New Evidence on the Impact of Fiscal Decentralization on the Size and Composition of Government Spending

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Abstract

This paper adds to the literature by utilizing improved data on tax revenue decentralization to re-examine the relationship between fiscal decentralization and the size of government. An econometric analysis using panel data from 18 OECD countries shows that fiscal decentralization matters for both the size and composition of government spending. Tax revenue decentralization is associated with a smaller public sector, while expenditure decentralization is associated with a larger public sector. The results indicate that the former effect is driven by a reduction in social security transfers, while the latter effect is driven by increased government consumption.

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1. Introduction

Early contributions to the theory of fiscal competition emphasize the possibility that interjurisdictional competition within a country leads to inefficiently low levels of taxes and expenditures (as formalized by Wilson (1986) and Zodrow and Mieszkowski (1986)). Based on similar reasoning, there is a large literature going back to Stigler (1957) and Musgrave (1959) which warns against the consequences of decentralized responsibility for redistribution. Another strand of literature stresses that governments do not always act in the best interest of the citizens, and that fiscal competition may help to constrain a public sector that would otherwise be inefficiently large (the argument of Brennan and Buchanan (1980)). Since households are more mobile among jurisdictions within a country than among countries, all these theories suggest that the size of the public sector is expected to vary inversely with the extent of fiscal decentralization.

Leaving aside the welfare consequences, a large empirical literature initiated by Oates (1985), has looked for downward pressure on taxes and spending from decentralization of fiscal powers. Although a myriad of studies have emerged since Oates' seminal contribution, an empirical consensus have not been reached. The econometric analyses can be divided into two groups: Those who focus on variation in decentralization across sub-central units within countries and those who focus on variation across countries.[1] A major problem with almost all of the latter is that they rely on a problematic measure of fiscal decentralization. The standard approach 'searching for Leviathan' in the cross country setting is to rely on the Government Finance Statistics (GFS) of the International Monetary Fund (IMF) which provides data on revenue or expenditure shares for sub-central relative to general government. Although GFS provides consistent definitions across countries and over time, the data set fails to address properly the intergovernmental fiscal structure of countries, and in particular ignores the degree of central government control over local tax rates and tax bases. Whether sub-central governments' expenditure is funded by intergovernmental grants, some revenue sharing program or own-source revenue through independent taxes and user charges clearly makes a difference. Strict use of account data may consequently give rise to confounded results because correspondence between budgetary items and actual decision making might be imperfect. Although this is widely accepted, almost all cross country analyses rely purely on

[1] Feld et al. (2003) present an extensive literature review.

GFS data to study the relationship between fiscal decentralization and the size of the public sector, including Anderson and van den Berg (1998), Ehdaie (1994), Jin and Zou (2002) and Oates (1985).[2]

The current analysis is distinctive in several ways. First, improved data on fiscal decentralization is introduced and the standard regression evaluating the relationship between government size and decentralization is re-examined. Contrary to previous studies the new data set, based on Stegarescu (2005), differentiates between revenue of sub-central government levels according to their ability to determine revenue sources autonomously. Second, I put the attention to how fiscal decentralization affects different parts of the public sector, in particular how it affects spending on social security transfers and government consumption. The former can be argued to be more redistributive in nature and might consequently be differently affected by fiscal decentralization than the latter. On theoretical grounds, countries with decentralized responsibility for redistribution find it harder to redistribute between households because generous redistributive programs serve to attract low-income households and chase away those with higher incomes whose taxes must finance the transfers. Third, a substantial part of the fiscal federalism literature typically assumes, implicitly or explicitly, that lower levels of government both collect taxes and spend funds, so regional authorities can be classified as low tax/ low services or high tax/high services (Bardhan, 2002). This assumed connection between local revenues and spending can be quite problematic, since many countries have a tendency towards vertical fiscal imbalance. Evaluating the size and composition of government, the current study stresses that it is important to distinguish between decentralization of taxing powers and spending powers.

The empirical analysis is based on panel data from 18 OECD countries[3] over the period 1970 to 2000, where period averages is utilized to avoid that business cycle fluctuations create a

[2] A notable exception is Rodden (2003). The measurement problems connected to the IMF data is further discussed by Ebel and Yilmaz (2003), Rodden (2003, 2004) and Stegarescu (2005) and also identified by Oates (1989) as an important challenge for future research: "in view of the forementioned reservations concerning the IMF data, I would have much more confidence in my finding of an absence of any relationship between fiscal centralization and public sector size at the national level were it confirmed by another study using a new data set" (1989, p. 582).

[3] The 18 countries included in the analysis are: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Ireland, Japan, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, the United Kingdom and the United States.

spurious relationship between decentralization and government spending. Consistent with recent studies that take the distinction between different types of decentralization seriously, notably Jin and Zou (2002), Rodden (2003) and Stein (1999), I find an asymmetric impact of tax revenue decentralization and expenditure decentralization on government spending. Oates' conclusion that it "makes little difference whether we use a revenue or expenditure measure of the extent of fiscal centralization" (1985, p. 754) does not hold for the new and improved indicator of tax revenue decentralization. The econometric analysis suggests that tax revenue decentralization depresses the total size of government (as suggested by fiscal competition theory), while expenditure decentralization is associated with a larger public sector. This is interpreted to be a result of vertical fiscal imbalance which attenuates the link between financing of the public sector and its performance. Such vertical fiscal imbalance create a common pool problem while simultaneously allowing public officials to ignore the financial consequences of competition for mobile tax bases and poor provision of public services.

Evaluating the two main parts of overall government expenditures, transfers and government consumption, I find that the asymmetric impact on tax revenue and expenditure decentralization seems to be driven by two different parts of government expenditures. Social security transfers decrease with tax revenue decentralization, but are independent of expenditure decentralization. Government consumption is independent of tax revenue decentralization, but increases in expenditure decentralization.

The rest of the paper is organized as follows. Section 2 presents the theoretical framework and the main hypotheses. Section 3 describes the data on fiscal decentralization, while section 4 introduces data on government spending and presents the econometric design. In section 5 the results are presented, while section 6 carry out some sensitivity analysis. Section 7 discusses the results in relation to the theoretical literature on fiscal competition, before Section 8 concludes.

2. Theoretical Framework

2.1 Fiscal Decentralization and the Size of Government

Two different approaches, rooted in two contrasting visions of public sector decision making have typically been applied to analyze the effect of fiscal competition between horizontally related governments. One strand of literature have accentuated that, assuming benevolent policymakers who seek to maximize the 'well-being of society', fiscal competition can create a welfare reducing 'race-to-the-bottom' in public good provision. Brennan and Buchanan (1980) challenge the notion that tax competition is welfare reducing. Starting with the assumption that governments are revenue-maximizing Leviathans', they argue that emigration imposes a serious restriction on the ability of government to exploit taxes. It follows that decentralization of the public sector introduces elements of competition which contribute to contain agency problems. This is the argument underpinning the famous Leviathan hypothesis: "total government intrusion into the economy should be smaller, ceteris paribus, the greater the extent to which taxes and expenditures are decentralized" (Brennan and Buchanan, 1980, p. 185).

