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Decentralisation
and Economic Growth - Part
1: How Fiscal Federalism
Affects Long-Term
Development

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ABSTRACT / RÉSUMÉ

Decentralisation and economic growth

Part 1: How fiscal federalism affects long-term development

Intergovernmental fiscal frameworks usually reflect fundamental societal choices and history and are not foremost geared towards achieving economic policy objectives. Yet, like most institutional arrangements, fiscal relations affect the behaviour of firms, households and governments and thereby economic activity. This paper presents empirical research on the potential effects of fiscal decentralisation on a set of outcomes such as GDP, productivity, public investment and school performance. The results can be summarised as follows: decentralisation, as measured by revenue or spending shares, is positively associated with GDP per capita levels. The impact seems to be stronger for revenue decentralisation than for spending decentralisation. Decentralisation is strongly and positively associated with educational outcomes as measured by international student assessments (PISA). While educational functions can be delegated either to sub-central governments (SCG) or to schools, the results suggest that both strategies appear to be equally beneficial for educational performance. Finally, investment in physical and – especially – human capital as a share of general government spending is significantly higher in more decentralised countries.

JEL classification codes: H10; H70; I22

Keywords: Fiscal federalism; fiscal decentralization; public spending; education decentralisation

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Décentralisation et croissance économique

Partie 1 : Comment le fédéralisme budgétaire affecte le développement à long terme

Les cadres budgétaires intergouvernementaux sont habituellement le reflet de choix sociétaux fondamentaux ainsi que de l'histoire, et n'ont pas pour vocation première d'atteindre des objectifs de politique économique. Pourtant, comme la plupart des modalités institutionnelles, les relations budgétaires influent sur le comportement des entreprises, des ménages et des pouvoirs publics et, partant, sur l'activité économique. Le présent document fait une synthèse des études empiriques consacrées aux effets potentiels de la décentralisation budgétaire sur une série de résultats comme le PIB, la productivité, l'investissement public et les performances des établissements scolaires. Ces résultats peuvent être résumés comme suit : la décentralisation, mesurée en pourcentage des recettes ou des dépenses, est corrélée positivement avec le niveau de PIB par habitant. L'impact semble plus marqué pour la décentralisation des recettes que pour celle des dépenses. La décentralisation semble être fortement et positivement corrélée avec les résultats de l'éducation tels que mesurés par le Programme international pour le suivi des acquis des élèves (PISA). Si les fonctions éducatives peuvent être déléguées soit aux échelons infranationaux de l'administration, soit aux établissements scolaires, les résultats donnent à penser que les deux stratégies semblent également bénéfiques pour les performances des écoles. Enfin, l'investissement dans le capital physique mais, plus particulièrement, dans le capital humain exprimé en part des dépenses des administrations publiques, est nettement plus élevé dans les pays décentralisés.

Classification JEL : H10 ; H70 ; I22

Mots clés : Fédéralisme budgétaire ; décentralisation budgétaire ; dépenses publiques ; décentralisation de l'éducation

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DECENTRALISATION AND ECONOMIC GROWTH
PART I: DECENTRALISATION, ECONOMIC ACTIVITY AND EDUCATIONAL PERFORMANCE

By Hansjörg Blöchliger¹

1. Introduction and main findings

Intergovernmental fiscal frameworks usually reflect fundamental societal choices and history and are not foremost geared towards achieving economic policy objectives. Yet, like most institutional arrangements, fiscal relations affect the behaviour of firms, households and governments and thereby economic activity. Firms' investment decisions are affected by the productivity of the public sector, and differences between costs and benefits of service provision across jurisdictions may induce them to change their location. Similarly, labour supply decisions by households will be affected by differences in taxation across jurisdictions, and households may migrate if they consider the ratio of services received in relation to taxes paid superior elsewhere. The combined actions of households and firms may in turn lead to policy reactions at both the national and sub-national level, triggering reforms to intergovernmental fiscal relations. As a result, the mutual interactions between governments, both central and sub-central, households and firms may affect the long-term growth path of a country.

The major findings are the following:

- Across countries, sub-central fiscal power, as measured by revenue or spending shares, is positively associated with economic activity. Doubling sub-central tax or spending shares (e.g. increasing the ratio of sub-central to general government tax revenue from 6 to 12%) is associated with a GDP per capita increase of around 3%. The impulse stems both from productivity and human capital improvements, while capital investment appears to have little economic effect.
- Revenue decentralisation appears to be more strongly related with income gains than spending decentralisation. This empirical finding may reflect that “true” fiscal autonomy is better captured by the sub-central revenue share, as a large part of sub-central spending may be mandated or regulated by central government.

1. Hansjörg Blöchliger is Senior Economist at the Economics Department. I thank Jorgen Elmeskov, Kaja Fredriksen, Peter Höller, Mauro Pisu, Jean-Luc Schneider, and various Delegates of the Fiscal Relations Network for valuable comments. Special thanks go to Chantal Nicq and Susan Gascard for excellent editorial assistance.

- The relationship between decentralisation and GDP is weaker for more decentralised countries, probably reflecting that wide sub-central fiscal powers could also have detrimental economic effects and that certain policy areas are not suitable for decentralisation. However, the estimated relationship never becomes negative and is not hump-shaped, i.e. “more decentralisation always tends to be better”.
- Investment in physical and human capital as a share of general government spending is significantly higher in more decentralised countries. On average, a 10% point increase in decentralisation increases the share of investment in total government spending from around 3% to 4%. The impact is stronger for investment in human than physical capital, and stronger for revenue than for spending decentralisation.
- Decentralisation is strongly and positively associated with educational outcomes as measured by international student assessments (PISA). Decentralisation of various educational functions and regulations appear to be particularly beneficial. A 10% point increase in education decentralisation improves PISA results by four points, corresponding to an average improvement by around four positions in the PISA country ranking. The results again suggest that the *shape* of policy decentralisation is crucial for success.
- Educational functions can be delegated either to sub-central governments (SCG) or to schools. OECD-wide there is a negative relationship between decentralisation and school autonomy, i.e. the two forms of devolution are substitutes rather than complements. Highly decentralised countries provide schools with little autonomy and *vice versa*. However, both strategies appear equally beneficial for educational performance.

