

Chapter 2

Fiscal decentralisation and economic growth

by

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This chapter deals with the relationship between fiscal decentralisation and economic growth. Using a novel empirical approach, the analysis suggests that decentralisation tends to be supportive of economic growth. Decentralisation of tax revenues tends to have a stronger impact than spending decentralisation, especially when government is small. Intergovernmental transfers, covering a large part of sub-central spending in most countries, are associated with slower growth, which could point at common-pool problems and a lack of incentives for own-source development. Balanced decentralisation – i.e. when the various policy functions are decentralised to a similar extent – is conducive to growth. Balanced decentralisation allows sub-national governments to better co-ordinate policy and to reap economies of scale and scope across functions. While public investment tends to have a positive growth effect overall, its decentralisation is negatively associated with growth.

Introduction and main findings

Sub-national governments are responsible for around 33% of OECD government spending and collect 19% of tax revenues, with considerable scope to affect their country's fiscal and economic outcomes. Sub-national policies are one determinant of how households and firms save, invest, spend, innovate and pay taxes; and, by encouraging productivity in the public sector, sub-national governments help increase the productivity of businesses. Competitive pressure and policy benchmarking drive jurisdictions to factor in the demands and preferences of households and firms. As such, sub-central fiscal autonomy and intergovernmental fiscal frameworks shape fiscal outcomes and finally also affect growth.

This chapter shows empirically that the design of fiscal decentralisation matters for growth. The chapter is organised as follows: the next section provides a short overview of decentralisation trends over the last two decades and a literature review portraying the channels linking decentralisation to growth; the third section presents the growth model and the data for the empirical investigation; and the last section shows the results, divided into a sub-section on overall decentralisation measures and one on decentralisation of individual spending items. Finally, the role of decentralisation for inclusive growth will be shortly assessed, in particular, whether decentralisation creates synergies or trade-offs between growth and inequality.

The chapter relies partly on a newly constructed dataset on public spending and taxation across OECD countries, which combines various existing data sources in a consistent manner (Bloch et al., 2016). Given that data availability varies – in particular, the time series for the tax side is longer than for the spending side – different specifications are used for estimating the effects of tax and spending decentralisation.

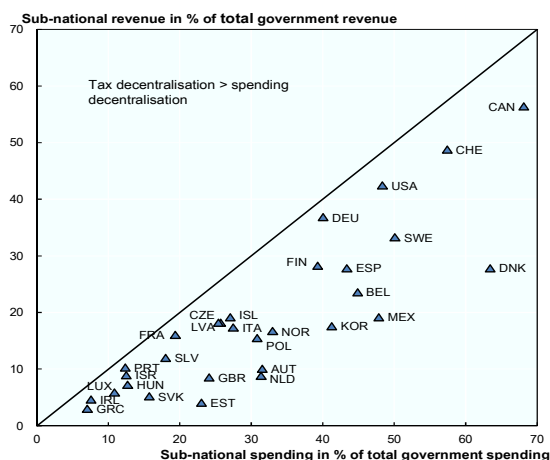
Decentralisation and economic performance

A bird's-eye view of fiscal decentralisation

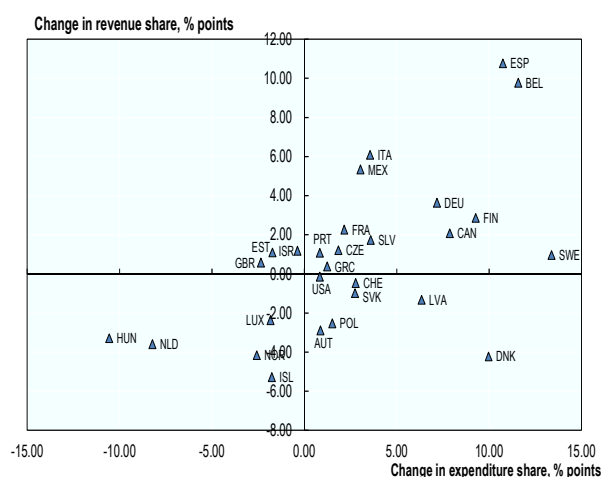
Fiscal decentralisation – the role of sub-national government in overall public finance – varies strongly across countries, but has changed relatively little over time. A commonly used indicator measuring decentralisation is the sub-central revenue or spending share. OECD-wide, in 2014, sub-central governments (SCGs) were responsible for around 33% of general government spending on an unweighted average, while the sub-central share of own revenue – own taxes, user fees and property income – averaged 19% (Figure 2.1, Panel A). Both the sub-central share of spending and revenue increased a bit since 1995 (Figure 2.1, Panel B). The difference between sub-central spending and own revenue – the vertical fiscal imbalance – hovered between 14% and 16% of general government spending over the last two decades. Decentralisation reforms that have profoundly changed intergovernmental fiscal frameworks were rare and confined to a few countries on a secular decentralisation path (OECD/KIPF, 2016).

Figure 2.1. Revenue and spending assignment vary widely across countries

A. Decentralisation ratios, 2016 or latest available year



B. Decentralisation ratios, 1995-2016 or latest



Note: Sub-national spending includes intergovernmental grants, while sub-national revenues do not.

Source: OECD Fiscal Network database, <http://oe.cd/fiscalnetwork>.

Decentralisation owes much to country size. Larger countries are more decentralised than smaller ones, with a few outliers confirming the rule: Denmark and Switzerland are small and highly decentralised, while France is large and quite centralised (Figure 2.2). The relationship is independent of whether decentralisation is measured by the sub-central revenue or spending share, or whether area or population is the gauge for size. Geography plays a role, suggesting that some benefits of decentralised policy making – taking better account of heterogeneous preferences, lower information and co-ordination cost, fewer diseconomies of scale and scope – are related to space and distance. As such, reforms to intergovernmental fiscal frameworks often have a spatial or territorial component as seen when jurisdictions merge or when an intermediate (regional) government layer is created or abolished.

