.67 (1995)	29.86 (1993)	1980-2015	31.48	39.81 (1995)	26.40 (1990)
	Norway*	1980-2015	29.90	37.97 (1992)	20.20 (2008)	1980-2015	34.36	37.74 (1988)	29.77 (2004)
	Poland*	1984-2015	29.02	35.68 (2010)	17.41 (1994)	1984-2015	26.17	30.55 (2008)	14.86 (1994)

Region	Country	Sub-national government revenues to general government revenues (%)				Sub-national government expenditures to general government expenditures (%)			
		Period	Period Average	Highest (year)	Lowest (year)	Period	Period Average	Highest (year)	Lowest (year)
Europe	Portugal*	1987-2015	13.44	16.59 (2009)	8.06 (1990)	1987-2015	10.45	14.19 (2008)	4.56 (1987)
	Romania	1980-2015	18.43	29.80 (2015)	6.84 (1991)	1980-2015	16.38	24.09 (2013)	6.70 (1986)
	Serbia	2007-2012	17.67	19.36 (2012)	16.35 (2009)	2007-2012	14.60	15.65 (2007)	13.82 (2010)
	Slovak Republic*	1995-2015	14.03	18.87 (2004)	6.44 (1998)	1995-2015	13.20	18.05 (2003)	6.26 (2000)
	Slovenia*	1992-2015	18.82	22.02 (2010)	10.98 (1993)	1992-2015	15.93	17.97 (2006)	10.20 (1994)
	Spain*	1980-2015	40.87	63.05 (2009)	12.00 (1980)	1980-2015	37.29	53.42 (2008)	10.12 (1980)
	Sweden*	1980-2015	43.68	50.41 (2014)	37.08 (1990)	1980-2015	42.57	49.69 (2015)	32.46 (1994)
	Switzerland*	1980-2014	62.06	64.33 (1993)	59.34 (1984)	1980-2014	61.27	64.10 (1990)	56.57 (1984)
	Ukraine	2001-2015	32.92	35.98 (2014)	28.18 (2005)	2001-2015	30.13	32.62 (2001)	26.75 (2005)
	United Kingdom*	1980-2015	29.53	34.57 (2009)	26.40 (1998)	1980-2015	26.99	29.00 (2006)	25.12 (2014)
Oceania	Australia*	1980-2015	49.17	55.59 (1993)	45.14 (2005)	1980-2015	47.15	50.52 (1990)	44.89 (2014)
	Kiribati	2011-2015	2.63	3.94 (2011)	1.56 (2015)	2011-2015	3.36	3.74 (2013)	2.57 (2015)
	New Zealand*	1980-1981, 2003-2007	9.93	13.35 (1980)	8.37 (2006)	2003-2007	8.75	9.01 (2007)	8.16 (2003)

Notes:
1) Main source of data for all countries: IMF Government Finance (GFS) Statistics Annual Yearbook (www.imf.org/en/Data).
2) Additional sources of data for all countries and for individual nations:
Organization for Economic Cooperation and Development (OECD) (www.oecd.org/ctp/federalism/fiscal-decentralisation-database.htm) Economic Commission for Latin America and the Caribbean (estadisticas.cepal.org/cepalstat/WEB_CEPALSTAT/Portada.asp) Argentina: Federal Tax Commission (www.cfi.gov.ar) and the Treasury and Ministry of Finance (www.economia.gob.ar) Bolivia: National Institute of Statistics (www.ine.gob.bo)
3) *OECD countries
4) Countries from Asia include those in the continental landmass known as Eurasia.