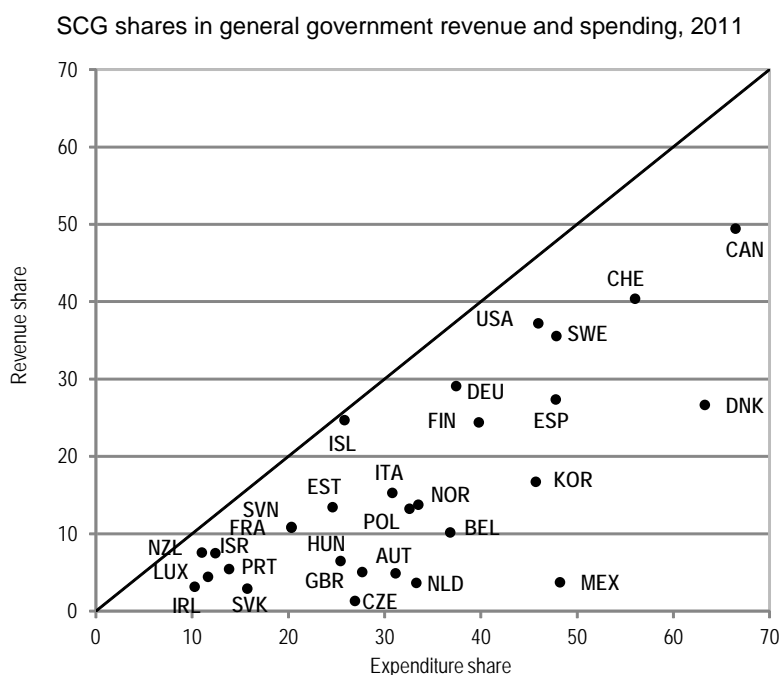
The remainder of the paper is organised as follows: section two retraces the evolution of fiscal decentralisation in the OECD economies from 1995 to 2011. Section three provides an analysis of the channels through which fiscal decentralisation can affect growth – mainly as a result of inter-jurisdictional fiscal competition – and summarises the results of an empirical investigation for OECD countries. Section four deals with the relationship between decentralisation and government investment and presents the results of an empirical investigation linking the degree of decentralisation and the level of government spending on physical capital and education. Section five assesses to what extent educational outcomes as measured by international students assessments (PISA) are influenced by sub-central powers and school autonomy. The paper adopts a *national* view of growth, i.e. it deals with the impact of intergovernmental fiscal frameworks on national economic performance rather than the development of individual SCGs or differences in growth rates across them. Also, issues of regional disparities or regional convergence/divergence are not considered.

2. Fiscal decentralisation across OECD countries

The degree of decentralisation varies widely across countries but has changed little over the past 15 years, with a few notable exceptions. OECD-wide, the sub-central spending share averaged around 31% in 2010, with values ranging between 66% for Canada and 11% for Ireland, while the tax revenue share was at around 15%, with values between 50% for Canada and 1% for the Czech Republic (Figure 1). Spending is clearly more decentralised than revenues, with a considerable part of sub-central spending covered by intergovernmental grants. Tax autonomy, i.e. the share of taxes over which SCGs have some power to set the base or the rate is even lower at around 11% of all tax revenue and several countries provide none at all. Constitutional provisions explain only a part of the differences in sub-central autonomy as various federal countries appear more “centralised” than some unitary ones. While both revenue and spending became more decentralised over the past 20 years, spending decentralisation clearly outpaced revenue decentralisation, resulting in a higher vertical fiscal imbalance and growing intergovernmental grants (Figure 2). Only a few countries – in particular Spain and Italy that embarked on a secular decentralisation process and a few Eastern European economies such as Estonia and Poland – underwent

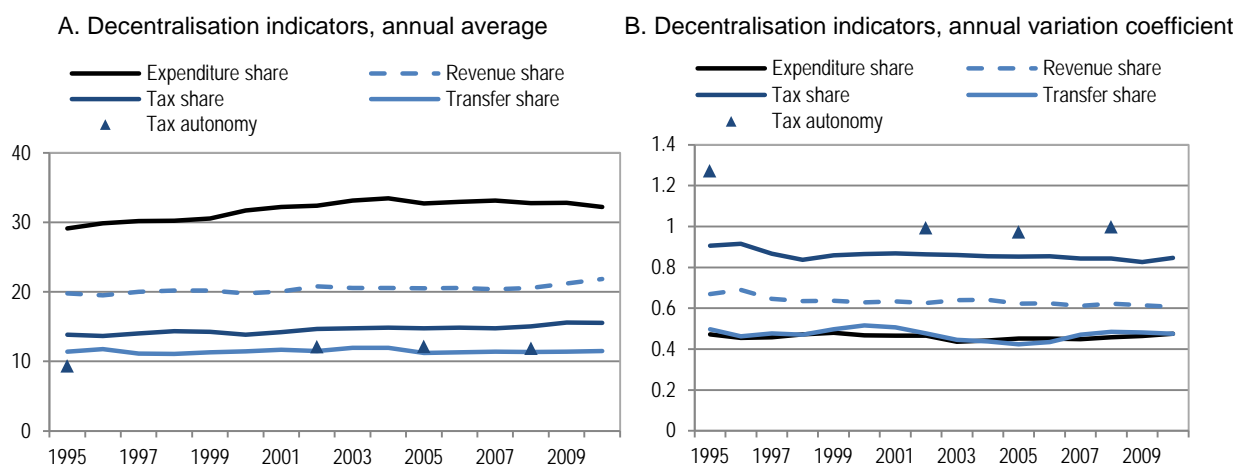
considerable changes in sub-central spending and taxation powers. Decentralisation appears to converge towards an intermediate level, with a few highly decentralised countries re-centralising and several highly-centralised countries devolving fiscal powers to lower government levels. Also, tax autonomy seems to converge towards arrangements where SCGs have some power to set tax rates on nationally-set tax bases. Box 1 provides more information on how fiscal decentralisation is measured.

Figure 1. Decentralisation varies considerably across OECD countries



Source: OECD Fiscal Decentralisation database.

Figure 2. Decentralisation has slightly increased and converged over the past 15 years



Source: OECD Fiscal Decentralisation Database.

Box 1. The challenge of measuring fiscal decentralisation

The common measure to assess fiscal decentralisation is the share of resources assigned to SCGs. Spending, revenue or tax ratios drawn from the OECD National Accounts or OECD Revenue Statistics allow measuring the extent of sub-central fiscal powers. These ratios, however, only poorly measure the true fiscal discretion that SCGs enjoy in practice. On the revenue side, central government may limit tax autonomy, i.e. the ability to set tax bases and/or rates, while on the expenditure side, central government regulation may strongly influence SCG spending, thereby reducing discretion in setting policy. In some countries, the transfer of financial responsibility hardly reflects more than a change in accounting, as essential regulatory power remains at the central level. The traditional decentralisation ratios are therefore often inadequate, which becomes apparent once they are used to test how fiscal frameworks affect outcomes such as economic growth, efficiency in the provision of services, or citizen's satisfaction. In recent years, the OECD Fiscal Network has worked on new indicators, focusing on sub-central tax autonomy or on sub-central spending power, to complement and improve decentralisation statistics (Kim, Lotz and Blöchliger, 2013).

Since intergovernmental fiscal frameworks have many dimensions and since it is difficult to judge *ex ante* which indicator best reflects the relationship between decentralisation and economic performance, the various empirical analyses presented in this paper use a wide array of indicators. The various decentralisation indicators are inserted into otherwise identical equations, so that the results can be compared. The merits of each indicator are hence judged by the results it delivers, thereby helping to identify those frameworks that are most conducive to growth. The following four decentralisation indicators are used alternatively and, in order to avoid multi-collinearity, one by one (sequentially) in the empirical analysis:

- Spending decentralisation (the ratio of sub-central to general government spending);
- Revenue decentralisation (the ratio of sub-central own revenue to general government revenue);
- Tax revenue decentralisation (the ratio of sub-central tax revenue to general government tax revenue);
- Tax autonomy (the ratio of taxes over which SCGs have some base or rate-setting autonomy to general government tax revenue), taken from the OECD Fiscal Decentralisation database.