Figure 2.2. Larger countries are more decentralised than smaller ones
Area, population, and the share of sub-central in general government revenue, 2014



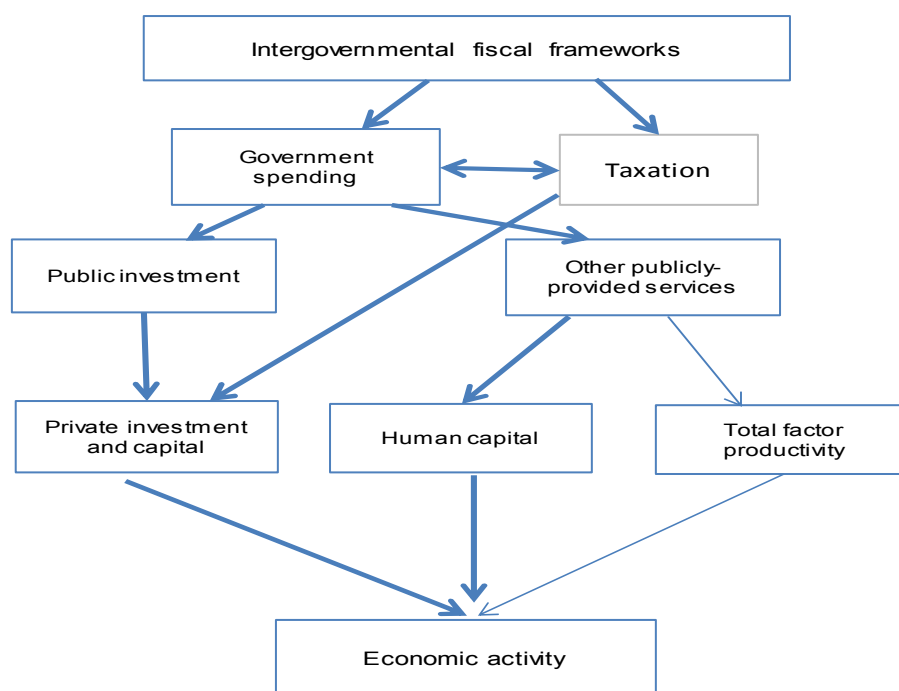
Note: Federal countries are shown in black.

Source: OECD Economic Outlook and OECD Regional Database.

Channels from decentralisation to growth

The link from decentralisation to economic outcomes can be portrayed by a macroeconomic production function, where output is determined by physical and human capital and the productivity of these factors. Productivity, in turn, is affected by institutions and policy design, including fiscal frameworks. The productivity of firms and the well-being of households depend on the taxes sub-national governments levy and the money they spend on the various policy functions. More specifically, private investment may rely on investment by the public sector, and the taxes levied. Finally, decentralisation in specific sectors such as education or healthcare may directly affect their effectiveness, which in turn may affect human capital formation or productivity. Channels, shown as *thick arrows*, will be analysed in more detail in this chapter (Figure 2.3).

Figure 2.3. Channels from decentralisation to economic activity



Note: Channels, shown by thick arrows, are analysed in more detail in this chapter.

Source: Authors' elaboration.

The effect of intergovernmental fiscal frameworks on economic performance works through several channels. Decentralisation can have both a positive or negative long-term impact on growth, so the overall effect is indeterminate on theoretical grounds, as discussed below.

Decentralisation can be conducive to growth

- **Inter-jurisdictional competition and public sector efficiency:** The growth-promoting channel most often cited is inter-jurisdictional competition for mobile production factors (Tiebout, 1956). The interaction between locational choices of households and firms and the policy choices of sub-national governments are thought to make for a more productive public sector, which in turn would promote productivity in the private sector. Also, peripheral jurisdictions may lift their growth prospects by competing against the gravitational pull of agglomerations (Baldwin and Krugman, 2004).
- **Political economy and the preservation of markets:** This channel relates to the political economy of intergovernmental fiscal frameworks. Decentralisation may restrain the power of special interests and reduce spending on non-productive items such as on subsidies (Besley and Coate, 2003). Decentralisation may also help reduce regulation and preserve open markets (Weingast, 1995). Finally, decentralisation may encourage policy innovation and yardstick competition, improving the productivity of the sub-central public sector and hence foster private investment (Besley and Case, 1995).

Decentralisation can be harmful to growth

- **Economies of scale and scope:** The lack of size may increase the cost of public services (Spolaore, 2015). A typical case in point is infrastructure and network industries whose cost decreases with growing size and where insufficient scale and/or the lack of co-ordination between jurisdictions or across government levels may fail to take account of network externalities and diminish the impact of infrastructure investment.
- **Spending and tax externalities:** The individual policy choices of jurisdictions may harm growth prospects of others or those of the entire country. Externalities may induce an undersupply of public goods and especially of public investment and infrastructure (Zodrow and Mieszkowski, 1986). It may also distort the tax structure and lead to excessively low sub-national tax rates (Wildasin, 1989). Such tax externalities could hamper growth.

Empirical investigations linking decentralisation and growth have provided mixed results so far. A meta-analysis of around 30 studies concludes that there is no strong support for either a positive or negative effect of intergovernmental fiscal frameworks on growth (Baskaran et al., 2016). Single-country studies provide more significant – and positive – results than cross-country studies, likely because the institutional and policy environment can be better controlled for in an individual country study. Revenue decentralisation tends to be associated with more positive results than spending decentralisation (Asatryan and Feld, 2014). An earlier study by the OECD Fiscal Network finds that decentralisation has a positive but economically weak effect on productivity (Blöchliger et al., 2013). Finally, some recent research finds that decentralisation is associated with less income inequality (Stossberg and Blöchliger, 2017).

Finally, the overall results suggest that the effect of decentralisation on growth depends on the broader policy environment and the quality of the institutional framework

within which sub-national governments operate (Enikopolov and Zhuravskaya, 2007). In general, the link from decentralisation to growth seems to be more robust for developed countries than for emerging economies (Martinez-Vazquez and McNab, 2006), suggesting that institutional quality plays a role. However, adding indicators of government effectiveness tends to reduce rather than improve significance in several studies that use them as controls, probably because decentralisation is closely associated with government quality (Baskaran, Feld and Schnellenbach, 2016).

Empirical set-up and data

Model and specifications

The empirical approach builds on the neo-classical growth theory. In a human capital augmented Solow model, in the steady state, the logarithm of gross domestic product (GDP) per capita depends linearly on the logarithm of the stock of human capital and the logarithm of the investment rate (Mankiw, Romer and Weil, 1992). This long-term relationship is embedded in a convergence growth equation where the potential growth rate of GDP per capita depends on the past potential GDP per capita level, production factors and a set of structural variables influencing growth. The sample is restricted to OECD countries because these countries provide better data on decentralisation.¹ The convergence growth equation is augmented by the size of government and the decentralisation variables and embedded in an error-correction model, following Barro (2015):

$$\Delta \ln(Y_{i,t} / POP_{i,t}) = a - \phi [\ln(Y_{i,t-1} / POP_{i,t-1}) - a_1 \ln(\text{schooling}_{8t-1} * PISA_{i,t-1}) - a_2 \ln(I_{i,t-1} / Y_{i,t-1}) - \dots - a_3 X_{i,t-1} - a_4 G_{i,t-1} - a_5 D_{i,t-1}] + b_1 \Delta \ln(\text{schooling}_{8t} * PISA_{i,t}) + b_2 \Delta \ln(I_{i,t} / Y_{i,t}) + v_t + c_i + \varepsilon_{i,t} \quad (1)$$

where i indicates the country, t is time, Y is potential GDP in 2010 purchasing power parity, POP is the working-age population (age 15 to 74), schooling is the average years of schooling of the working age population, PISA is the mean PISA (Programme for International Student Assessment) score in 2006, I/Y is the cyclically-adjusted total investment rate² and X is a set of control variables including openness (measured as the sum of exports and imports to GDP), rule of law, employment protection legislation, inflation (measured by consumer price inflation), population size, old-age dependency ratio and financial development (proxied by the credit to GDP ratio). G is the size of government (cyclically-adjusted primary spending or revenue to potential GDP), and D are the sub-central spending or revenue variables, measured in terms of GDP or general government spending/revenue. v_t is a time fixed effect and c_i a country fixed effect. The standard errors are adjusted for country clusters to allow for serial correlation of the residuals. In this set-up, a decentralisation reform affects GDP growth in the short run and GDP levels in the long run. Since it can take decades to reach the new long-run GDP level after a reform, the temporary growth effect lasts for a long time.