Brennan and Buchanan accentuate that the Leviathan hypothesis should be evaluated for given extent of 'collusion' among governmental units. One obvious form of collusion would be agreements between sub-central and central government about revenue sharing programs, where the sub-central government cede taxing powers to the central government and receive grants in return (Grossman, 1989, Ehdaie, 1994). Brennan and Buchanan (1980, p. 183) conclude that such arrangements are undesirable "because it subverts the primary purpose of federalism, which is to create competition between jurisdictions". Clearly, decentralization of expenditures without accompanying decentralization of revenues is unlikely to generate any beneficial competition to restrain the Leviathan. The broader problem related to such vertical fiscal imbalance is the attenuated link between financing and performance of the public sector and the possibility for sub-central governments to impose their costs on residents outside their jurisdiction. Thus based on the Leviathan hypothesis it is reasonable to expect decentralization of spending powers (ceteris paribus) to be positively and decentralization of taxing powers (ceteris paribus) to be negatively associated with the size of government.

Note that other links between fiscal decentralization and government size may also exist: (i) because decentralization provides a better match between the population's preferences and

public tax-expenditure bundles (as captured in Oates (1972) decentralization theorem)[4] or (ii) because political agents at the sub-central level are better able to tailor public goods to their constituency's needs (Oates, 1972), or (iii) because decentralization increases the accountability and visibility of public officials which may give more competent and less corrupt government.[5] On theoretical ground it is not clear how these three mechanisms affect the size of the public sector. Less waste in the public sector is not necessarily associated with a smaller public sector. A more efficient public sector implies lower marginal costs of public services which leads residents to increase their demand for these expenditures. As a result, the total size of government may increase.

2.2 Fiscal Decentralization and the Composition of Government

An important issue in evaluating the effect of fiscal decentralization on the size of government which seems to have been neglected in the previous literature is that decentralization may have a different impact on different parts of the public sector.[6] Keen and Marchand (1996) show that fiscal competition may not only lead to inefficient levels of aggregate public expenditures, but also to systematic inefficiencies in the composition of public expenditures. They present a theoretical framework with a benevolent planner and focus on two parts of public spending: the first being a local public good, such as consumption of social services or redistributive payments from altruistic rich households to poor households. The second is a local public input in the economy's production function and corresponds to for example infrastructure spending. Assuming immobile workers and mobile firms, Keen and Marchand show that holding the size of the public sector constant, welfare could be increased by a rebalancing of expenditures from publicly provided inputs towards provision of local public goods which benefit immobile residents: "the picture that emerges is thus one in which fiscal competition leads to too many business centers and airports but not enough parks or libraries" (Keen and Marchand 1996: 35).

[4] In its purest form, a centralized system provide a 'one size fits all' public sector outcome that does not reflect local needs, while in a decentralized system, local governments offer different public tax-expenditure bundles which mobile households can choose between by "voting with their feet".

[5] Utilizing cross country data, Fisman and Gatti (2002) find that decentralization is associated with lower levels of corruption.

[6] Faguet (2004) is to some extent an exception. He evaluates how decentralization changed local investment patterns in Bolivia.

Assuming immobile households, Keen and Marchand provide one rationale why fiscal competition may put a downward pressure on welfare spending. In addition there is a large literature in public finance going back to Stigler (1957) and Musgrave (1959) that warns against the consequences of decentralized responsibility for redistribution exactly *because* households are mobile. The idea is that policies that are redistributive in nature give rise to a phenomenon that resembles adverse selection: net beneficiaries of redistributive policies are attracted to generous jurisdictions, while net contributors are repelled (Wildasin, 1991). This kind of reasoning led Stigler (1957, p. 217) to the conclusion that "redistribution is intrinsically a national policy". The key point is that decentralized responsibility for redistribution without any corrections induces each jurisdiction to choose its policy in isolation, ignoring the positive external benefits it creates for other jurisdictions. Generally this yields redistribution levels lower than socially desirable, possibly leading to a 'race to the bottom'.

3. Measuring Fiscal Decentralization – New Data on Decentralization of Taxing Powers

Fiscal decentralization reflects how responsibilities for tax revenues and public expenditures are distributed among different tiers of government. The complexity of vertical government structures make this notion challenging to quantify. A reliable measure of fiscal decentralization needs to effectively quantify the activities of sub-central governments arising from their autonomous decisions. The standard approach in cross country analyses is to make use of accounting measures of revenue and expenditure shares for sub-central relative to general government as a proxy for fiscal decentralization. Until recently the data from the International Monetary Fund's (IMF) Government Finance Statistics (GFS) was the only available cross-national time-series data to generate these measures. Although these measures have the advantage of being operational they can give rise to seriously biased results (Ebel and Yilmaz, 2003).

The tax revenue decentralization provided by the GFS indicator does not separate between locally determined taxes, taxes regulated by the central government, taxes levied as surcharges on national taxes and shared taxes. Whether sub-central governments' expenditure is funded by intergovernmental grants, some revenue sharing program or own-source revenue through independent taxes and user charges clearly makes a difference. The GFS measure of tax revenue decentralization will consequently overestimate the true nature of sub-central

taxing autonomy. Stegarescu (2005) finds that this is particularly the case for Austria (28.4% vs. 3.5%), Belgium (44.4% vs. 24.6%), Germany (49.4% vs. 7.3%) and Portugal (8.7% vs. 3.2%).[7] The GFS measure of decentralization of spending powers is also likely to overestimate the true nature of spending autonomy, since central governments may influence sub-central decisions through directives etc. Local expenditures that are mandated by the central government or are spent on behalf of the central government appear as sub-central expenditures, even though sub-central governments may have no autonomy in these spending decisions.

OECD (1999) tries to overcome the first of these measurement issues and present cross country data which explicitly focused on the role of taxation in determining the fiscal autonomy of sub-central governments. The study aimed to classify taxes in terms of the kind of autonomy they provided to state and local governments, hence focusing on tax revenue decentralization. Stegarescu (2005) draws on the analytical framework provided by OECD (1999) and expands their dataset to cover 23 OECD countries from 1965 to 2001.[8] Stegarescu's data distinguishes between different kinds of sub-central government revenue according to the degree of discretion sub-central governments have on determining them autonomously. In this respect the data represent a major improvement compared to existing measures of fiscal decentralization. The second measurement issue which concerns sub-central government's actual autonomy of expenditure decisions remains an unresolved issue.

As discussed in section 2, decentralization of spending and taxing powers may have an asymmetric impact on government expenditures. I have consequently chosen to rely on both the improved measure of tax revenue decentralization and the potentially problematic measure of expenditure decentralization from the GFS in the following analysis. This leaves an asymmetry between the accurateness of the two measures available, which may be problematic. I have nonetheless chosen this strategy to stay as close as possible to theory. Incorporating an improved measure of decentralization of spending powers is an avenue for future research.

[7] The numbers within the brackets refer to data from 1999/2000.
[8] Contrary to the OECD study, Stegarescu (2005) does not only consider sub-central governments' autonomy of taxes, but also their size relative to general government.

The key explanatory variables in the empirical analysis conducted below are *TaxRevDec* and *ExpDec*. *TaxRevDec* measures the revenue share of sub-central government relative to general government, but contrary to what is common in the literature, this variable only includes revenues where the sub-central government has discretion over tax rate, tax base or both. *ExpDec* is measured as the share of sub-central to general government expenditure, and is based on the Government Finance Statistics (GFS). Table 1 summarizes the descriptive statistics for *TaxRevDec* and *ExpDec*. Countries are on average more decentralized in the expenditure, than in the revenue dimension (34% vs. 21%). But the difference may be exaggerated since expenditure decentralization is likely to be overstated. The correlation between the two variables is 0.7.