When measuring the impact of decentralisation on educational performance, two additional indicators are used:

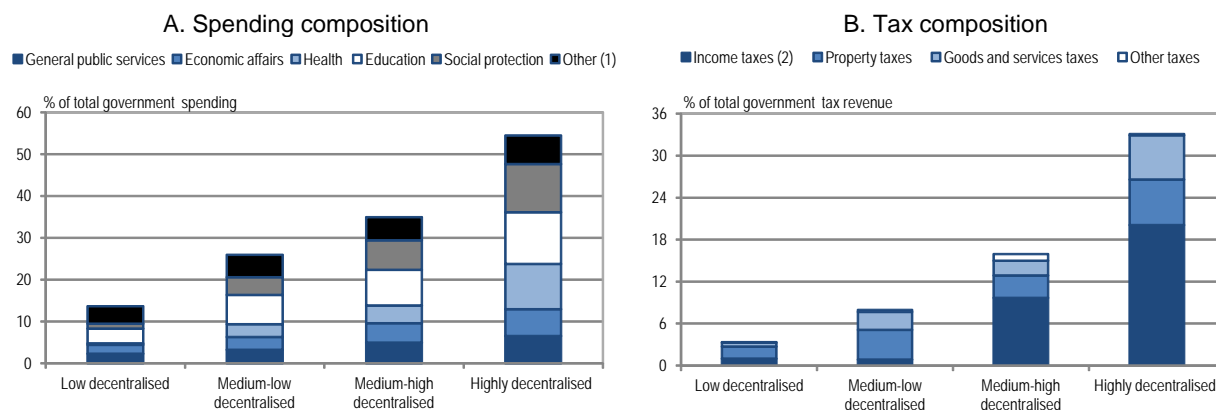
- An institutional indicator of decentralisation in educational systems, showing at which level of government a wide array of education policy decisions are taken (taken from the OECD Education database);
- The share of sub-central education spending to general government education spending (taken from the OECD COFOG database).

Despite this agnostic view about the relevance and reliability of the various indicators, there is *a priori* evidence that some of them are better than others in reflecting true sub-central fiscal policy autonomy. Revenue shares appear to better reflect fiscal and regulatory power than spending shares, because sub-central spending is often financed by large transfers with many regulatory strings attached. Institutional indicators that encompass several dimensions of policy making are probably best in providing insights into SCGs' actual power. Since institutional indicators provide a richer picture of the policy framework than simple spending and revenue ratios, they provide a better basis for specific policy guidance. Examples for institutional indicators are the Fiscal Network's tax autonomy indicators or the spending power indicators, the latter being available for a few countries only. The institutional indicator on education decentralisation provided by the OECD's Education at a Glance database is also broad-based and policy-relevant, with several dimensions reflecting sub-central power in primary and secondary education.

The policy and spending areas for which SCGs are in charge vary with the extent of decentralisation (Figure 3). In highly centralised countries the bulk of SCG spending is comprised of local services such as (primary and secondary) education, economic affairs, recreation and other residential services. In more decentralised countries the spending structure looks a bit different, with health care and social welfare becoming relatively more important, while education remains a core responsibility. The tax structure also changes with increasing decentralisation. While SCGs in centralised countries rely mainly on the property tax – which in virtually all OECD member countries is an exclusive sub-central tax – SCGs in more decentralised countries rely more heavily on income taxes and, to a lesser extent, consumption taxes. As a

result, while spending for services such as education and health care increases with increasing decentralisation, so does funding through more progressive taxation, which may potentially create structural funding imbalances in poorer SCGs and may also induce changes in behaviour as they affect incentives.

Figure 3. The SCG spending and tax composition changes with the degree of decentralisation



1. Other includes defense, public order, environment, housing and recreation.
2. Including social security and payroll taxes.

Source: OECD Tax Revenue Database.

Reforms to intergovernmental fiscal frameworks can explain a part of the evolution of decentralisation indicators over the past 15 years. The most common fiscal federalism reforms include: the devolution of new responsibilities for public services to the sub-central level, especially in the area of economic affairs and social welfare; the upgrading and amendment of equalisation and other intergovernmental grant systems, particularly a move from earmarked to non-earmarked grants; the introduction or tightening of sub-central fiscal rules; a move from grants to tax sharing; and sub-central tax reforms, mostly entailing a stronger harmonisation of central and sub-central tax bases.² Most reforms were quite encompassing and covered more than one of the areas mentioned above. They have considerably changed sub-central fiscal policy especially on the spending and transfer side, while intergovernmental tax systems tended to be more stable. Reforms that confer more tax autonomy to SCGs were particularly difficult from a political economy perspective. It is still unclear to what extent the ongoing episode of fiscal consolidation will affect the fiscal power of the sub-central government level and the long-term trend towards decentralisation.

3. Decentralisation and economic performance

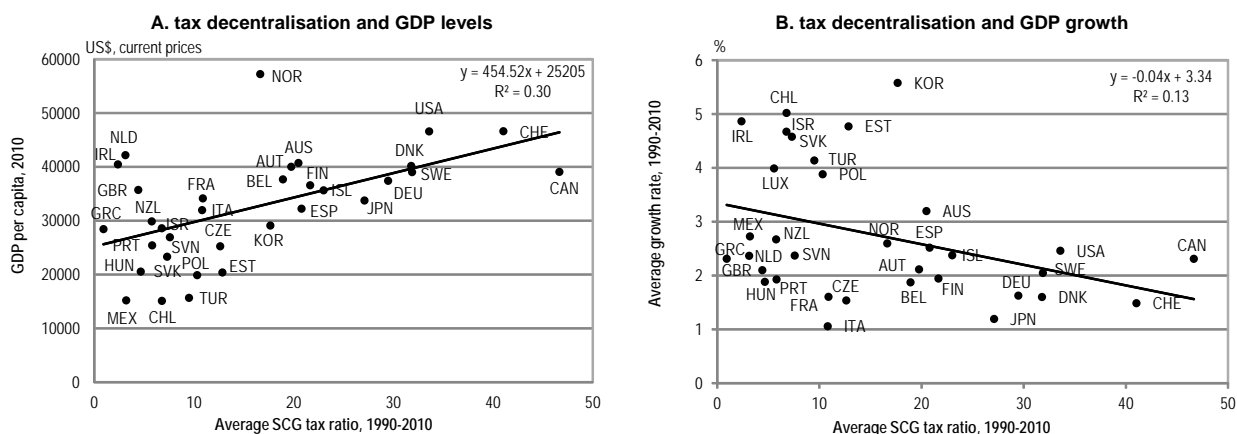
3.1. Decentralisation and growth: some stylised facts

Across the OECD, decentralisation appears to be positively associated with GDP per capita *levels* but negatively associated with GDP per capita *growth*. The latter is probably influenced by convergence between countries (Figure 4, Panels A and B). The relationship is stronger for revenue decentralisation than for spending decentralisation, suggesting that a budget's revenue side is a better gauge for the link between fiscal frameworks and economic performance than the spending side. Decentralisation is also positively linked to total factor productivity and human capital, but no significant relationship emerges

2. Blöchliger and Vammalle (2012) provide an overview on fiscal federalism reforms and their budgetary implications.

between decentralisation and business investment. Again, the total revenue and tax revenue variables have a stronger link than the spending decentralisation variables, with the tax autonomy indicator yielding the most significant relationship. All in all, intergovernmental fiscal frameworks appear to be associated with both economic activity and its main determinants such as human capital and productivity.