The model is run both with and without country-fixed effects. The specification without country-fixed effects helps to capture the impact of fundamental cross-country differences in intergovernmental fiscal frameworks on growth. As mentioned above, most decentralisation ratios change slowly over time, while cross-country heterogeneity is much more significant (Table 2.1 and Figure 2.1). For instance, the estimated decentralisation coefficient in the growth equation may capture critical structural differences in the design of decentralisation across countries such as a persistently high (e.g. Denmark) or low (e.g. Greece) share of sub-central in overall spending or taxation.

As the specification without country-fixed effects exploits both the cross- and within-country variability, the standard errors of the coefficient estimates are smaller.

Table 2.1. **Most variation in decentralisation ratios is across countries**

	Share of between variance in total variance (in %)	
	Share of general government expenditure or revenue in GDP	Share of sub-central expenditure or revenue in GDP
Spending	84.0	95.2
Revenue	88.9	97.9
Tax revenue	92.1	92.0
Grants	--	90.9
Education	88.5	95.9
Health	84.3	89.2
Social protection	93.7	98.9
Investment	54.8	69.5
Wage	92.9	96.4
Subsidies	71.9	96.8

Source: Authors' calculations.

Data and measurement

The decentralisation data are taken from the *OECD Fiscal Decentralisation Database*. To account for differences in decentralisation design, altogether four different indicators are selected to enter *alternatively* into otherwise identical equations: spending decentralisation; revenue decentralisation; tax decentralisation; and intergovernmental transfers (OECD/KIPF, 2013). While revenue and tax revenue decentralisation are similar in highly decentralised countries, they tend to differ in fiscally centralised countries where sub-national governments rely on user fees rather than tax revenues. Spending, revenue and tax decentralisation indicators are available for the period 1970 to 2011 for a few OECD countries; for the period 1985 to 2014 for around half of the countries; and for the period 1995 to 2014 for most countries.

The control variables stem from various databases. Most macroeconomic variables are taken from the *OECD Economic Outlook November 2015 database*. The quality of education is measured as the average of reading, science and math PISA scores in 2006.³ Average years of schooling of the working-age population are from the *OECD Long-term Economic Outlook database*. The rule of law indicator stems from the *Worldwide Governance Indicator (WGI) database* of the World Bank. Employment protection legislation (EPL) is the protection for regular contracts based on the second edition of this OECD indicator. For these two slow-moving indicators, the average value over the available years is used in the regressions.⁴ The credit to GDP ratio is from the *World Bank Global Financial Development database*, with some adjustments made, as in Cournède and Denk (2015). Individual spending items by function (education, healthcare, etc.) and transactions (wages, investment, subsidies, etc.) are taken from Bloch et al. (2016) (see Annex Table 2.A1.1). The tax composition is taken from the *OECD Revenue Statistics*.

Certain decentralisation indicators are sensitive to the business cycle.⁵ To obtain a measure of decentralisation net of cyclical movements, the various decentralisation shares are cyclically adjusted following the methodology of Price, Dang and Botev (2015).

GDP is measured as potential GDP, and the size of government is expressed as cyclically adjusted primary spending to potential GDP. The use of cyclically adjusted variables is novel as research on decentralisation and growth has used non-adjusted variables so far (Baskaran, Feld and Schnellenbach, 2016). The final baseline sample for the growth regressions covers 797 country-year observations from 1987 to 2014, where the main restriction for the coverage of the sample is the availability of cyclically adjusted data. When the decentralisation variables are inserted, the sample size shrinks to between 400 and 550 observations. Descriptive statistics are provided in Annex Table 2.A1.1.

Results

Baseline results

The baseline regressions cover the production function incorporating physical and human capital and the control variables but without the fiscal decentralisation variables (Table 2.2). The regression is run on three panels: a parsimonious one, featuring investment and human capital only; a rich one, featuring many control variables; and an intermediate one excluding some controls. Each panel is run using both time-fixed effects and time- and country-fixed effects. Human capital is measured by PISA results rather than education spending as this reflects the quality of education. The regressions were also run with years of schooling and interacting PISA results with years of schooling, with results becoming a bit weaker.

Table 2.2. **Growth regression: Baseline results**

	(1)	(2)	(3)	(4)	(5)	(6)
Long term						
$\ln(Y_{it-1}/POP_{it-1})$	-0.024*** (0.0042)	-0.041*** (0.0085)	-0.020*** (0.0065)	-0.039*** (0.013)	-0.026*** (0.0062)	-0.039*** (0.0093)
$\ln(PISA_i * schooling_{it-1})$	0.020** (0.0080)	-0.015 (0.021)	0.0029 (0.0093)	-0.021 (0.023)	0.012 (0.0082)	-0.019 (0.017)
$\ln(I_{it-1}/Y_{it-1})$	0.014* (0.0071)	-0.0013 (0.0097)	0.023*** (0.0058)	0.012 (0.0095)	0.017*** (0.0058)	0.0094 (0.0088)
Short term						
$\Delta \ln(PISA_i * schooling_{it})$	0.27 (0.29)	0.33* (0.18)	0.25 (0.29)	0.27 (0.29)	0.39 (0.32)	0.30 (0.27)
$\Delta \ln(I_{it}/Y_{it})$	0.019*** (0.0062)	0.0073 (0.0047)	0.0069 (0.0052)	0.0021 (0.0057)	0.0097* (0.0056)	0.0018 (0.0049)
Additional variables						
$\ln(\text{population size})_{it-1}$	-0.0014 (0.00095)	0.035* (0.019)	0.00094 (0.00086)	0.034* (0.018)	0.0010 (0.0011)	0.031* (0.016)
Average rule of law _i			0.0069** (0.0031)		0.0074** (0.0032)	
Average employment protection _i			-0.0032 (0.0031)			
Openness _{it-1}			0.011** (0.0042)	0.012* (0.0064)	0.010** (0.0047)	0.0099 (0.0063)
Inflation _{it-1}			-0.026** (0.010)	-0.030*** (0.0079)	-0.020*** (0.0074)	-0.031*** (0.0073)
Credit ratio _{it-1}			-0.0052** (0.0023)	-0.0068 (0.0054)	-0.0038 (0.0025)	-0.0070 (0.0049)
Old-age dependency ratio _{it-1}			-0.013 (0.030)	0.00086 (0.047)		