Focusing on the most reliable measure of fiscal decentralization, *TaxRevDec*, the 18 countries can be divided into three groups with respect to decentralization trends in the period under study (1970-2000).[9] A clear trend towards an increasing role for sub-central governments can be observed in particular for Belgium, France and Spain, but also for Denmark, Japan, Portugal and Sweden.[10] While three countries, Ireland, Norway and the UK, have moved in the opposite direction of less sub-central tax autonomy. The remaining 8 countries, including the traditional federal countries, Australia, Austria, Canada, Germany, Switzerland and the US, have had a fairly stable degree of tax revenue decentralization from 1970 to 2000. The trends seem to reflect very well with the institutional changes that have taken place in these countries (Stegarescu, 2005, p. 323).

Table 1 about here.

Figures 1 and 2 show the trends in the tax revenue decentralization indicator based on 5-year averages, separated into traditional federal and unitary countries. Figure 2 shows that the traditional federal countries underwent no significant changes during the last 30 years with

[9] 5 countries are excluded from Dan Stegarescu's data set because of size (Luxembourg and Iceland) and uncertainty with respect to data availability (Greece and Italy) and missing data on the dependent variables (New Zealand).

[10] Note that considerable differences in trends between the two measures of fiscal decentralization are observed. Belgium and France for example have increased their sub-central share of tax revenue considerably in the period under study (from 7% to 24% and 2% to 20%, respectively) while expenditure decentralization remains basically unaltered.

respect to decentralization of taxing powers. In the empirical analysis, estimation both with and without these countries are reported.

Figure 1 and Figure 2 about here.

4. Econometric Specification

The best empirical strategy to study the impact of fiscal decentralization on public sector spending would be to have some sort of 'natural experiment' in which some countries have radically altered their vertical government structure and evaluate in particular how these reforms have changed government spending. During the time period that I study there have been implemented some such reforms in some of the countries. To identify the effects of these reforms I rely on the tax revenue indicator, *TaxRevDec*, introduced in section 3, to work as a proxy. This indicator changed considerably in for example Belgium in 1989, France in 1980, Portugal in 1989 and in Spain in 1997, indicating that this variable captures reforms taking place in these countries well.

Utilizing panel data, inference can be based on variation across countries and/or variation within countries. There are two arguments for relying primarily on the latter: First, because inherent features of different countries that affect government spending, which are not captured in any of the included regressors yields biased cross country estimations. Second, because fiscal decentralization probably is measured more consistent over time within countries than across countries. The problem with the within country approach is that vertical government structure varies considerably more across countries than within countries (as illustrated in figures 1 and 2). Thus basing inference purely on within country variation removes a lot of variation in the data. In the empirical analysis presented below, I present estimates based on both cross country and within country variation.

Figure 2 about here.

The standard approach 'searching for Leviathan' in the spirit of Oates (1985) is to regress some measure of government size on expenditure or tax revenue decentralization and a set of control variables. I re-examine the relationship between government size and fiscal

decentralization utilizing new data on sub-central fiscal autonomy. The econometric specification is given by:

$$GovernmentSize_{it} = \alpha_1 + \beta_1 TaxRevDec_{it} + \delta_1 ExpDec_{it} + \gamma_1 \mathbf{controls}_{it} + u_{it}, \quad \text{(i)}$$

where $GovernmentSize_{it}$ is government spending as a share of GDP in country i at time t. β_1 and δ_1 measures the effect of fiscal decentralization on public sector size and are the coefficients of interest. u_{it} is an iid error term. Since *ExpDec* may overestimate the true extent of expenditure decentralization for some countries I report results both with and without this variable. To take into account all other potentially important determinants of government expenditures that might be correlated with fiscal decentralization, a matrix of **controls** is included. These are elaborated below. Descriptive statistics are included in Appendix Table A.1 and A.2.

As accentuated in section 2, may the effects of fiscal decentralization differ according to the extent that the public spending enters as an input into the production function. It may also be reasonable to expect the effects to differ according to the redistributive impact of different kinds of government spending. Hence, separating public spending according to the United Nations' Classification of the Functions of Government (COFOG) could be useful. Unfortunately, there is, as far as I know, no reliable longer time series available in the cross country setting for this classification. Thus, as a first investigation the current analysis focuses on the two main parts of government expenditures, social security transfers (*transfers*) and government consumption (*GovernmentConsumption*). As the general measure of the size of government, these variables are also based on OECD data. *Transfers* are defined as "benefits for sickness, old-age, family allowances, etc., social assistance grants and welfare benefits paid by general government" and is commonly used in the welfare state literature (see for example Garrett and Mitchell (2001), Huber and Stephens (2001), Rodrik (1997, 1998) and Swank (2002)). *Government consumption* is defined by OECD as "expenditure, including imputed expenditure, incurred by general government on both individual consumption goods and services and collective consumption services". Due to the difficulty of valuing government services, this measure is related to the cost of government services, including most significantly the wage bill. Some of the dominate categories in government consumption

are spending on public administration, public order, education, health and national defense (Rodrik, 1998).

Comparing the period 1970-1976 to the period 1996-2000 most countries have expanded their spending on consumption, transfers and overall spending relative to GDP. The data reveals large cross country differences, but also considerable within-country differences. The average spending on transfers out of GDP increased from 10.7% in 1970-1976 to 14.5% in 1996-2000, peaking in the mid 1990s. *GovernmentSize* and *GovernmentConsumption* exhibit similar trends as *Transfers*. Although *Transfers* is not a perfect measure of welfare spending, it is reasonable to argue that it captures important aspects of the welfare state, in particular the effort to carry out redistribution. To identify the effects of fiscal decentralization on *Transfers* and *GovernmentConsumption*, I estimate the following two specifications:

$$Transfers_{it} = \alpha_2 + \beta_2 TaxRevDec_{it} + \delta_2 ExpDec_{it} + \boldsymbol{\gamma_2}\mathbf{controls}_{it} + \varepsilon_{it}, \qquad \text{(ii)}$$

$$GovernmentConsumption_{it} = \alpha_3 + \beta_3 TaxRevDec_{it} + \delta_3 ExpDec_{it} + \boldsymbol{\gamma_3}\mathbf{controls}_{it} + \eta_{it}, \qquad \text{(iii)}$$

where ε_{it} and η_{it} are iid error terms. Pooling all the data and running an ordinary least squares (OLS) regression on (i), (ii) and (iii) provide consistent and unbiased results only if the error terms can be considered to be random across countries and over time. This is a strong assumption to make. A potential remedy is to estimate a restricted version of (i), (ii) and (iii) which includes a full battery of time and country fixed effects. Such Fixed Effects (FE) estimation removes a lot of variation in the data and consequently reduces the signal-to-noise ratio which in effect is likely to bias the estimates towards zero. On the other hand is fiscal decentralization probably measured more consistent over time within countries than across countries. This is a strong argument for relying primarily on fixed effects estimation. In the empirical analysis, presented in section 5, both approaches are followed.[11]

Although the data set provided by Stegarescu (2005) represents an improvement to the current data it is not flawless. In particular one might worry that tax revenue decentralization will be

[11] As a robustness test I also check whether my fixed effects estimations are robust to the exclusion of the federal countries which have had a stable vertical government structure from 1970 to 2000.

sensitive to business cycle fluctuations due to differing elasticities of the tax base of sub-central and central government even when the assignment of competencies remains unchanged. To avoid that such business cycle fluctuations create a spurious relation between decentralization and government expenditures I base the regressions on period averages for all variables.[12] A period is defined as 5 consecutive non-overlapping years between 1970 and 2000.[13] Introducing period averages reduce the measurement problem induced by business cycles. In addition I include several macro variables as controls: the unemployment rate (will also capture direct entitlement pressures), gdp per capita and economic growth.