Figure 4. Decentralisation and economic performance



Source: OECD Fiscal Decentralisation Database and OECD National Accounts.

Although simple correlations suggest a link between the two main variables of interest, they have to be taken with care, as they leave out other factors affecting economic performance. Other determinants of economic performance such as capital and labour input or the productivity level need to be taken into account, which will be done within a proper production function framework.

3.2. Inter-jurisdictional competition and productivity in the public sector

Production functions can help assess the relationship between decentralisation and growth in a more rigorous way. In this context, GDP per capita of an economy is assumed to rest on three pillars: the stock of physical capital; human capital; and technological progress, captured by total factor productivity or TFP, reflecting the overall efficiency level of an economy. TFP is influenced by a country's institutions and policies, of which intergovernmental fiscal frameworks form an integral part. Decentralised fiscal frameworks can raise TFP through an increase in the efficiency and productivity of the public sector, which in turn instils higher productivity in the private sector. Decentralisation may also affect the stock of physical capital (through more public and private investment), human capital (through education spending by central and sub-central governments) and labour utilisation, although the latter will not be assessed. Fiscal frameworks may thus affect several main determinants of growth. The estimation strategy is laid out in more detail in Box 2.

Public sector productivity is influenced by competition between SCGs and inter-jurisdictional mobility. Most SCGs aim at attracting and retaining mobile production factors, in order to promote investment and economic activity. They can do so by using fiscal policy, among other instruments. Since firms are choosing their location based on where they expect the highest returns on investment, and since returns depend (partly) on public inputs, SCGs have an incentive to raise the productivity of their public sector. SCGs may also try to improve the relationship between taxation and public service levels, by lowering taxes or by spending more in areas such as infrastructure or education. Competition between SCGs works hence in two ways: *i*) it can increase spending on productive services and spending that

benefits the corporate sector relative to spending on consumptive, residential and social services,³ and *ii*) it can increase the efficiency of all public spending irrespective of whether they are productive or consumptive, corporate or residential. The more decentralised a country, the stronger these competitive forces could be. Competition and inter-jurisdictional mobility could be weakened by large intergovernmental transfer systems, in particular fiscal equalisation. The pressure for productivity improvements may not even require spatial mobility to exist: Voters may press their governments for tax and spending policy changes by simply claiming what they observe in neighbouring jurisdictions, without an intention to move (“yardstick competition”).

Box 2. Empirical design

The model

The empirical tests relating decentralisation and growth are based on an augmented neoclassical growth model in which total output depends on physical and human capital, labour, and total factor productivity. TFP in turn depends on a set of institutions and policies, among them the degree of decentralisation. The estimation uses a Cobb-Douglas type production function. The overall long-term impact of decentralisation on output is estimated within a framework of a truncated error correction model.

$$dY_t = a + b \cdot (Y_{t-1} + c_1 \cdot K_{t-1} + c_2 \cdot H_{t-1} + c_3 \cdot X_{t-1} + c_4 \cdot DEC_{t-1}) + e_t \quad (1)$$

where dY denotes the change in GDP, K is physical capital, H is human capital, X is a set of control variables and DEC represents the various decentralisation indicators. In addition, separate estimations are made for the impact of decentralisation on, respectively, TFP, human capital, and business investment. All equations are estimated on pooled data as well as with a combination of country and time fixed effects. Given that the decentralisation indicators, in particular the tax autonomy indicator, change little over time and can thus be viewed as a country fixed effect, the equations are also run using time fixed effects only. Equations are estimated in logarithmic form; hence the coefficients shown in the tables show the effect of per cent changes (not percentage point changes) in decentralisation ratios on the independent variable.

Data

Equations are estimated on a dataset comprising all OECD member countries. Y is GDP per capita, K the total investment to GDP ratio and H the average years of schooling. The set of the X control variables comprise population growth, inflation, openness, the general government tax composition and the size of the intergovernmental grant system. The four DEC decentralisation variables – spending ratio, total revenue ratio, tax revenue ratio and the tax autonomy indicator (Box 1) – are inserted *sequentially* into the equations, in order to avoid multi-collinearity. Most data are available for the period 1995 to 2010, but since one of the four decentralisation indicators – tax autonomy – is available for the years 1995, 2002, 2005 and 2008 only, regressions are run separately for the entire period as well as for those years only. The data sample is further divided into sub-periods to check for trend breaks, as well as run separately for federal and unitary countries, in order to gauge institutional differences not covered by the decentralisation indicators. Finally, all relationships are tested for non-linearities, e.g. “diminishing returns to decentralisation”.

More details on the empirical design can be found in Blöchliger H. and B. Égert (2013), *Decentralisation and Economic Growth. Part 2: Decentralisation and its Impact on Economic Activity, Productivity and Investment, OECD Working Papers on Fiscal Federalism*, No. 16, OECD Publishing.

Causality in the relationship between decentralisation and growth may however run the other way round, i.e. higher living standards may be the root rather than the consequence of decentralised fiscal frameworks. Indeed the pioneering decentralisation studies of the 1970s and the 1980s found that a decentralised public sector was a “superior good”, demand for which was growing with rising income levels. These studies argued and showed that high income levels promote decentralisation.⁴ Since both

3. Capital is more mobile than labour, which explains why sub-central competition for firms is generally higher than competition for residents (Blöchliger and Pinero-Campos, 2011).
4. Examples include Oates (1972) or Pommerehne (1977). Later again, some studies linked economic performance to decentralisation rather than the other way round, e.g. Bahl and Nath (1986) or Tanzi (2000).

types of studies – the older ones arguing for a link from growth to decentralisation and the newer ones arguing the reverse – are using largely the same indicators and datasets, one could even suspect that the results are a mere reflection of spurious correlation. For several reasons it is very difficult in a cross-country study on decentralisation and growth to derive a clear order of cause and effect, and one cannot exclude that the two variables strongly interact or that they are simultaneously determined by a third factor, such as a society’s preference for small or big government.⁵

3.3. Decentralisation is positively, but weakly related to economic activity

The economic effects of decentralisation, as captured in multivariate regressions, appear to be positive (Table 1). Doubling decentralisation ratios (e.g. moving from a SCG tax revenue share of 6 to 12%) is associated with a GDP per capita increase of around 3%, and a productivity increase of more than half a per cent on average. The investment effect is negligible. The institutional set-up of countries (federal versus unitary) has only a small impact, with the results suggesting that differences in intergovernmental fiscal frameworks are larger *within* each of the two country groups than *between* them. The relationship between decentralisation and labour utilisation was not tested, since no clear hypothesis could be established. Other elements of the intergovernmental fiscal framework appear to have a small effect on economic activity: the impact of the size of intergovernmental transfers is mostly negative but insignificant, and – a bit surprising – the same holds true for the tax structure as represented by the share of property and consumption taxes in the total tax take. Finally, tax autonomy in general appears to have little influence on economic activity, but the insignificant results may be due to the small sample.⁶

Table 1. Decentralisation is positively but weakly associated with economic activity
Elasticities between output variables and decentralisation indicators

	All countries			Federal countries			Unitary countries		
	GDP per capita	Productivity	Investment	GDP per capita	Productivity	Investment	GDP per capita	Productivity	Investment
Tax autonomy	0.003	0.002	-0.075	0.011	-0.012	0.323**	0.003	0.001	3.8
Tax revenue decentralisation	0.033**	0.006**	0	-0.01	-0.002	-0.002	0.033**	0.008*	-0.002
Revenue decentralisation	0.032**	0.005**	0.001	-0.003	-0.008	-0.003	0.031**	0.008	-0.001
Spending decentralisation	0.03**	0.004**	0.005	0.01	-0.011	-0.001	0.027*	0.005	0.007

Note: Coefficients are derived from various multi-variate regressions linking a set of output variables (GDP, productivity and investment) to the four decentralisation indicators and a set of controls, using time fixed effects. Decentralisation indicators are inserted sequentially into the equations in order to avoid multicollinearity. Coefficients are partial elasticities and represent percentage changes, e.g. 0.032 means that a 100% increase in decentralisation (e.g. a revenue share increase from 6% to 12%) is associated with a GDP level increase of 3.2%. A * means significance at the 10% level, ** at the 5% level and *** at the 1% level. Coefficients for variables other than decentralisation indicators are provided in Annex 1.