Table 2.2. Growth regression: Baseline results *cont.*

	(1)	(2)	(3)	(4)	(5)	(6)
Observations	797	797	592	592	627	627
R-squared	0.563	0.606	0.662	0.672	0.645	0.674
Country-fixed effects	No	Yes	No	Yes	No	Yes
Year-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes

Note: Asterisks (*, **, ***) indicate the significance level (10%, 5%, 1%) of the coefficients. The standard errors are adjusted for country clusters. The long-run steady state coefficients can be calculated based on these short-run coefficients as ratios of the short-term coefficient to the negative of the convergence coefficient Φ .

Source: Authors' calculations.

Table 2.2 presents the baseline regression with significant and positive effects of the production factors on growth and plausible convergence rates. The effect of education is more significant in the parsimonious specifications than in those with many control variables, suggesting that some control variables indirectly capture the effect of education. Indeed, some controls such as the rule of law or openness might be affected by better education. As such, better education lifts growth both directly and indirectly, the latter by improving the quality of institutions. According to the “iron law of convergence”, countries are expected to converge to the productivity frontier at a 2% rate per year (Barro, 2015), which is roughly the rate estimated here. The estimation suggests that it takes about 30 years to close half of the initial GDP per capita gap.

Different sets of control variables are used to investigate the robustness of the production function effect. The specifications in Table 2.2 include three different sets of control variables that are unlikely to be directly affected by investment and education. Most controls have the expected sign and are significant, except the credit ratio, where the effect is negative and significant. Overall, the most parsimonious regression tends to provide more significant results for investment and education, again suggesting some interaction between the production factors and the controls. Finally, the results are mostly unchanged when the sample is restricted to the pre-crisis years.

The effect of spending and revenue decentralisation on growth

The empirical results with the decentralisation variables inserted suggest that the design of fiscal decentralisation matters for growth (Table 2.3). Columns 1-6 present the findings with time-fixed effects and columns 7 to 12 with both time- and country-fixed effects. Columns 2 and 8 report the results of a simultaneous estimation of spending decentralisation and of the size of the system of intergovernmental transfers. All regressions control for the overall size of government as measured by the public spending-to-GDP ratio. Using the share of sub-national spending or revenue in general government rather than in GDP does not change the result, although they become a bit less significant. All regressions include a large set of control variables to avoid omitted variable bias, and most of them enter significantly and with the expected sign.⁶

The overall estimation results suggest that tax decentralisation is more conducive to growth than spending decentralisation. In the country-fixed effects specification, increasing tax decentralisation by 10 percentage points is associated with around 0.09 percentage points more growth or, in the long run, with around 1.75% higher GDP per capita. The insignificant effect of revenue decentralisation could be explained by its composition as sub-national tax revenues are often a substitute for other sub-national

resources such as user fees or property income. The constitutional set-up also matters: in federal countries the negative effect of spending decentralisation is significant, while tax decentralisation exerts its (positive) significant effect in unitary countries only (Table 2.4). These results suggest that unitary countries would gain most from tax decentralisation, while federal countries might have to address the sub-national spending side more seriously.

Intergovernmental transfers could explain the weak or sometimes negative association between spending decentralisation and growth. Transfers tend to diminish spending financed by own-source revenue and discourage the development of the economic and fiscal base. As such, spending decentralisation could be subject to two countervailing forces: while spending covered by own sources is growth-enhancing, transfers and transfer-funded spending are growth-dampening. Recent empirical research also found opposite effects for spending and tax revenue decentralisation with the role of intergovernmental transfers (Bartolini, Stossberg and Blöchliger, 2016; Baskaran, Feld and Schnellenbach, 2016). Using the vertical fiscal imbalance – the difference between spending and revenue decentralisation – rather than intergovernmental transfers delivers similar results.⁷ Overall, transfers may slow down overall GDP growth. Some recent research also suggests that while transfers reduce differences in regional *income* levels, they might be responsible for growing differences in *GDP* (Bartolini, Stossberg and Blöchliger, 2016). Also, decentralisation is associated with less income inequality, suggesting that it can contribute to inclusive growth (Stossberg and Blöchliger, 2017).