In addition to the macro variables it is obviously important to control for other variables which may be correlated with both decentralization and government spending. Previous studies focus on a number of explanatory variables. Rodrik (1998) finds that one of the most important determinants of government spending is the economy's exposure to trade. In addition are demographic and structural characteristics often found to have an impact on public sector spending. Consequently I control for *openness,* country size (*population*) and the share of people that are: living in rural areas, are under 15 years and are above 65 years, respectively. In addition to these proxies for political demand I also control explicitly for partisanship by including the share of the cabinet from left and center parties.

Previous research has found a negative relationship between a simple dummy for federal political systems, as defined according to for example Riker (1964)[14], and government spending. Cameron (1978, p. 1253) for example, whose main contribution was to discuss the role of an open economy in promoting public spending, found that federalism 'dampens the degree of expansion in the public economy'. Federalism is often suggested as a way of reducing the role of the state in general, by fragmenting central authority and introducing more interjurisdictional competition and checks and balances (Bardhan, 2002).[15] Consequently it is of interest to investigate whether the effect of decentralization is robust to

[12] Note that the panel data studies by Jin and Zou (2002) and Rodden (2003) have based their inference on year-to-year changes.
[13] The first period consist of 6 years, 1970-1975.
[14] A federal country has according to Riker (1964) at least two levels of government where each level must have 'at least one area in which it is autonomous'. This must be formally guaranteed in for instance a constitution (Riker, 1964, p. 11, Treisman, 2002).
[15] Rodden (2004) speculates that the negative association between federations and government spending might have to do with the status quo bias among federations due to multiple veto players in the era of welfare state expansion.

the inclusion of a simple dummy for federalism.[16] Note that because there is time variation in federalism only for one country, Belgium, inference must be based on cross country variation which is vulnerable to omitted variable bias.

5. Results

Table 2 displays the benchmark results. The results are based on period averages for 18 countries, 1970-2000, where a full set of period dummies are included to soak up common period specific shocks. Two different versions of (i), (ii) and (iii) are estimated, one where tax revenue decentralization enters alone and one where tax revenue decentralization and expenditure decentralization enters simultaneously, in addition to all other controls. Specification (1) and (2) in Table 2 are reinvestigations of the classic Oates (1985) model, relying on pooled panel data from OECD countries and the improved tax revenue indicator. Controlling for expenditure decentralization, tax revenue decentralization is negatively associated with the size of government. Expenditure decentralization, on the other hand is, ceteris paribus, associated with a larger public sector. Contrary to what Oates (1985) finds, it does seem to matter whether expenditure or tax revenue decentralization are used as a proxies for fiscal decentralization.

According to specification (2) in Table 2, it is not decentralization per se, but only fiscal federalism accompanied by decentralization of tax authority than can be expected to reduce the size of government. I interpret this as a consequence of vertical fiscal imbalance. Vertical fiscal imbalance is typically bridged through intergovernmental transfers and consequently associated with soft budget constrains. Vertical fiscal imbalance also yields incentives for local jurisdictions to push for high taxes at the central level, which yields expenditures with regionally concentrated benefits. Both mechanisms introduce the possibility for sub-central governments to impose their costs on residents outside the jurisdiction ('the problem of commons'). Generally is vertical fiscal imbalance associated with less accountability and bureaucrats/politicians that have weaker incentives to care about the financial consequences of fiscal competition and poor provision of public services. Thus, consistent with Brennan and Buchanan (1980)'s collusion argument, it is not surprising that expenditure decentralization, for given extent of tax revenue decentralization, is associated with a larger public sector.

[16] The following countries were coded as federations: Australia, Austria, Belgium (since 1993), Canada, Germany, Spain, Switzerland and the United States.

However, alternative mechanisms may give similar results. Voters may simply demand a larger public sector if there are less waste when the production of public services is decentralized.

The asymmetric impact of the two measures of decentralization is consistent with the central findings of recent studies takes the distinction between different types of decentralization seriously, notably Jin and Zou (2002), Rodden (2003) and Stein (1999). These studies suggest that vertical fiscal imbalance is an important determinant of the size of the public sector. Jin and Zou (2002) utilize panel data from developed and developing countries from the GFS. They estimate models where expenditure decentralization and tax revenue decentralization enter separately and find that expenditure decentralization increases the aggregate size of government, while tax revenue decentralization restricts it. Jin and Zou also find that a measure of vertical fiscal imbalance (the percentage sub-central government expenditure that is financed with grants) is positively associated with public sector size. Utilizing a similar panel data set, Rodden (2003) also finds that governments tend to grow faster when sub-central governments are more dependent on grants.[17] Finally, Stein (1999) employing cross country data from Latin America finds that countries with larger vertical fiscal imbalance tend to have larger governments.

Table 2 about here.

A first attempt on explaining how different parts of the public sector are affected by fiscal decentralization is presented in specification (3) to (6) in Table 2. Interestingly, it seems like transfers and government consumption are differently affected by fiscal decentralization. Social security transfers decrease with tax revenue decentralization, while no statistical significant effect is found for expenditure decentralization. Government consumption portrays a different picture: tax revenue decentralization is not important, while expenditure decentralization increases government consumption. This suggests that the asymmetric impact of the two measures of fiscal decentralization on overall government spending can be traced back to differing impact on components of the government spending.

[17] In an extension, Rodden utilizes information from the OECD (1999) analysis to distinguish between sub-central governments' ability to set the tax rate and tax base autonomously. His cross-country estimations suggest a negative relationship between tax revenue decentralization and public sector size.

The cross country estimations suggests that an increase in tax revenue decentralization with one standard deviation (17 percentage points) decreases total government expenditures and transfers with around 2 percentage points out of GDP. This corresponds to 0.2 and 0.4 of a standard deviation in total government expenditures and transfers, respectively. A one standard deviation increase in expenditure decentralization (13 percentage points) increases total government expenditures and government consumption with around 3 and 2 percentage points, respectively.

Previous research has found a negative relationship between a simple dummy for federalism and welfare spending. This finding is confirmed in Table 2. Federal countries seem to spend less on both transfers and government consumption. It is interesting to note that the impact of the decentralization indicators and the federation dummy seem to be quite independent of each other. The effects of tax revenue decentralization and expenditure decentralization are basically unaltered if *federation* is excluded from the regressions, although the statistical significance decreases somewhat for total government spending and government consumption.[18]

Cross-country evidence has a number of shortcomings. As discussed above, it may be problematic to base inference on variation between countries if cross section heterogeneity is large. If there are some inherent features of different countries that affect government spending which are not accurately captured by any of the included regressors, than the correct approach is to include a full set of country dummies. Garrett and Mitchell (2001) criticize the standard approach in welfare state research and argue that leaving out country fixed effects is likely to give substantial bias in the results. In the following I report different specifications that take into account country fixed effects (FE). These are reported in Table 3.

Table 3 about here.

The main results from the OLS analysis are reproduced when country specific fixed effects are controlled for. Tax revenue decentralization is associated with less transfers (but now only statistically significant at the 10% level), and expenditure decentralization is associated with

[18] The raw correlation between *TaxRevDec (ExpDec)* and *federation* is 0.34 (0.47).

increased government consumption. There is evidence (on the 10% level of significance) that overall government spending increases with increasing decentralization of spending powers.

Inference in the FE estimations is based on countries that have altered their vertical government structure over time. This means that decentralization trends observed in particular for Belgium, France and Spain contribute considerably to identifying the effect of tax revenue decentralization on government spending. But also other countries that have changed their vertical government structure between 1970 and 2000 contribute to identifying the main coefficients of interest.