Source: OECD Fiscal Decentralisation Database and OECD National Accounts.

Revenue-side decentralisation has a stronger and more significant impact than spending-side decentralisation, which may reflect problems with measuring true spending autonomy. In particular, regressions over sub-periods suggest that tax autonomy has emerged as a significant driver for both GDP and productivity in the last decade or so, corroborating recent experience with regard to sub-central tax competition and its impact on firms’ and households’ behaviour. Inter-jurisdictional tax competition

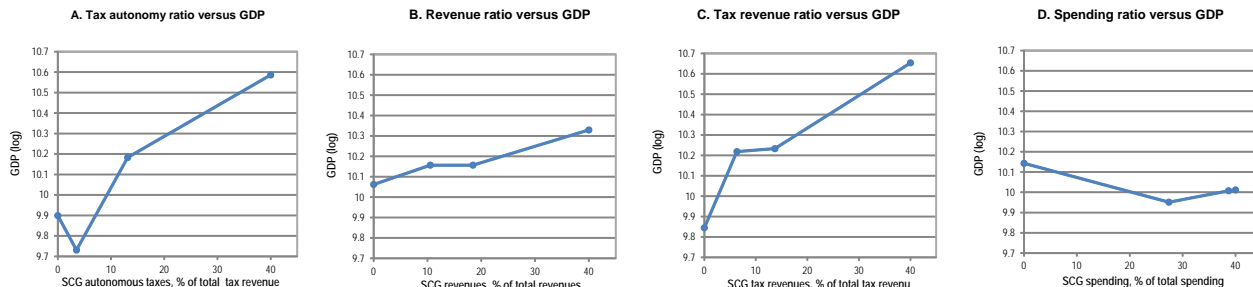
5. The causality of the relationship could be tested using the instrumental variables (IV) or generalised method of moments (GMM) approaches. However, there are no good instruments for decentralisation, and the number of countries in the dataset is too small for a GMM estimation to be applied.
6. The economic effects of decentralisation are similar to the effects of a reduction of the tax burden: a reduction of the tax burden by 1% yields around the same effect on GDP as an increase of 1% in the decentralisation ratio (Bouis et al., 2011).

appears to have intensified since the turn of the millennium, and that taxation has become a powerful tool in sub-central economic and fiscal policy. Finally, the main impulse from decentralisation to growth appears to work through the channel of productivity improvements and higher human capital, while the effect on corporate investment is smaller. The results corroborate other cross-country studies, which often find a non-significant relationship, but argue that revenue autonomy has a stronger impact on economic activity than spending autonomy.⁷

3.4. How much could countries gain from more decentralisation?

The relationship between decentralisation and economic activity could be non-linear, with the positive effect fading away with increasing levels of decentralisation. Some evidence even suggests a hump-shaped relationship, portraying a level of “optimal decentralisation” beyond which additional devolution would restrain rather than foster economic activity. The reasoning behind the idea of optimal decentralisation is that negative factors such as diseconomies of scale and scope, internal trade barriers, distorting local tax systems, rent seeking of local vested interests and other negative implications of decentralised policymaking might overwhelm the positive aspects once devolution extends beyond a critical level. Moreover, the benefits and costs of decentralisation may vary according to the size and fragmentation of a country.⁸ A number of additional tests reveal that the relationship may indeed be non-linear but becomes weaker the higher the degree of decentralisation (Figure 5). Highly centralised countries could gain more from devolving fiscal powers to SCGs than countries with a large sub-central government sector, especially if they decentralise on the revenue side. Also, as the figure reveals, the relationship is not hump-shaped, unlike some recent empirical research would suggest.⁹ More devolution has always a positive economic effect.

Figure 5. Returns to decentralisation are decreasing



Note: The line shows the relationship between decentralisation ratios and the log of GDP. The slope of the different lines reflects the strength of the relationship, i.e. the size of the coefficients between the different thresholds.

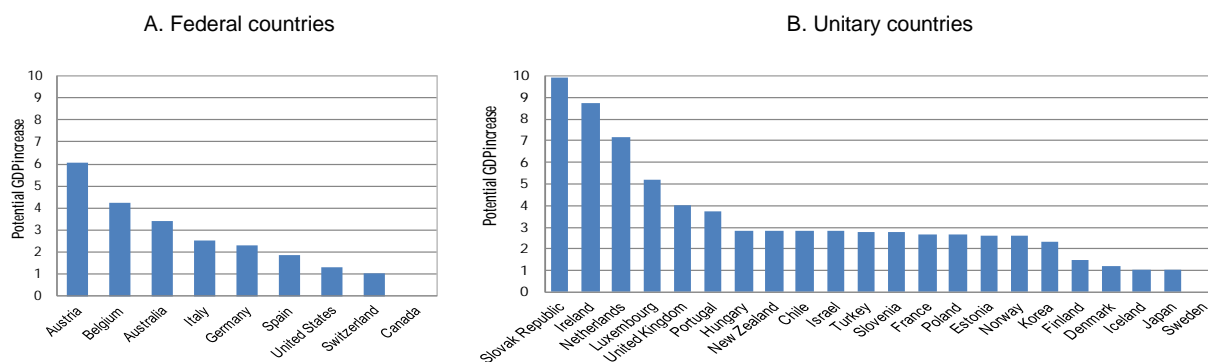
Source: OECD Fiscal Decentralisation Database and OECD National Accounts.

Incorporating the non-linear character of the relationship allows for an assessment of what a country might gain in terms of higher GDP if it moved to the benchmark of the most decentralised country. To be more specific, the gains were calculated for each federal country if it moved tax decentralisation to the level of Canada, and for each unitary country if it moved tax decentralisation to the level of Sweden

7. See for instance Yilmaz (1999), Rodriguez-Pose (2009) or Asatryan (2010).
8. The optimal level of decentralisation might differ between a small country with many municipalities and a large country with few regions.
9. Bodman and Ford (2006) and Thiessen (2003) both use a quadratic rather than a linear specification and suggest, based on their results, that a medium level of decentralisation is best for growth and human capital accumulation.

(Figure 6). Further decentralisation could potentially be associated with an average increase of GDP of around 1% to 2% for federal countries and 3% to 4% for unitary countries, with values for more centralised countries being larger. Given the decreasing returns of decentralisation, highly centralised countries could gain considerably more than countries closer to the median. While this is an interesting way of showing non-linear and threshold effects of potential policy reforms, this mechanical exercise should not be overrated since it is based on bivariate estimations and does not take into account other factors affecting GDP per capita.