Table 2.3. The effect of decentralisation on growth: Main results

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Long term												
$\ln(Y_{it-1}/POP_{it-1})$	-0.022*** (0.0054)	-0.021*** (0.0053)	-0.019*** (0.0056)	-0.019*** (0.0054)	-0.020*** (0.0049)	-0.014** (0.0051)	-0.020 (0.017)	-0.023 (0.017)	-0.039** (0.016)	-0.048*** (0.012)	-0.023 (0.018)	-0.048*** (0.012)
$\ln(PISA_i * schooling_{it-1})$	-0.00038 (0.0083)	-0.00051 (0.0083)	-0.0058 (0.0097)	-0.00030 (0.0086)	-0.00057 (0.0074)	-0.0039 (0.0073)	-0.025 (0.037)	-0.037 (0.037)	-0.063 (0.046)	-0.037 (0.033)	-0.030 (0.037)	-0.034 (0.033)
$\ln(I_{it-1}/Y_{it-1})$	0.015** (0.0058)	0.016** (0.0057)	0.014** (0.0061)	0.014** (0.0056)	0.018*** (0.0054)	0.016*** (0.0048)	0.012 (0.011)	0.011 (0.011)	0.0089 (0.0098)	0.014 (0.0091)	0.012 (0.011)	0.014 (0.0090)
Short term												
$\Delta \ln(PISA_i * schooling_{it})$	-0.15 (0.19)	-0.16 (0.19)	-0.15 (0.21)	0.10 (0.23)	-0.14 (0.16)	0.022 (0.19)	0.10 (0.21)	0.071 (0.20)	-0.16 (0.25)	-0.021 (0.26)	0.077 (0.23)	-0.012 (0.26)
$\Delta \ln(I_{it}/Y_{it})$	0.0061 (0.0053)	0.0062 (0.0052)	0.0028 (0.0044)	0.0030 (0.0047)	0.0070 (0.0053)	0.0038 (0.0050)	0.0024 (0.0086)	0.0024 (0.0086)	-0.0032 (0.0085)	0.00067 (0.0063)	0.0018 (0.0088)	0.00087 (0.0064)
Additional variables												
$\ln(\text{population size})_{it-1}$	-0.00033 (0.00079)	-0.00037 (0.00078)	-0.00017 (0.00084)	0.0010 (0.00085)	0.00023 (0.00088)	0.0012 (0.00088)	0.094*** (0.033)	0.089** (0.032)	0.070** (0.034)	0.049** (0.022)	0.096*** (0.033)	0.048** (0.021)
Average rule of law _i	0.0058** (0.0028)	0.0059** (0.0029)	0.0064* (0.0033)	0.0050* (0.0025)	0.0069** (0.0029)	0.0044* (0.0025)						
Average employment protection _i	-0.0040** (0.0019)	-0.0040** (0.0018)	-0.0054** (0.0020)	-0.0014 (0.0027)	-0.0042** (0.0016)	-0.0023 (0.0022)						
Openness _{it-1}	0.0050* (0.0026)	0.0043 (0.0030)	0.0068* (0.0034)	0.010** (0.0039)	0.0048* (0.0024)	0.010*** (0.0027)	0.011 (0.0073)	0.011 (0.0071)	0.012* (0.0064)	0.015** (0.0064)	0.012 (0.0074)	0.015** (0.0061)
Inflation _{it-1}	-0.044* (0.024)	-0.044* (0.024)	-0.047** (0.023)	-0.015 (0.027)	-0.041 (0.025)	-0.0080 (0.024)	-0.048*** (0.016)	-0.046*** (0.016)	-0.040*** (0.014)	-0.026* (0.015)	-0.049*** (0.016)	-0.026* (0.015)
Credit ratio _{it-1}	-0.0042 (0.0028)	-0.0044 (0.0029)	-0.0057* (0.0031)	-0.0061** (0.0027)	-0.0052* (0.0029)	-0.0075** (0.0030)	-0.0049 (0.0058)	-0.0046 (0.0058)	-0.0073 (0.0060)	-0.0079 (0.0058)	-0.0046 (0.0058)	-0.0080 (0.0057)
Old-age dependency ratio _{it-1}	-0.0029 (0.031)	-0.0046 (0.032)	-0.0036 (0.031)	-0.039 (0.026)	-0.0038 (0.029)	-0.024 (0.023)	0.17** (0.074)	0.16** (0.073)	0.14** (0.065)	0.0046 (0.048)	0.16** (0.076)	0.0035 (0.048)

Table 2.3. The effect of decentralisation on growth: Main results (*cont'd.*)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Decentralisation												
Government size	-0.021 (0.018)	-0.021 (0.018)	-0.023 (0.017)	-0.024 (0.018)	-0.032** (0.015)	-0.049** (0.018)	-0.034* (0.017)	-0.041** (0.018)	-0.0044 (0.030)	-0.019 (0.029)	-0.045* (0.023)	-0.017 (0.029)
Spending decentralisation	-0.019 (0.013)	-0.023 (0.018)			-0.036*** (0.0097)		0.030 (0.040)	0.086* (0.048)			0.045 (0.033)	
Intergovernmental transfers		0.011 (0.025)						-0.080* (0.041)				
Revenue decentralisation			-0.027 (0.019)						0.11 (0.082)			
Tax decentralisation				0.017 (0.028)		-0.010 (0.020)				0.084* (0.049)		0.065 (0.056)
Spending decentralisation X government size					0.44*** (0.12)						-0.25 (0.27)	
Tax decentralisation X government size						0.88*** (0.19)						0.27 (0.41)
Observations	404	404	410	553	404	553	404	404	410	553	404	553
R-squared	0.758	0.759	0.760	0.727	0.782	0.766	0.885	0.887	0.884	0.870	0.886	0.871
Country-fixed effects	No	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Year-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note: Asterisks (*, **, ***) indicate the significance level (10%, 5%, 1%) of the coefficients. The standard errors are adjusted for country clusters. The long-run steady state coefficients can be calculated based on these short-run coefficients as ratios of the short-term coefficient to the negative of the convergence coefficient Φ .

Source: Authors' calculations.

Table 2.4. **The effect of decentralisation on growth: federal versus unitary countries**

Results by country type

	% of GDP			% of overall exp. or rev.		
	(1)	(2)	(3)	(4)	(5)	(6)
$\ln(Y_{it-1}/POP_{it-1})$	-0.016*** (0.0049)	-0.015** (0.0055)	-0.012** (0.0052)	-0.015*** (0.0046)	-0.014** (0.0055)	-0.011** (0.0054)
Government size	-0.044** (0.017)	-0.045** (0.016)	-0.045** (0.018)	-0.049*** (0.015)	-0.047*** (0.015)	-0.039** (0.017)
Spending decentralisation X federal country indicator	-0.027*** (0.0078)			-0.013*** (0.0040)		
Spending decentralisation X unitary country indicator	0.0067 (0.010)			0.0048 (0.0054)		
Revenue decentralisation X federal country indicator		-0.035*** (0.012)			-0.015*** (0.0054)	
Revenue decentralisation X unitary country indicator		0.017 (0.016)			0.0085 (0.0088)	
Tax decentralisation X federal country indicator			-0.021 (0.017)			-0.0072 (0.0058)
Tax decentralisation X unitary country indicator			0.069*** (0.021)			0.025** (0.0092)
Observations	404	410	553	404	410	553
R-squared	0.788	0.782	0.766	0.797	0.785	0.762
Country-fixed effects	No	No	No	No	No	No
Year-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes

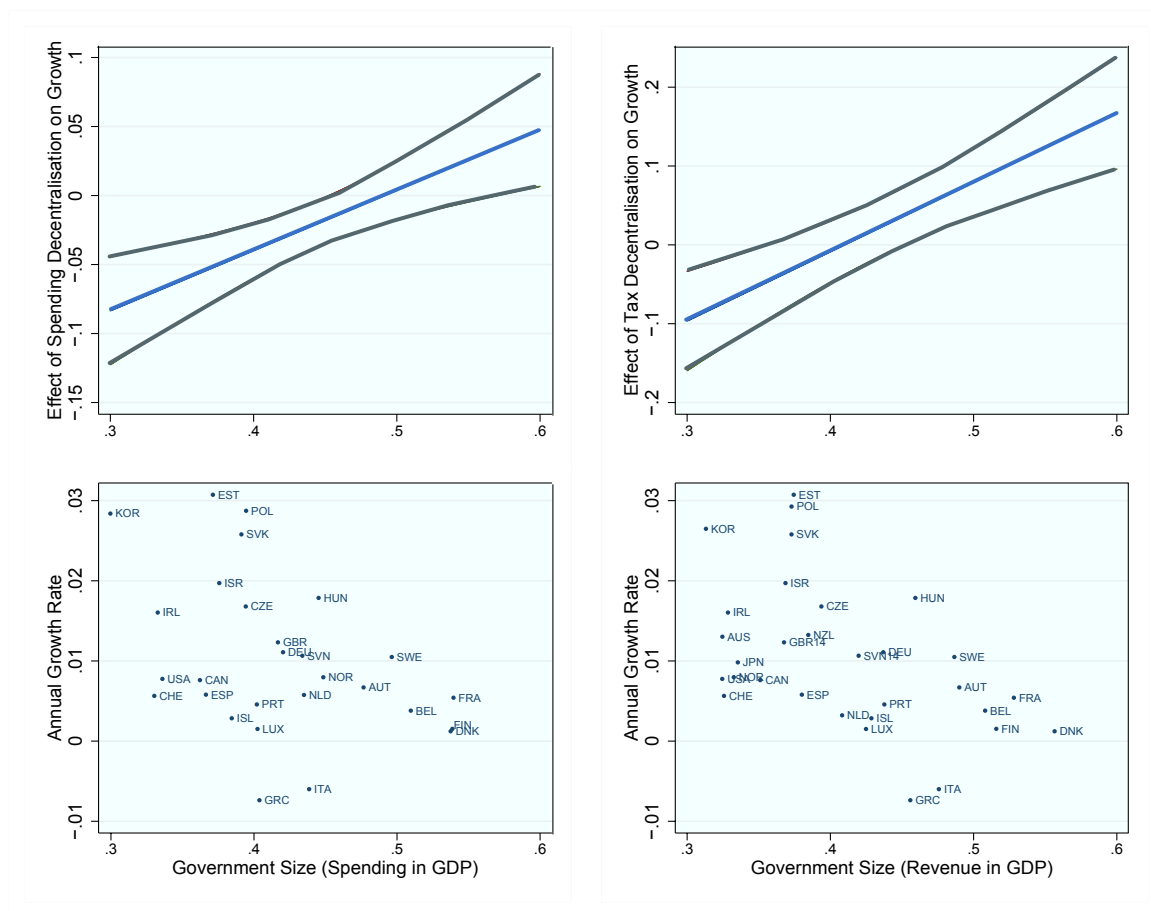
Note: Indicators and their interactions are added to the baseline equation. Asterisks (*, **, ***) indicate the significance level (10%, 5%, 1%) of the coefficients. The standard errors are adjusted for country clusters. The long-run steady state coefficients can be calculated based on these short-run coefficients as ratios of the short-term coefficient to the negative of the convergence coefficient Φ .

Source: Authors' calculations.

Decentralising public functions to sub-national governments could become more pressing when the government is large since a large government tends to slow down growth. Indeed spending and tax revenue decentralisation seems to become growth-enhancing when the government is larger than around 48% or 44% of GDP for the two decentralisation measures, respectively (Figure 2.4).

A balanced assignment of responsibilities across policy functions is more conducive to growth, suggesting that sub-national governments can exploit economies of scope and policy complementarities if they are responsible for a range of functions (Box 2.1). Interacting government quality with decentralisation hardly delivers any meaningful results, probably because devolved governments are also those with higher quality (Kyriacou, Muinelo-Gallo and Roca-Sagalès, 2011).

Figure 2.4. **Larger governments should be more decentralised**
 Interacting government size with spending and tax revenue decentralisation



Note: The figure shows how the effect of spending decentralisation (vertical axis) turns from negative to positive when the size of government, measured as spending or revenue to GDP (horizontal axis), increases.

Source: Authors' calculations.

Box 2.1. Balanced decentralisation

Intergovernmental fiscal frameworks are balanced if sub-national governments have similar levels of responsibility for policy functions such as education, healthcare and infrastructure or spending transactions, such as investment, wages and others. A balanced assignment may allow for more flexible administrative arrangements across policy functions and for better reaping economies of scale and scope. Moreover, policy complementarities may be easier to achieve. Indeed balanced decentralisation could be a more important driver for long-term growth than decentralisation alone (Blöchliger and Kantorowicz, 2015). Moreover, decentralisation of individual spending items delivers relatively insignificant results, suggesting that no spending item should be preferred over another, but that all should be devolved to a similar extent (Eyraud and Lusinyan, 2011).

To test whether decentralisation's impact on growth varies with how balanced intergovernmental frameworks are, a measure of “balanced assignment” is developed (Table 2.5). This measure is defined as the variance of the sub-national spending shares in education, healthcare, social protection, investment, wages and subsidies. As such it covers almost all government spending. This implicitly assumes that spending decentralisation should be equal across functions, which might not necessarily be the case. For example, from a normative perspective, neighbourhood services should probably be more decentralised than social security systems. As an alternative, the variance of the *differences* between average decentralisation in a policy area and decentralisation in that country is taken, which takes into account that “optimal” decentralisation may vary across policy areas. However, the results do not change much.

Table 2.5. **Balanced decentralisation is conducive to growth**
Interacting decentralisation with the variance of decentralisation across functions

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	% of GDP		% of Total Exp.		% of GDP		% of Total Exp.	
Lagged dependent variable	-0.022*** (0.0052)	-0.022*** (0.0053)	-0.022*** (0.0052)	-0.023*** (0.0057)	-0.020 (0.016)	-0.029* (0.015)	-0.022 (0.016)	-0.028* (0.014)
Government size	-0.025 (0.019)	-0.030* (0.015)	-0.039* (0.019)	-0.040** (0.016)	-0.040** (0.018)	-0.054** (0.024)	-0.030 (0.018)	-0.036 (0.027)
Spending decentralisation	-0.034* (0.019)	-0.036*** (0.012)	-0.018** (0.0081)	-0.017** (0.0071)	0.049 (0.045)	0.061 (0.037)	0.022 (0.021)	0.0071 (0.017)
Spending decentralisation X government size		0.54*** (0.16)		0.20** (0.073)		-0.25 (0.29)		-0.023 (0.13)
Balanced assignment	0.0021 (0.0017)	0.0025 (0.0031)	0.0023 (0.0015)	0.0048 (0.0036)	-0.0037 (0.0042)	-0.0023 (0.0045)	-0.0042 (0.0049)	0.0039 (0.0051)
Spending decentralisation X balanced assignment		0.023 (0.015)		0.020* (0.011)		0.055* (0.028)		0.036** (0.016)
Observations	404	404	404	404	404	404	404	404
R-squared	0.763	0.786	0.767	0.790	0.886	0.890	0.886	0.890
Country-fixed effects	No	No	No	No	Yes	Yes	Yes	Yes
Year-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note: Indicators and their interactions are added to the baseline equation. Asterisks (*, **, ***) indicate the significance level (10%, 5%, 1%) of the coefficients. The standard errors are adjusted for country clusters. The long-run steady state coefficients can be calculated based on these short-run coefficients as ratios of the short-term coefficient to the negative of the convergence coefficient Φ .