Among the countries in my sample, the traditional federal countries stand out. They have had a very stable vertical government structures in the period that I study. Consequently one may argue that they should not be included in the fixed effects estimation where inference is based purely on within country variation. An argument for doing so is nonetheless that they help to identify other effects and consequently yields more precise estimates also of the decentralization variables. As a robustness check I analyze how my results are affected by excluding the traditional federal countries. This is reported in Table 4. I find that the main results are confirmed when the countries with the least variation in the central independent variables are excluded. Expenditure decentralization is associated with increased government consumption and a larger public sector. But no statistically significant effect of tax revenue decentralization on social security transfers can be found in this sample.

Table 4 about here.

The control variables reported in Table 3 show the more or less expected pattern. The macroeconomic variables, unemployment, income and economic growth, are important. An increase in unemployment and the share of people over 65 is associated with a larger public sector, and in particular transfer spending. *Unemployment* and *Over 65* captures both automatic entitlement pressures and political demands. Economic growth is negatively associated with public sector size which suggests a countercyclical pattern. Relying on within country variation, no support for Wagner's law, which states that the demand for government services is income elastic, is found. In fact gdp per capita enters with a negative sign in specification (8), which is significant at the 10% level. *Rural population* is negatively

associated with government consumption and positively associated with transfer spending, both being statistically significant.[19]

On theoretical grounds it is not clear how increased integration into the world economy affects welfare spending. On the one hand is economic integration likely to create competition for cross country mobile factors in a similar fashion as interjurisdictional competition within a country. Hans-Werner Sinn, among others, has been concerned about this development for the European welfare states (see for example Sinn, 2003). However, it can also be argued that government spending is expected to increase if governments expand the welfare state to provide a cushion against external risks (Rodrik 1997, 1998). Relying on cross country inference a positive relationship is observed, and the effect on total government spending is driven by increases in transfers, which seems reasonable if government expenditures play a risk-mitigating role (Rodrik, 1998). When country fixed effects are included, such a positive relationship is no longer observed. In fact openness seems to depress government consumption according to specification (11) and (12). Finally, there is some evidence based on cross country regressions that left and center governments are associated with a larger public sector, but this effect also vanishes if country fixed effects are included.

6. Sensitivity analysis

One of the most interesting findings in the current analysis is that fiscal decentralization seems to be associated with less transfer spending and potentially less generous welfare states. To investigate how robust this result is, I carry out two sensitivity analysis concerning the applied measure of welfare generosity (transfers), before I move on (in section 7) to discussing how the results should be interpreted. First, I evaluate whether the negative effect of fiscal decentralization on transfer spending holds when old-age pensions, which hardly can be decentralized to the regional level, is excluded. Second, I apply net replacement rates as an alternative proxy for welfare generosity.

6.1 Non-pension social security expenditures

[19] Settlement pattern is a standard control variable in studies focusing on the size of government and was also included in Oates' seminal study (Oates (1985)). It is not clear how the effect of settlement pattern should be interpreted.

An important component of 'transfers' is old age pensions, which hardly can be decentralized to the regional level. Studying the effect of decentralization on transfer spending, there is a rationale for excluding old age pensions. Since there exists no data going back to the 1970s where one can distinguish between different forms of transfer spending, this has not been done in the above presented analysis. However, in OECD's social expenditure database it is possible to distinguish between different forms of transfers spending from 1980 onwards.[20] A potentially problematic aspect with this data is that it also includes mandatory private social security expenditures. Keeping this in mind and the reduced time variation, it can nonetheless be interesting to evaluate whether the association between fiscal decentralization and transfer spending holds with this alternative measure.

Additional regressions are run where I replace the measure of *transfers* documented above, with OECD's aggregate social expenditure measure excluding old age, disability and survivor benefits. Old age, disability and survivor benefits constitute on average close to half of total social expenditures. Regressions with non-pension social expenditures as dependent variable are reported in Table 5. A somewhat puzzling positive and statistically significant effect of expenditure decentralization is found, relying on pooled OLS estimates. This coefficient flips around in the more reliable Fixed Effects estimates, suggesting a negative impact of expenditure decentralization and no impact of tax revenue decentralization. The same pattern is found when I utilize the aggregate measure of social expenditures (including all benefits).[21] This is quite different from the results presented in Table 3, where I found a negative impact of tax revenue decentralization and no impact of expenditure decentralization. Note that relying on *transfers* as defined in section 5 and restraining the sample to post 1980 and reanalyzing model (9) and (10) I find similar, but not statistically significant, results as in Table 3 (not reported). Although the reduced time variation makes it harder to obtain the 'true' effect of fiscal decentralization on transfer spending, these regressions provide suggestive evidence that the negative effect of decentralization of taxing powers is partially due to reduced pension spending. All estimates based on Fixed Effects estimations suggest that there seems to be a negative association between fiscal decentralization and transfer

[20] The Social Expenditure Database distinguishes between: old age, survivors, incapacity-related benefits, health, family, active labor market programs, unemployment, housing, and other social policy areas.

[21] This measure is similar, but not identical to 'transfers'. The raw correlation between these two measures is range from around 0.8 to 0.9 for different years.

spending, but which aspect of fiscal decentralization that matters, differs depending on the dependent variable chosen.

Table 5 about here.

6.2 An alternative measure of welfare generosity

To isolate the effect of decentralization on redistribution it would be useful to have some measure of the welfare entitlements of a standardized household across countries. This is the strategy followed by Fiva and Rattsø (2006), studying welfare competition among Norwegian local governments. An equivalent reliable measure suitable for cross country evaluations is hard to obtain. As an approximation I introduce 'benefit replacement rates' as an alternative measure of welfare generosity. If fiscal decentralization is actually associated with less generous welfare states, then this alternative measure should produce similar results as above.

Since my emphasis is on redistributive spending which can 'easily' be decentralized I evaluate OECD's measure of 'net replacement rates' for long term benefit recipients. These replacement rates show the proportion of in-work income that is maintained for somebody being unemployed on their 60th month, net of the taxes they are liable to pay. The measure includes unemployment insurance and related welfare benefits (e.g. social assistance, family benefits, housing benefits, employment-conditional benefits and lone parent benefits).[22]

The replacement rates are calculated as an unweighted average of four different household groups and two alternative earnings possibilities. This measure is close to (unconditionally) unrelated to the measure of fiscal decentralization and varies from 28% in the US to around 75% for Austria, Denmark, Finland, Germany, Netherlands, Sweden and Switzerland. The raw correlations with 'transfers' and 'non-pension social expenditures' are 0.45 and 0.55 respectively. Clearly, since redistributive spending vary within decentralized countries, the OECD measure of replacement rates must be interpreted as a national average.

To my knowledge there is no reliable longer time series available for net replacement rates across countries for long term unemployed. Thus, this leaves me with a cross section of 18

[22] The data is collected from OECD (2004), table 3.2a.

observations for 2001. In Table 6 I present results where the most reliable measure of fiscal decentralization is related to the net replacement rate utilizing the same controls as in the previous analysis. Interestingly, countries which have more decentralized responsibility for financing of the public sector have lower replacement rates, but the effect is statistically insignificant. However, with only 18 observations, it is hard to test the impact of several different variables. Consequently I exclude one and one variable until I am left with variables which are (close to) statistically significant at the 20% level, presented in specification (24), and at the 10% level, presented in specification (25). These more parsimonious specifications show a statistically significant negative association between tax revenue decentralization and net replacement rates. Specification (26) and (27) where I include both measures of fiscal decentralization and only expenditure decentralization respectively show the same pattern: a negative association with decentralization of taxing powers, and no association with decentralization of expenditures.