Figure 6. Some countries might gain considerably from decentralising



Note: GDP changes are calculated in per cent on the basis of estimating threshold effects (non-linearities) in bivariate relations between tax revenue decentralisation and GDP per capita. Benchmark countries are Canada (for federal countries) and Sweden (unitary countries). The Czech Republic, Greece and Mexico are excluded due to a very low SCG tax ratio, yielding implausible results.

Source: Calculations based on regression results.

4. Decentralisation and public investment

4.1. Linking decentralisation to the determinants of growth

The channel that runs from decentralisation to economic activity is long and winding, with a multitude of factors potentially interacting. Exploring the shorter channels from decentralisation to the *determinants* of growth can be a complementary way of analysis. As shown in the previous section, decentralisation appears to be linked to main determinants of economic activity, such as education or – albeit much less significant – physical capital. Testing for the relationship between decentralisation and some growth determinants more thoroughly can help gauge the relative significance of each determinant and provide some guidance as to which policy areas would be the most beneficial to decentralise.

The following sections deal with decentralisation and their impact on production factors from two different angles. This section deals with the relationship between decentralisation and public spending on physical investment and on education. If inter-jurisdictional competition is more intense the more decentralised a country, SCGs could be assumed to spend relatively more on productive investment such as infrastructure or education and less on other public spending. The next section deals with the relationship between decentralisation and educational performance. If SCGs have strong incentives to provide efficient education systems, educational performance would be higher in more decentralised countries. Details on the empirical strategy can be found in Fredriksen (2013).

4.2. What is public investment?

Public or government investment encompasses all spending to increase the stock of fixed public capital. Government investment provides an input for economic activity within a jurisdiction and by doing

so increases the productivity and competitiveness of the corporate sector located therein. While the term “capital spending” leaves a notion of brick and mortar, investment in a broader sense also includes education, research and innovation, i.e. investment in human capital or, in a wider sense, the “soft infrastructure” of a jurisdiction. Indeed, for the rest of this section the term “investment” is used in a broad sense and includes both fixed capital spending and spending on education. While both infrastructure and education spending tend to create externalities – infrastructure used by individuals and firms not resident in the territory, locally educated people emigrating to other jurisdictions –, thereby potentially discouraging investment at the sub-central level, the empirical evidence suggests that such cross-border externalities are relatively small in general, though they can be considerable for small entities. There is evidence that, in some countries, SCGs may even over- rather than under-invest (Delgado and Alvarez, 2007). In any case, it suggests that the benefits of sub-central government investment in the form of more economic activity or higher tax revenues tend to accrue in the investing jurisdiction. Central government often fosters sub-central investment by tying grants to SCG investment spending (central government capital grants matching sub-central capital in the form of “co-funding”) or tackling specific infrastructure externalities.

General government gross fixed capital formation (physical investment) trended down from around 5% of GDP in 1980 to 3% in 2006 – probably reflecting decreasing investment needs as the physical infrastructure was maturing – and then increased slightly again due to the stimulus programmes during the 2008-09 crisis.¹⁰ OECD-wide, SCGs make up around two thirds of total government capital spending, with percentages ranging from more than 90% (Canada) to less than 20% (Greece). Given its “residual” nature in the budgeting process, investment levels fluctuate strongly over the cycle and even more so at the sub-central than at the central government level. Education spending accounts for around 6% of GDP, with SCGs making up more than half of education spending on average, and again differences across countries are large. Simple correlations against revenue decentralisation suggest that more decentralised governments spend slightly more on infrastructure and education.

4.3. Public investment is higher in decentralised countries, especially on education

When looking at the more elaborate relationship using multivariate regressions, investment in physical and human capital is related to the extent of fiscal decentralisation of a country (Table 2). Both on the spending and the revenue side, decentralisation indicators are related with investment, except for tax autonomy. Typically a 10% point increase in decentralisation increases the investment share by 1.1 percentage points, thereby lifting the share of public investment in total government spending from around 3% to more than 4% on average. More specifically, while spending decentralisation contributes little to boosting economic activity, it provides incentives for SCGs to provide education spending and – to a lesser extent – spending on physical capital. In many countries, earmarked and matching intergovernmental grants targeted at SCG investment enhance these incentives.¹¹ Results for unitary countries are more significant both statistically and economically than for federal countries, suggesting that decentralisation would have a stronger impact in the (more centralised) unitary countries than in federal countries where SCG investment responsibilities are already large. This said, some non-linearities (not tested) might be hidden in the investment channel, as devolving more fiscal power to SCGs could boost investment especially in countries with decentralisation ratios below the OECD average.

10. The investment behaviour of central and sub-central governments since the crisis began in 2008 is described in Kim and Vammalle (2011).

11. Central governments are often co-funding sub-central investment projects, especially those with an inter-jurisdictional scope. Indeed, capital grants belong to the most common form of earmarked matching grants, providing SCGs with incentives to spend on physical capital. Also the European Union Structural Fund provides mainly capital grants.

Table 2. Decentralisation and the share of public capital plus education spending

Unbalanced panel, time fixed effects, all OECD countries

Dependent variable: Share of public physical and human capital spending												
	All countries				Federal countries				Unitary countries			
	Exp	Rev	Taxrev	Taxaut	Exp	Rev	Taxrev	Taxaut	Exp	Rev	Taxrev	Taxaut
Government size	-0.61***	-0.60***	-0.61***	-0.60***	0.01	-0.39***	-0.37***	0.00	-0.58***	-0.77***	-0.77***	-0.52***
Population	-0.03***	-0.03***	-0.03***	-0.03**	0.01***	-0.04	0.02	0.02**	-0.03**	-0.02	-0.02	-0.04
Decentralisation	0.11***	0.11***	0.15***	0.16**	0.35***	0.13***	0.12***	0.32***	0.13***	0.33***	0.33***	0.10*
<i>R2 adjusted</i>	<i>0.42</i>	<i>0.40</i>	<i>0.44</i>	<i>0.44</i>	<i>0.85</i>	<i>0.61</i>	<i>0.60</i>	<i>0.85</i>	<i>0.45</i>	<i>0.53</i>	<i>0.53</i>	<i>0.36</i>
<i>No observation</i>	<i>329</i>	<i>329</i>	<i>335</i>	<i>75</i>	<i>126</i>	<i>126</i>	<i>125</i>	<i>22</i>	<i>205</i>	<i>205</i>	<i>205</i>	<i>54</i>

Note: *** means significance at the 1% level, ** means significance at 5% level and * means significance at 10% level.

Coefficients derive from linear multivariate regressions using time fixed effects. Decentralisation indicators are inserted sequentially into the equations in order to avoid multicollinearity. Coefficients are point elasticities and therefore represent per cent point changes, e.g. 0.11 means that a 10% point decentralisation increase is associated with a capital spending share increase of 1.1% points.

Source: OECD Fiscal Decentralisation Database and OECD National Accounts.