Source: Authors' calculations.

The role of a balanced assignment of responsibilities is positively and significantly associated with growth, although the economic effect is weak. For an average decentralised country, improving the balance of responsibility assignment by one standard deviation improves the growth prospects of a decentralisation reform by 0.01 percentage point or an increase in GDP per capita by around 0.2-0.3%. A balanced assignment alone has no effect on growth. The results suggest that decentralisation reforms should be aligned with the broader intergovernmental framework and co-ordinated between policy functions.

Decentralisation of individual spending categories

The empirical results suggest that the decentralisation of some spending items could be detrimental for growth, but becomes positive when the government is larger (Table 2.6). Decentralising education is associated with lower growth but becomes positive when education spending is large. Decentralised social protection becomes significantly positive when measured in terms of overall social spending rather than GDP (not shown). Public investment per se has a positive and sizeable effect on growth. Sub-national public investment, which makes up around 65% of total public investment OECD-wide, is correlated with less growth. Some differences become apparent between federal and unitary country: while unitary countries would benefit from a more decentralised health-care system, the adverse effect of public investment decentralisation on growth is driven by federal countries only, pointing at non-linearities in the association between sub-national investment and growth (not shown here). Overall, the results suggest again that balanced decentralisation is more important than a focus on one particular policy function.

Table 2.6. **Decentralising individual policy functions has little effect, but more so if much is spent**

	Education	Health	Social protection	Investment	Wages	Subsidies
Lagged dependent variable	-0.031*** (0.0043)	-0.024*** (0.0043)	-0.023*** (0.0038)	-0.015** (0.0056)	-0.019*** (0.0053)	-0.014** (0.0053)
Government size	-0.061*** (0.018)	-0.040* (0.021)	-0.044* (0.024)	-0.035** (0.014)	-0.058* (0.032)	-0.050** (0.018)
Spending item	0.16 (0.10)	-0.068 (0.070)	-0.0047 (0.031)	0.40*** (0.081)	0.11 (0.097)	0.20 (0.17)
Decentralisation of spending item	-0.14* (0.072)	0.042 (0.040)	0.063 (0.11)	-0.36** (0.14)	-0.0013 (0.043)	-1.21*** (0.30)
Interaction with decentralisation item	14.7*** (5.23)	-2.76 (2.90)	-0.58 (1.18)	4.73 (7.89)	-0.34 (1.17)	25.5*** (8.86)
Observations	425	425	425	495	473	495
R-squared	0.834	0.824	0.822	0.782	0.761	0.784
Country-fixed effects	No	No	No	No	No	No
Year-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes

Note: Indicators and their interactions are added to the baseline equation. Government size is measured as general government spending as a ratio of GDP. Asterisks (*, **, ***) indicate the significance level (10%, 5%, 1%) of the coefficients. The standard errors are adjusted for country clusters. The long-run steady state coefficients can be calculated based on these short-run coefficients as ratios of the short-term coefficient to the negative of the convergence coefficient Φ .

Source: Authors' calculations.

Government investment decentralisation affects growth both in a direct and indirect way. The direct channel links public investment decentralisation to growth; and as shown above, the corresponding coefficient suggests that decentralising public investment is bad for growth. The indirect channel links decentralisation to overall investment and then overall investment to growth. This channel suggests that decentralisation underpins growth (Box 2.2). Bringing the results of the two channels together suggests that investment carried out by the national government might be more growth-promoting than investment carried out by sub-national governments. While devolution raises overall public investment, the sub-central part of it seems to be less effective than investment carried out by the central level. In a decentralised environment, public investment requires close co-ordination across

government levels, taking network externalities into account, if it is to become growth-promoting (OECD, 2016 or 2013a). Using public, rather than overall, investment as the dependent variable leaves results largely unchanged.

Box 2.2. Decentralisation and investment

Decentralising fiscal frameworks could underpin investment in productive private and public capital. The decentralisation of spending or taxing power to sub-national governments tends to raise the overall share of the budget devoted to public investment and education (OECD, 2013b). Sub-national governments will compete for residents and firms, by providing more productive public infrastructure and tailoring it to local needs. This, in turn, is thought to produce a “crowding-in” effect as businesses will invest more, thereby increasing productivity and competitiveness of the local corporate sector. Given the competition for mobile production factors, there is some evidence that sub-national governments even tend to over- rather than under-invest in public infrastructure (Delgado and Alvarez, 2007). Moreover, central government often supports sub-national governments with capital grants, and may thereby foster investment spending at the sub-national level.

The results of a set of investment regressions linking spending, revenue or investment decentralisation to the share of overall physical investment in GDP tends to confirm a positive association between the two (Table 2.7). A 1 percentage point increase in the sub-central spending share raises investment growth in the economy by 0.02 percentage points or, in the long run, the investment share in GDP by around 0.2 percentage points, in line with earlier findings of Blöchliger, Égert and Bonesmo Fredriksen (2013) or Kappeler and Väilä (2012). Decentralising public investment rather than spending per se has an even stronger effect. The findings also point to the “crowding in” effect of public investment as government investment brings in more private investment rather than deterring it. Similar results are obtained when the regressions are run for public rather than total investment, supporting the crowding-in hypothesis (not shown here). Finally, capital grants do not spur overall investment, suggesting that sub-national governments scale back self-financed investment once they obtain additional capital grants. As such, grants have no multiplier role for sub-central investment, yet they may have a role in helping to co-ordinate investment projects between the central and sub-central level.

Summing up, the regression results suggest that decentralisation is likely to foster investment. Since a higher share of investment in GDP is associated with more growth (Fournier and Johansson, 2016), decentralisation might, therefore, be associated with more growth.