Table 6 about here.

7. Discussion

The Leviathan theory, elaborated by Brennan and Buchanan (1980), argue that greater centralization can be harmful, because it reduces voters' fiscal location choices, thereby increasing government's monopoly power. With less competition, the government is able to exploit more fully its citizenry and increases the size of the public sector. Following this line of reasoning, it is reasonable to expect a downward pressure on government size from decentralization of taxing powers (for given extent of decentralization of spending powers). Decentralization of spending powers (for given extent of decentralization of taxing powers) is likely to increase the size of government, because this reduces interjurisdictional competition. The regressions related to government size where both measure of fiscal decentralization, Specification (2), (8) and (14), is consistent with this hypothesis, although no effect can be found of tax revenue decentralization in the Fixed Effects estimations. Closer investigation of the composition of government spending suggests that this pattern seems to be driven by less transfer spending due to decentralization of taxing powers and increased government consumption due to increased decentralization of spending powers. Whether the reduction in transfer is caused by less non-pension or pension expenditures, this is suggestive evidence

that fiscal decentralization does not act as a powerful instrument to prevent policy makers from wasting resources.

Since transfer spending is negatively related fiscal decentralization, a possible mechanism discussed by Stigler (1957) and others may be more important than restricting Leviathan. Stigler stressed that decentralized responsibility for redistribution yields incentives for sub-central levels of government to behave strategically in determining taxation and spending levels to influence the location of household.[23] In its extreme version this phenomenon is known as the 'race to the bottom' in taxation and welfare spending. Since social security transfers as a share of GDP is an imperfect proxy for redistributive spending, it is comforting that the alternative measure of welfare generosity, presented in section 6.2, portrays the same picture.

8. Conclusion

A large empirical literature has looked for evidence of downward pressure on taxes and expenditures from decentralization of fiscal powers. Until recently most cross country studies have ignored the distinction between taxes which the sub-central government can alter autonomously and taxes the sub-central government do not have full discretion upon. This paper adds to the empirical literature by utilizing improved data on tax revenue decentralization to re-examine the relationship between fiscal decentralization and the size of government. An important lesson from this paper is that whether revenue generation and expenditures, or just expenditures, is decentralized matters for both the size and composition of the public sector. Vertical fiscal imbalance, in the sense of more expenditure decentralization for given tax revenue decentralization, is associated with a larger public sector. This effect seems to be driven by increased public consumption. Tax revenue decentralization is on the other hand associated with a smaller public sector, primarily due to less spending on social security transfers. Since transfer spending may work as a proxy for redistributive spending, the results indicate, inline with theory, that fiscal decentralization yields less generous welfare states. Utilizing an alternative measure of welfare generosity, I find the same pattern.

[23] It may also be that mobility of firms provides incentives for sub-central governments to strategically reduce transfer spending (and increase infrastructure, say) (Keen and Marchand, 1996).

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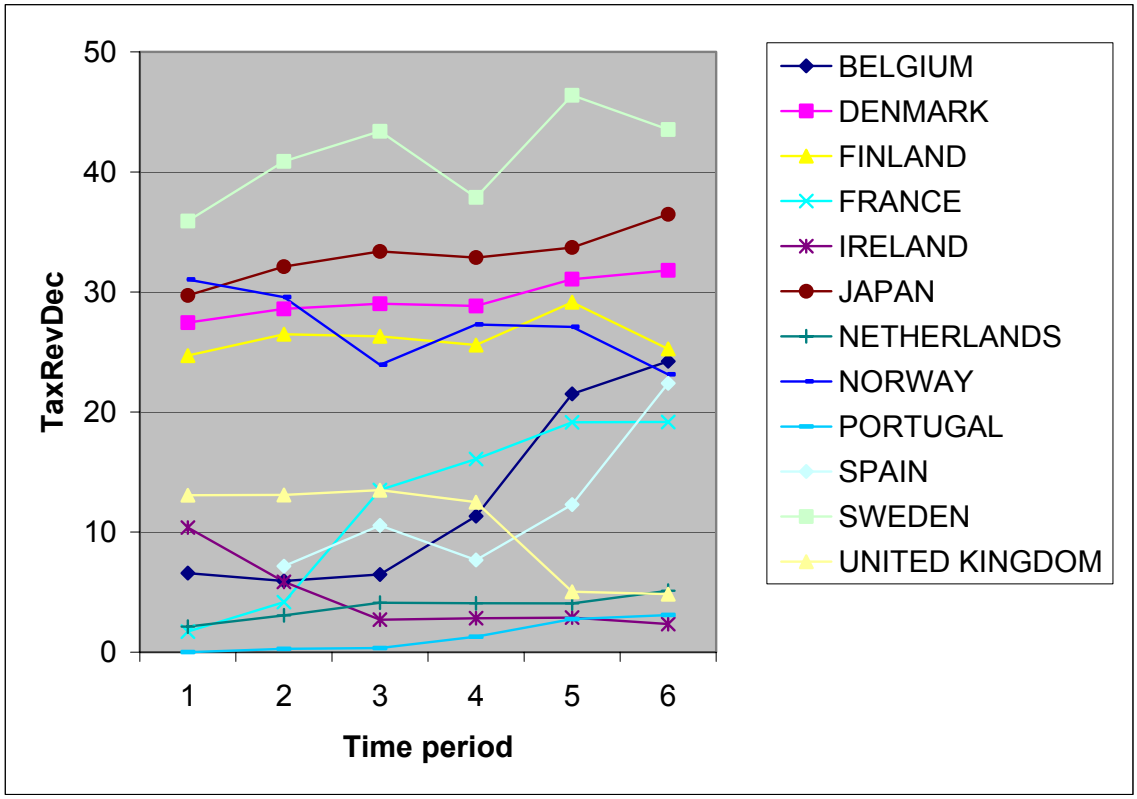
Figure 1

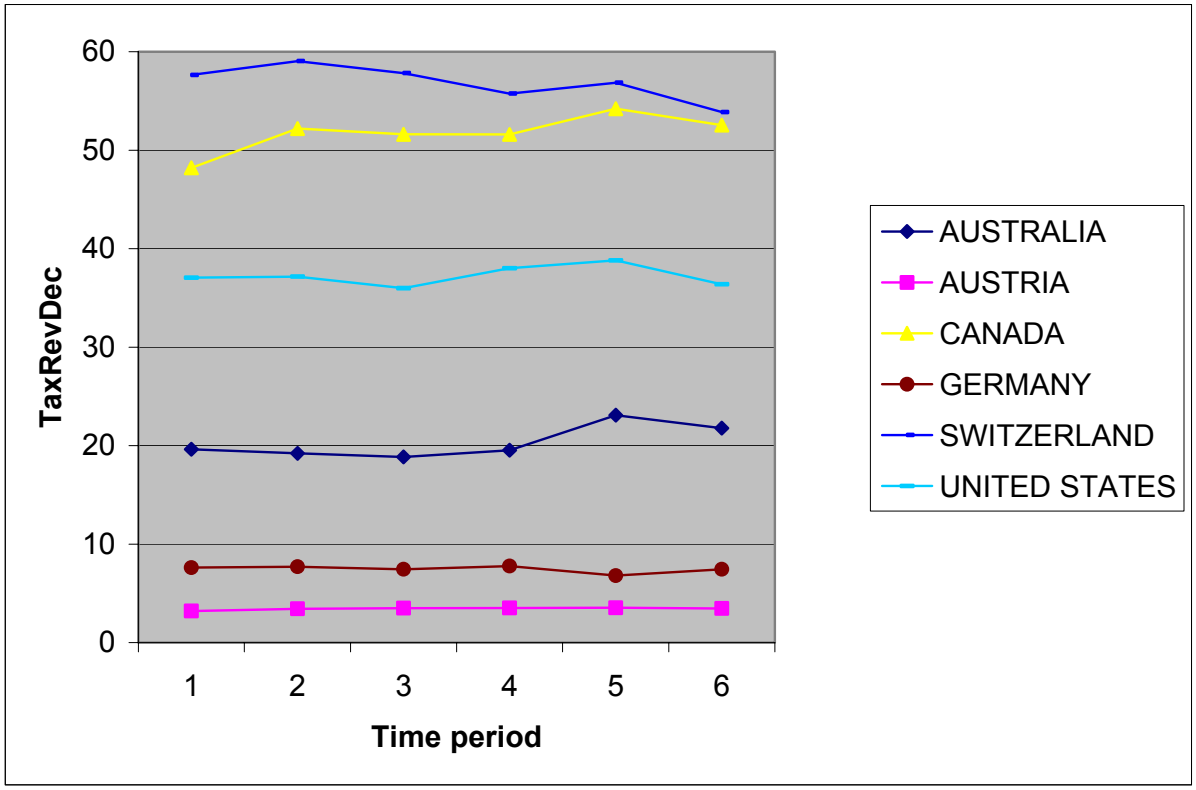
Trends in Tax Revenue Decentralization – Traditional Unitary Countries