The association of decentralisation with physical and human capital is not equally strong, however. While more decentralisation appears to be linked to higher education spending, the evidence is relatively weak for physical capital, especially in federal countries (Fredriksen, 2013). Thus, while fiscal decentralisation seems to change the composition of public spending, it is education budgets rather than traditional forms of capital investment that become larger when fiscal power is devolved. SCGs with wide fiscal powers seem to consider human capital formation as a more important economic policy device than physical capital formation. Providing SCGs with more fiscal power, especially in countries below the respective OECD average, could therefore result in more educational investment and enhanced human capital.

5. Decentralisation and performance in primary and secondary education

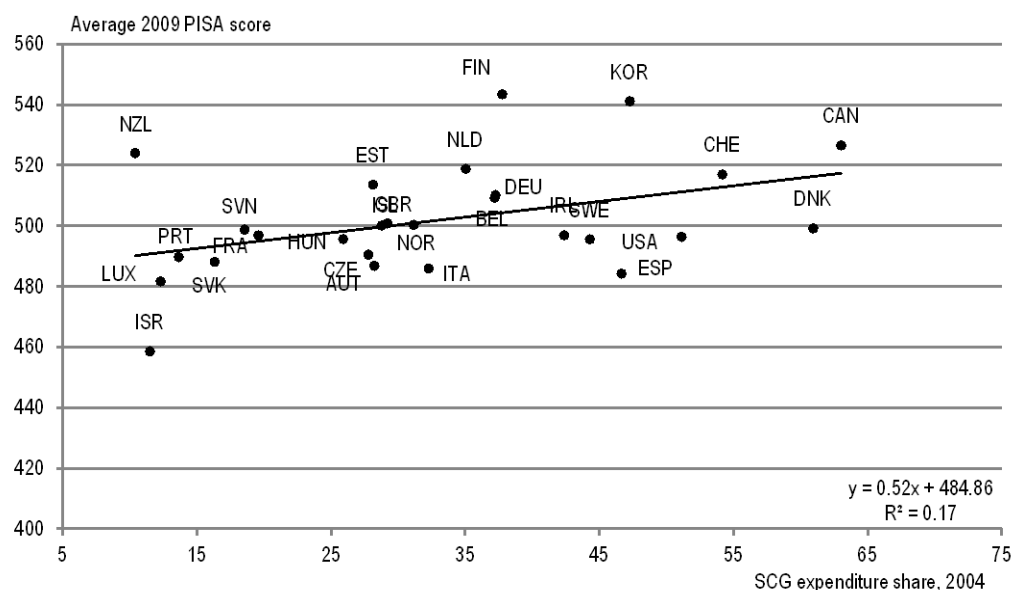
The last relationship to be tested is between decentralisation and performance in a crucial policy area, namely primary and secondary education. While an assessment of public sector efficiency and quality is often difficult due to data limitations, there is one area where international comparisons are abundant. This is the primary and secondary education sector, which is covered by the PISA (Programme of International Students Assessment) datasets on education inputs, outputs and outcomes. These datasets make it possible to estimate a relationship between institutional frameworks – the extent of decentralisation in our case – and educational performance in the form of internationally comparable test results. Since education and human capital in turn are essential ingredients of the production function, exploring the channel from decentralisation to education helps explore the channel from decentralisation to economic performance.

5.1. The education production function

The delegation of power in primary and secondary education is thought to foster the efficiency and quality of educational systems. In the last three decades most OECD countries underwent comprehensive educational reforms, with more than 50% of education funded by the sub-central government level and education being the single most important sub-central spending item today. Decentralisation of education functions is thought to increase responsiveness to the demands of local constituencies, improve the quality of schools, raise the potential for innovation and adaptation in learning, and improve financial and human resource management in the educational sector.¹² The pressure to deliver on education originates in competitive forces and benchmarking across SCGs and increased accountability of educational providers. By offering “good” educational policy (high quality teaching, a stimulating school environment, etc.), SCGs may attract or retain firms interested in a well-educated workforce and residents interested in more and better opportunities for their children. Some SCGs have started to use education as an important policy tool by targeting highly mobile families and by investing heavily in schools. The more autonomous SCGs in all matters of education policy, the stronger such strategic interactions. The simple correlation between PISA results and the spending share suggests a positive relationship between decentralisation and educational outcomes (Figure 7).

12. An overview on the most recent developments in education decentralisation can be found in OECD (2011).

Figure 7. Simple correlation between spending decentralisation and education results



Source: *Fiscal Decentralisation Database and Education at a Glance*. For the decentralisation indicator the year 2004 is taken as this is around the time when the 2009 panel started secondary education. Data without Mexico.

The generation of knowledge can be modelled by an “education production function”, i.e. by analysing the relationship between educational inputs and educational performance.¹³ In its most general form, educational performance – usually in the form of examination and test results – depends on three main factors: the characteristics and innate capabilities of the students, the characteristics of teachers and schools, and the properties of the wider institutional environment, which is power delegation in this case. Students’ characteristics are often captured by indicators of socio-economic background such as income and educational degrees of parents. School characteristics are usually captured by total spending or spending on teachers, thought to be an important determinant of teaching quality – although most empirical studies over the past three decades found only a weak relationship between salaries and teaching quality. The extent of sub-central autonomy enters as the “third factor” that affects student performance. This factor captures the perceived advantages that local constituencies have in managing and combining the other input resources – students and teachers – in the school. In order to reflect sub-central autonomy in education, an indicator of education decentralisation, provided by the OECD Education at a Glance database, is added to the four traditional decentralisation indicators. This institutional indicator – the Education at a Glance decentralisation indicator – reflects not only financial but also regulatory and operational powers of SCGs in running the education system.

13. Education production functions in their most general form are described in Hanushek (1996) or Wössmann (2007). Using an education production function approach, Sutherland and Price (2007) find a slightly positive relationship between various forms of decentralisation and school performance.

5.2. More decentralised countries achieve higher PISA results

Using PISA results as an indicator for performance and a set of input variables like student background, education spending and the decentralisation variables, an education production function was estimated. The empirical investigation reveals a strong relationship between decentralisation and educational outcomes, although only for the Education at a Glance decentralisation indicator (Table 3). A 10% increase in decentralisation improves PISA results by four points, which corresponds to an average improvement by around four positions in the PISA country ranking. The traditional decentralisation indicators (spending, revenue and tax decentralisation as well as the sub-central education spending share) are, in general, insignificant. The results suggest that decentralisation is more than just about the sub-central share in general government outlays but also encompasses responsibility over regulation and management in a certain policy area. The fact that the institutional indicator – which reflects not only fiscal but also regulatory decentralisation – provides better and more significant results suggests that true sub-central power does not merely lie in the right to spend money but in shaping the way and for which functions the money is spent. Providing SCGs with education money does little to improve education, if it is not accompanied by some flexibility in education management. The remaining variables (spending on education, student background) provide the expected positive and significant results.

Decentralisation in the education sector has various facets, with powers not only delegated to lower level governments or special school districts, but also – as with other public sector areas like health care or public transportation – to the providers themselves, namely the schools and their managing bodies. Countries pursue different ways of endowing citizens with the power to shape educational inputs, either by giving sub-central governments the authority to decide on educational matters or else by giving the schools the flexibility to do the same thing. Scrutinising the relationship between sub-central power and school autonomy suggests that the two forms of power delegation tend to be substitutes rather than complementary. Countries with less SCG power provide schools with more autonomy and *vice versa* (Figure 8), with federal countries usually providing much power to SCGs but little to schools. Indeed, the drivers behind the two roads towards devolution may be quite different. While decentralisation of educational powers to local governments is generally undertaken as part of a broader, more general public sector reform, school autonomy reforms tend to be led more by specific concerns about educational performance and the operational tools needed to improve the latter. Put in other words: decentralisation is often motivated by wider political objectives, while school autonomy is a management device. While school autonomy and sub-central government autonomy might be seen as alternative ways to increase the performance of the education system, the empirical results suggest that both types of autonomy have similar positive effects on school performance (Fredriksen, 2013, Table 6).