REFERENCES

1. Alesina, A., & Spolaore, E. (2003). *The size of nations*. Cambridge, MA: The MIT Press.
2. Arzaghi, M., & Henderson, V. (2005). Why countries are fiscally decentralizing. *Journal of Public Economics*, *89*, 1157-1189.
3. Bodman, P., & Hodge, A. (2010). What drives fiscal decentralisation? Further assessing the role of income. *Fiscal Studies*, *31*(3), 373-404.
4. Cai, H., & Treisman, D. (2006). Did government decentralization cause China's economic miracle? *World Politics*, *5*(4), 505-535.
5. Canavire-Bacarreza, G., Martinez-Vazquez, J., & Yedgenov, B. (2017). Reexamining the determinants of fiscal decentralization: What is the role of geography? *Journal of Economic Geography, 17*(6), 1209-1249.
6. Channa, A., & Faguet, J.P. (2016). Decentralization of health and education in developing countries: A Quality-adjusted review of the empirical literature. *World Bank Research Observer, 31*(2), 199-241.
7. Faguet, J.P. (2014). Decentralization and governance. *World Development*, *53*, 2-13.
8. Faguet, J.P., & Pöschl, C. (2015). Is decentralization good for development? Perspectives from academics and policy makers. In Faguet, J.P. & Pöschl, C. (eds.). *Is decentralization good for development? Perspectives from academics and policy makers*. Oxford, UK: Oxford University Press.
9. Fedelino, A. & Smoke, P. (2013). Bridging public financial management and fiscal decentralization reforms in developing countries. In Cangiano, M.M., Curristine, M.T.R., &. Lazare, M.M. (Eds.). *Public financial management and its emerging architecture* (pp. 363-388). Washington, DC: International Monetary Fund.
10. Gadenne, L., & Singhal, M. (2014). Decentralization in developing economies. *Annual Review of Economics, 6*, 581-604.
11. Grazzi, M. & Jaramillo, F. (2015). Is Latin America on the path to achieving sustainable fiscal decentralization? In Faguet, J.P., & Pöschl, C. (Eds.). *Is decentralization good for development? Perspectives from academics and policy makers* (pp. 109-128). Oxford, UK: Oxford University Press.
12. Jametti, M., & Joanis, M. (2010). Determinants of fiscal decentralization: Political economy aspects. Document de treball de l'IEB 2010/7. Institut d'Economia de Barcelona. Retrieved from https://www.researchgate.net/publication/46469104_Determinants_of_fiscal_decentralization_political_economy_aspects
13. Jílek, M. (2015). Factors of tax decentralization in OECD-Europe countries. *European Financial and Accounting Journal, 10*(2), 33-49.
14. Letelier, L.S. (2005). Explaining fiscal decentralization. *Public Finance Review*, *33*(2), 155-183.
15. Musgrave, R. (1959). *The theory of public finance*. New York, NY: McGraw Hill.
16. Musgrave, R. (1969). Theories of fiscal federalism. *Public Finance*, *24*(4), 521-536.

17. Oates, W.E. (1972). *Fiscal federalism*. New York, NY: Harcourt Brace Jovanovich,

18. Oates, W.E. (1999). An essay on fiscal federalism. *Journal of Economic Literature*, *37*(3), 1120-1149.

19. Oates, W.E. (2007). On the theory and practice of fiscal Decentralization. CREI Working Paper no 1/2007. Retrieved from http://host.uniroma3.it/centri/crei/pubblicazioni/workingpapers2007/CREI_01_2007.pdf

20. Panizza, U. (1999). On the determinants of fiscal centralization: Theory and evidence. *Journal of Public Economics*, *74*, 97-139.

21. Rodden, J. (2004). Comparative federalism and decentralization: On meaning and measurement. *Comparative Politics*, *36*(4), 481-500.

22. Treisman, D. (2006). Explaining fiscal decentralisation: Geography, colonial history, economic development and political institutions. *Commonwealth & Comparative Politics,* 44:3, pp. 289-325.

23. Samuelson, P.A. (1954). The pure theory of public expenditure. *The Review of Economics and Statistics, 36*(4), 387-389.

24. Smoke, P. (2015). Rethinking decentralization: Assessing challenges to a popular public sector reform. *Public Administration and Development*, *35*(2), 97-112.

25. Stegarescu, D. (2009). The effects of economic and political integration on fiscal decentralization: Evidence from OECD countries. *Canadian Journal of Economics*, *42*(2), 694-718.

26. Tiebout, C.M. (1956). A pure theory of local expenditures. *Journal of Political Economy*, *64*, 416-424.