Note: 5-year averages, 1970-2000. First period: 1970-1976.

Figure 2

Trends in Tax Revenue Decentralization – Traditional Federal Countries



Note: 5-year averages, 1970-2000. First period: 1970-1976.

Table 1

Descriptive Statistics for the Extent of Fiscal Decentralization for each Country

Country	Tax revenue decentralization					Expenditure decentralization				
	Mean	St. dev.	Coefficient of variation	Minimum	Maximum	Mean	St. dev.	Coefficient of variation	Minimum	Maximum
AUSTRALIA	20.35	1.69	0.08	18.84	23.09	41.23	0.99	0.02	40.11	42.63
AUSTRIA	3.44	0.12	0.04	3.20	3.54	30.85	0.70	0.02	29.88	31.80
BELGIUM	12.68	8.18	0.64	5.94	24.24	11.90	1.15	0.10	10.97	13.65
CANADA	51.73	1.97	0.04	48.21	54.22	57.58	0.95	0.02	56.34	58.82
DENMARK	29.46	1.64	0.06	27.44	31.80	45.42	1.74	0.04	43.56	48.00
FINLAND	26.25	1.57	0.06	24.71	29.15	37.95	2.07	0.05	35.11	40.11
FRANCE	12.30	7.59	0.62	1.72	19.17	18.07	2.36	0.13	16.47	22.81
GERMANY	7.46	0.35	0.05	6.81	7.77	42.02	2.22	0.05	39.26	45.65
IRELAND	4.50	3.16	0.70	2.34	10.39	25.21	1.90	0.08	23.32	28.28
JAPAN	33.05	2.21	0.07	29.71	36.48	43.46	0.00	0.00	43.46	43.46
NETHERLANDS	3.76	1.03	0.27	2.13	5.12	25.09	1.43	0.06	23.34	26.96
NORWAY	27.02	3.08	0.11	23.14	31.05	34.66	2.81	0.08	31.81	38.90
PORTUGAL[a]	1.55	1.32	0.85	0.28	3.10	8.74	3.95	0.45	3.46	12.41
SPAIN[a]	12.01	6.17	0.51	7.17	22.40	23.02	9.02	0.39	10.14	31.69
SWEDEN	41.33	3.90	0.09	35.91	46.39	37.83	4.17	0.11	33.25	44.07
SWITZERLAND	56.84	1.82	0.03	53.88	59.06	51.77	3.76	0.07	47.30	56.86
UNITED KINGDOM	10.34	4.20	0.41	4.83	13.50	25.52	3.25	0.13	21.90	31.03
UNITED STATES	37.24	1.04	0.03	35.99	38.81	44.90	2.29	0.05	41.44	47.91

Note: Tax revenue decentralization based on Stegarescu (2005), Expenditure decentralization based on GFS data, period averages. [a]Data before 1977 is not included for Portugal and Spain. There are additionally 8 missing variables on *ExpDec* (5 periods for Japan, and 1 period for Belgium, Portugal and Switzerland).

Table 2

Fiscal Decentralization and Government Spending, Ordinary Least Squares Estimates

	Government Size				Transfers				Government Consumption			
	(1)		(2)		(3)		(4)		(5)		(6)	
	Coeff.	St.error	Coeff.	St.error	Coeff.	St.error	Coeff.	St.error	Coeff.	St.error	Coeff.	St.error
TaxRevDec	-0.016	0.045	-0.124**	0.054	-0.082***	0.024	-0.111***	0.028	0.023	0.024	-0.039	0.027
ExpDec			0.251***	0.076			0.061	0.040			0.151***	0.039
Federation	-6.193***	1.324	-7.438***	1.404	-1.605**	0.703	-2.302***	0.738	-4.131***	0.709	-5.391***	0.713
Unemployment	0.168	0.211	0.225	0.206	0.318***	0.112	0.318***	0.108	0.045	0.113	0.031	0.105
GDP_95us	-1.749	1.187	-2.268*	1.267	1.488**	0.630	1.542**	0.666	-1.143*	0.635	-1.394**	0.644
Growth	-1.627***	0.568	-1.968***	0.590	-0.842***	0.302	-1.103***	0.310	-0.727**	0.304	-0.986***	0.300
Openness	0.089***	0.033	0.112***	0.032	0.036**	0.017	0.037**	0.017	0.014	0.018	0.027	0.016
Population	-0.031	0.040	-0.030	0.044	-0.004	0.021	0.009	0.023	-0.035	0.021	-0.013	0.022
Population^2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Rural population	-0.071	0.049	-0.046	0.051	0.051*	0.026	0.076***	0.027	-0.125***	0.026	-0.098***	0.026
Under 15	-0.025	0.360	0.125	0.348	-0.096	0.191	-0.043	0.183	-0.210	0.193	-0.110	0.177
Over 65	1.285***	0.453	1.720***	0.461	0.610**	0.240	0.709***	0.242	-0.046	0.242	0.073	0.234
Left	0.043*	0.023	0.039*	0.022	0.023*	0.012	0.020*	0.011	0.019	0.012	0.017	0.011
Center	0.072***	0.025	0.074***	0.024	0.046***	0.013	0.045***	0.013	0.023*	0.013	0.021*	0.012
R^2_{adj}	0.638		0.664		0.565		0.616		0.494		0.555	
Number of countries	18		18		18		18		18		18	
Number of observations	106		98		106		98		106		98	

Note: A constant term and period fixed effects are included in all specifications (not reported). The symbols ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Table 3