Box 2.2. Decentralisation and investment *cont.*

Table 2.7. Effect of decentralisation on overall investment

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>Long term</i>								
I_{it-1}/Y_{it-1}	-0.12*** (0.027)	-0.13*** (0.028)	-0.16*** (0.026)	-0.16*** (0.026)	-0.12*** (0.033)	-0.18*** (0.029)	-0.11*** (0.032)	-0.16*** (0.024)
Real interest rate $_{it-1}$	0.024 (0.029)	0.024 (0.030)	-0.056 (0.045)	-0.057 (0.046)	0.0084 (0.031)	-0.063 (0.048)	0.0061 (0.031)	-0.074 (0.046)
$\ln(Y_{it-1}/POP_{it-1})$	-0.046 (0.081)	-0.054 (0.077)	-0.082 (0.11)	-0.093 (0.11)	-0.098 (0.075)	-0.24* (0.12)	-0.11* (0.061)	-0.24*** (0.085)
Government debt/GDP ratio $_{it-1}$	-0.0043*** (0.0013)	-0.0045*** (0.0014)	-0.0052*** (0.0016)	-0.0053*** (0.0017)	-0.0030 (0.0021)	-0.0071*** (0.0024)	-0.0030 (0.0021)	-0.0064** (0.0024)
$\ln(PISA_i * schooling_{it-1})$			0.0042 (0.0033)	0.0046 (0.0032)		-0.0022 (0.0047)		-0.00043 (0.0043)
Credit ratio $_{it-1}$			-0.0046*** (0.0014)	-0.0048*** (0.0015)		-0.0063*** (0.0019)		-0.0055*** (0.0017)
<i>Additional variables</i>								
Openness $_{it-1}$			-0.0012 (0.0015)	-0.0012 (0.0015)		0.0023 (0.0021)		0.0026 (0.0018)
Squared inflation $_{it-1}$			-0.52 (0.73)	-0.54 (0.74)		-0.72 (0.81)		-0.67 (0.80)
<i>Decentralisation</i>								
Government size $_{it-1}$	-0.0037 (0.0087)	-0.0026 (0.0084)	-0.0059 (0.010)	-0.0055 (0.010)	-0.0093 (0.0100)	-0.022* (0.012)	-0.0030 (0.0072)	-0.011 (0.0091)
Public investment ratio $_{it-1}$	-0.0087 (0.064)	-0.0082 (0.065)	-0.012 (0.062)	-0.0033 (0.060)	0.11* (0.063)	0.14* (0.070)	0.098* (0.053)	0.098 (0.058)
Investment decentralisation $_{it-1}$	0.30*** (0.10)	0.29*** (0.095)	0.38*** (0.096)	0.37*** (0.088)				
Grants $_{it-1}$		0.067 (0.072)		0.052 (0.086)				
Spending decentralisation $_{it-1}$					0.0063 (0.0070)	0.022** (0.0094)		
Revenue decentralisation $_{it-1}$						0.0056 (0.0083)	0.023** (0.011)	
Observations	454	454	360	360	407	319	411	323
R-squared	0.381	0.382	0.446	0.446	0.368	0.447	0.367	0.440
Country-fixed effects	No	No	No	No	No	No	No	No
Year-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note: Asterisks (*, **, ***) indicate the significance level (10%, 5%, 1%) of the coefficients. The standard errors are adjusted for country clusters.

The overall amount of money spent in an individual policy area matters for the effect of decentralisation in that policy area. This mirrors earlier findings that decentralising a large government has a stronger effect on growth than decentralising a small one. Decentralising education is positively associated with growth when education spending exceeds 5% of GDP. Also, investment decentralisation is no longer negative for growth when public investment is considerable. Large public health-care systems might require more central control, probably owing to the multitude of stakeholders in the health-care sector operating under a soft budget constraint.

Notes

1. Luxembourg is excluded in the estimations as the large share of cross-border workers affects the measure of the potential output to working-age population ratio.
2. The cyclically adjusted investment rate is the residual in the regression of the investment rate on the OECD output gap. It is replaced by the cyclically adjusted investment rate of the private sector in the regressions that include public investment to avoid double counting.
3. In the case of the United States, the 2009 average is used as the 2006 reading score is not available.
4. Replacing the average rule of law with the time-varying indicator yields broadly unchanged results (assuming that the index pre-1996 is equal to the value in 1996).
5. For instance, central government spending on social security depends on the cycle, while sub-central spending on education does less so, thereby affecting overall decentralisation ratios cyclically. Such cyclically induced changes should be distinguished from policy induced changes to intergovernmental fiscal frameworks.
6. By contrast, human capital no longer comes out positively and significantly in any specification. This can be explained with the relatively high bi-variate correlation between human capital and the decentralisation variables.
7. The vertical fiscal imbalance is the difference between sub-central spending and own sub-central revenue; hence it is a residual. It is sometimes seen as a better indicator to gauge the role of decentralisation for growth or debt dynamics as it reflects not only transfers but also the sub-national budget balance (Aldasoro and Seiferling, 2014).

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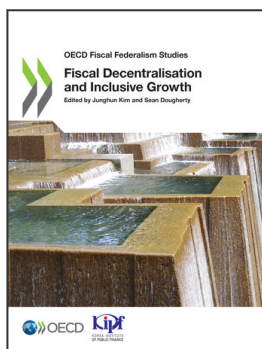
Annex 2.A1

Descriptive statistics

Table 2.A1.1. Descriptive statistics

Variable	Mean	Min	Max	Standard deviation	Mean
$\ln(Y_{it}/POP_{it})$	10.5889	9.2677	11.6764	0.3726	10.5889
$\ln(I_{it}/Y_{it})$	-1.4724	-1.8763	-0.9745	0.1409	-1.4724
$\ln(PISA_i * schooling_{it})$	8.4312	6.6564	8.9149	0.3588	8.4312
Average rule of law _i	1.2874	-0.5234	1.9484	0.5870	1.2874
Employment protection _i	2.3808	1.0048	3.7949	0.5717	2.3808
Openness _{it}	0.6984	0.0666	3.7425	0.4634	0.6984
$\ln(\text{population size})_{it}$	2.2759	-1.7201	5.4801	1.4760	2.2759
Inflation _{it}	0.1070	-0.0171	5.6788	0.3447	0.1070
Credit ratio _{it}	0.7316	0.0869	2.7281	0.4573	0.7316
Old dependency ratio _{it}	0.2084	0.0718	0.4202	0.0551	0.2084
Spending size (in GDP)	0.4098	0.1950	0.5779	0.0684	0.4098
Revenue size (in GDP)	0.3985	0.2089	0.5565	0.0701	0.3985
Education expenditure / GDP	0.0449	0.0218	0.0730	0.0096	0.0449
Health expenditure / GDP	0.0547	0.0017	0.0819	0.0160	0.0547
Social protection expenditure / GDP	0.1478	0.0061	0.2492	0.0506	0.1478
Public investment / GDP	0.0369	0.0056	0.0712	0.0102	0.0369
Wage expenses / GDP	0.1058	0.0595	0.1701	0.0243	0.1058
Subsidies / GDP	0.0148	0.0003	0.0513	0.0097	0.0148
Education decentralisation (share in GDP of local expend.)	0.1443	0.0253	0.3544	0.0692	0.1443
Health decentralisation (share in GDP of local expend.)	0.0881	0.0097	0.2322	0.0583	0.0881
Social protection decen. (share in GDP of local expend.)	0.0515	-0.0018	0.1684	0.0438	0.0515
Public investment decen. (share in GDP of local expend.)	0.0603	0.0034	0.2132	0.0372	0.0603
Wage decentralisation (share in GDP of local expend.)	0.0277	0.0000	0.0593	0.0144	0.0277
Subsidies decentralisation (share in GDP of local expend.)	0.0191	0.0000	0.0797	0.0224	0.0191

Source: Authors' calculations.



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