Table 3. Education decentralisation and PISA score

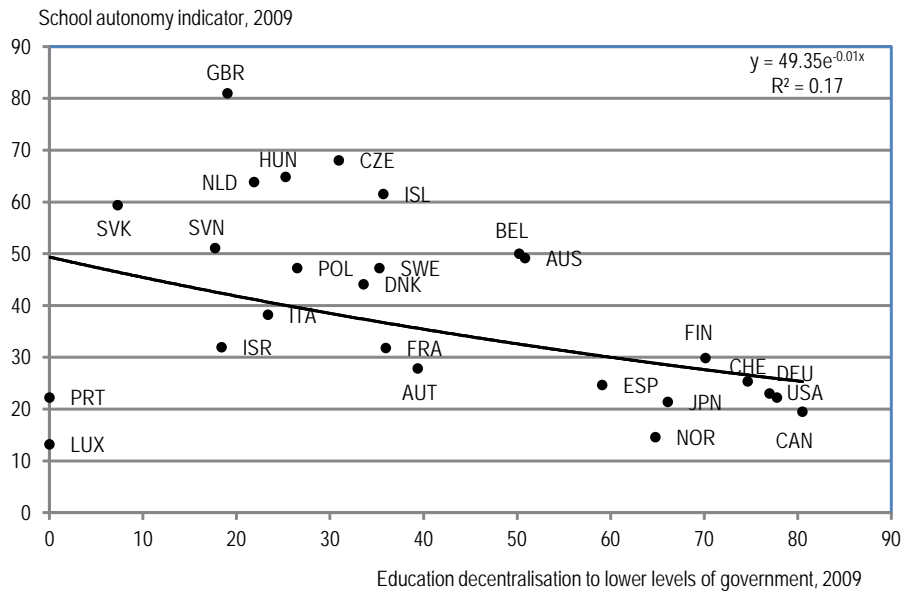
Unbalanced panel, time fixed effects, all OECD countries

Dependent variable: National PISA results																
	All countries						Federal countries					Unitary countries				
	Educ dec1	Educ dec2	Exp	Rev	Taxrev	Taxaut	Educ dec1	Exp	Rev	Taxrev	Taxaut	Educ dec1	Exp	Rev	Taxrev	Taxaut
Student characteristics	40.14***	23.13	41.29** *	40.98***	47.25***	46.78***	59.34***	58.80***	53.98***	59.48***	58.32***	1.40**	2.81***	6.68	31.45***	33.53*
Education spending/GDP	1.42***	-1.07	0.90*	0.87*	1.19***	1.31***	1.02	1.36***	1.03**	0.95**	1.00	1.41**	1.42***	-0.08	1.28*	2.17
Decentralisation	0.40***	0.13	0.19	0.10	0.10	0.13	0.14	0.40*	0.26	0.14	0.31	0.65***	0.64***	0.72*	0.32	0.31
<i>R2 adjusted</i>	<i>0.45</i>	<i>0.35</i>	<i>0.38</i>	<i>0.37</i>	<i>0.51</i>	<i>0.51</i>	<i>0.84</i>	<i>0.79</i>	<i>0.82</i>	<i>0.84</i>	<i>0.89</i>	<i>0.44</i>	<i>0.10</i>	<i>0.04</i>	<i>0.24</i>	<i>0.30</i>
<i>No observation</i>	<i>84</i>	<i>41</i>	<i>100</i>	<i>100</i>	<i>115</i>	<i>32</i>	<i>25</i>	<i>33</i>	<i>34</i>	<i>39</i>	<i>10</i>	<i>59</i>	<i>66</i>	<i>67</i>	<i>76</i>	<i>22</i>

Note: *** means significance at the 1% level, ** means significance at 5% level and * means significance at 10% level. Coefficients derive from linear multivariate regressions using time fixed effects. Decentralisation indicators are inserted sequentially into the equations in order to avoid multicollinearity. Coefficients are point elasticities and therefore represent percentage point changes. E.g. 0.40 means that a 10% point decentralisation increase is associated with an increase of 4 PISA points. Educ dec1 is the institutional education decentralisation indicator from the OECD Education at a Glance database and educ dec2 is the education decentralisation indicator based on COFOG data.

Source: OECD Fiscal Decentralisation Database, OECD Education at a Glance Database and OECD National Accounts.

Figure 8. Decentralisation and school autonomy are substitutes rather than complements



Source: OECD Education at a Glance Database.

6. Bringing the threads together

This paper presented some evidence for a positive relationship between the decentralisation of fiscal power and economic activity. The impulse for higher activity stems mainly from higher productivity (total or multi-factor productivity) and a better educated workforce. Additional evidence on the “intermediate channels” – i.e. the link from decentralisation on the *determinants* of growth, i.e. selected policy areas – tends to confirm that decentralised public finance is associated with a higher share of spending on physical investment and on education. Decentralisation is also associated with higher student performance (as measured by the internationally comparable PISA outcomes), and this also holds if the higher spending levels in decentralised countries are taken into account. On the other hand, decentralisation has no discernible impact on private investment.

The various estimation results together could be interpreted as follows: Decentralisation of fiscal and regulatory power fosters competition between sub-central governments. In order to attract firms and residents, SCGs will try to raise productivity levels of their public sector. The empirical findings indeed suggest that the spending items likely to increase public sector productivity – such as capital spending and spending on education – are typically higher in a more decentralised setting. Moreover, the performance of educational systems, measured in the form of the PISA indicators, is higher in more decentralised countries. Decentralisation hence offers a double educational dividend: it provides for more spending in the education sector compared to spending on other budget items, and it provides for a better use of that education spending. It hardly matters whether educational responsibilities are delegated to sub-central jurisdictions or whether they are directly assigned to schools; the most important is that a part of educational responsibility is delegated to administrations on the ground and close to the citizens and providers.

The double education dividend shown above is likely to materialise in two ways: it results in a better educated workforce, and it is likely to increase the overall productivity, e.g. through more innovation. Both the quantity effect – more education – and the quality effect – higher total factor productivity – are the

main components of the production function, prompting a stronger economic performance. The empirical findings indeed suggest that the impulse for higher GDP stems from both educational attainment and higher overall productivity. Both effects are about equally strong, i.e. higher GDP seems to be equally driven by a higher educational attainment and higher overall productivity. On the other hand, the empirical findings suggest that while public investment spending is higher in decentralised settings, it has relatively little effect on private investment, and that its contribution to higher GDP is relatively weak. Investment in soft infrastructure appears to be more productive than investment in hard infrastructure. Summarising these findings, the main results from this paper suggests that the channel from decentralisation to growth runs through education policy and how it is organised across governments. Appropriate assignment of education responsibilities and functions across government levels and between administrations and schools appears to be key to foster prosperity.

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