Fiscal Decentralization and Government Spending, Fixed Effects Estimates

	Government Size				Transfers				Government Consumption			
	(7)		(8)		(9)		(10)		(11)		(12)	
	Coeff.	St.error	Coeff.	St.error	Coeff.	St.error	Coeff.	St.error	Coeff.	St.error	Coeff.	St.error
TaxRevDec	0.073	0.095	0.006	0.104	-0.084	0.063	-0.128*	0.068	0.108***	0.035	0.058	0.035
ExpDec			0.289*	0.172			0.054	0.112			0.197***	0.058
Unemployment	0.638***	0.174	0.515***	0.190	0.389***	0.115	0.376***	0.124	0.222***	0.064	0.191***	0.064
GDP_95us	-3.296*	1.895	-5.773*	3.061	-1.936	1.247	-2.263	1.991	0.583	0.696	1.127	1.034
Growth	-0.980***	0.347	-1.051***	0.388	-0.203	0.228	-0.458*	0.253	-0.234**	0.127	-0.373***	0.131
Openness	-0.083	0.055	-0.100	0.060	-0.005	0.036	-0.009	0.039	-0.054***	0.020	-0.035*	0.020
Population	-0.627*	0.336	-1.206**	0.494	-0.205	0.221	-0.467	0.321	-0.387***	0.123	-0.379**	0.167
Population^2	0.001*	0.001	0.002**	0.001	0.000	0.000	0.001	0.001	0.001***	0.000	0.001*	0.000
Rural population	0.095	0.153	0.242	0.178	0.086	0.101	0.237**	0.116	-0.195***	0.056	-0.131**	0.060
Under 15	0.272	0.352	0.456	0.497	0.560**	0.232	0.478	0.323	-0.088	0.129	0.250	0.168
Over 65	1.620***	0.551	1.443**	0.668	0.843**	0.362	0.941**	0.435	0.277	0.202	0.422*	0.226
Left	-0.001	0.013	-0.007	0.014	-0.004	0.008	-0.004	0.009	0.002	0.005	-0.002	0.005
Center	0.004	0.018	-0.001	0.019	0.009	0.012	0.009	0.012	-0.003	0.007	-0.002	0.006
R^2_{adj}	0.941		0.941		0.891		0.898		0.961		0.966	
Number of countries	18		18		18		18		18		18	
Number of observations	106		98		106		98		106		98	

Note: A constant term, period and country fixed effects are included in all specifications (not reported). The symbols ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Table 4

Fiscal Decentralization and Government Spending, Traditional Federal Countries Excluded, Fixed Effects Estimates

	Government Size				Transfers				Government Consumption			
	(13)		(14)		(15)		(16)		(17)		(18)	
	Coeff.	St.error	Coeff.	St.error	Coeff.	St.error	Coeff.	St.error	Coeff.	St.error	Coeff.	St.error
TaxRevDec	0.139	0.125	0.059	0.147	-0.023	0.075	-0.067	0.078	0.117***	0.043	0.049	0.042
ExpDec			0.294*	0.267			0.047	0.142			0.203**	0.075
R^2_{adj}	0.929		0.924		0.893		0.911		0.965		0.973	
Number of countries	12		12		12		12		12		12	
Number of observations	70		63		70		63		70		63	

Note: A constant term, period and country fixed effects and control variables as used in previous estimations are included in all specifications (not reported). The symbols ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Table 5

Fiscal Decentralization and Non-pension Social Security Expenditures, Ordinary Least Squares and Fixed Effects Estimates

	Social expenditures excluding old-age, disability and survivors benefits							
	(19)		(20)		(21)		(22)	
	Coeff.	St.error	Coeff.	St.error	Coeff.	St.error	Coeff.	St.error
TaxRevDec	0.005	0.027	-0.006	0.026	0.043	0.062	0.034	0.063
ExpDec			0.103**	0.039			-0.245*	0.130
Federation	-3.427***	0.675	-4.143***	0.666				
Unemployment	0.278***	0.091	0.270***	0.084	0.244**	0.107	0.234*	0.118
GDP_95us	0.883	0.602	0.599	0.640	-1.266	1.256	2.456	1.948
Growth	-0.179	0.255	-0.470*	0.260	-0.076	0.184	-0.116	0.199
Openness	0.017	0.015	0.041**	0.016	-0.021	0.038	-0.067	0.046
Population	-0.038*	0.020	0.006	0.022	-0.043	0.378	-0.155	0.417
Population^2	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.001
Rural population	-0.110***	0.024	-0.071***	0.024	-0.186*	0.096	-0.147	0.142
Under 15	-0.107	0.186	-0.093	0.170	-0.205	0.283	-0.570	0.380
Over 65	0.088	0.243	0.097	0.239	-0.253	0.464	0.495	0.569
Left	0.014	0.010	0.016*	0.009	-0.004	0.007	-0.001	0.007
Center	0.032**	0.013	0.022*	0.012	-0.004	0.013	-0.002	0.013
R^2_{adj}	0.649		0.767		0.912		0.902	
Country Fixed Effects	No		No		Yes		Yes	
Number of countries	18		17		18		17	
Number of observations	69		63		69		63	

Note: A constant term is included in all specifications (not reported). The symbols ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Table 6

Fiscal Decentralization and Net Replacement Rates, Ordinary Least Squares Estimates

	Net replacement rates after 60 months of unemployment									
	(23)		(24)		(25)		(26)		(27)	
	Coeff.	St.error	Coeff.	St.error	Coeff.	St.error	Coeff.	St.error	Coeff.	St.error
TaxRevDec	-0.200	0.160	-0.268**	0.107	-0.263**	0.106	-0.357***	0.138		
ExpDec							0.233	0.204	-0.094	0.196
Federation	0.157	7.424								
Unemployment	0.666	0.954	0.812	0.590						
GDP_95us	12.937***	3.918	13.984***	2.737	11.392***	2.012	10.362***	2.367	9.366***	2.839
Growth	0.874	3.753								
Openness	0.051	0.109								
Population	-0.065	0.048	-0.092***	0.027	-0.110***	0.025	-0.115***	0.027	-0.114***	0.033
Rural population	-0.088	0.276								
Under 15	-2.866	2.766	-1.860	1.373						
Over 65	-3.820	3.157	-3.918	2.316						
Left	0.208	0.150	0.232**	0.093	0.102*	0.055	0.146*	0.067	0.113	0.080
Center	-0.057	0.101								
R^2_{adj}	0.655		0.794		0.788		0.790		0.690	
Number of countries	18		18		18		17		17	
Number of observations	18		18		18		17		17	

Note: A constant term is included in all specifications (not reported). The symbols ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively. The control variables used, are based on a 5-year average for the period 1996-2000.

Appendix Table A.1

Descriptive Statistics and Documentation

Variable	Definition	Source	Mean	St.dev.	Min	Max
Government Size	Total outlays (excluding consumption of fixed capital) consists of current disbursements plus gross capital formation, acquisitions less disposals of non-produced non-financial assets, net capital transfers payable less consumption of fixed capital, percent of GDP. Current disbursements consists of final consumption expenditure, subsidies, property income payable, current taxes on income and wealth payable, social benefits other than social transfers in kind and other current transfers.	A	43.937	8.886	22.325	64.438
Transfers	Social security transfers as a percentage of GDP. Consists of benefits for sickness, old-age, family allowances etc., social assistance grants and welfare benefits paid by general government.	A	14.934	4.468	5.600	27.540
Government Consumption	Government final consumption expenditure, percent of GDP. Government final consumption expenditure consists of expenditure, including imputed expenditure, incurred by general government on both individual consumption goods and services and collective consumption services.	A	20.058	3.926	11.070	29.189
Non-pension social expenditures	Total social expenditures, excluding benefits to old-age, survivors and disability, as a share of GDP. For a complete definition, see OECD's Social Expenditure Database	B	11.342	3.468	4.085	18.336
Net replacement rates	Net replacement rates are calculated after tax, including unemployment benefits, social assistance, family and housing benefits in the 60th month of benefit receipt. The rates are calculated as an unweighted average of four different household groups (single person with and without 2 children, one-earner married couple with and without 2 children) and two alternative earnings possibilities (67% and 100% of the average production worker salary).	C	63.31	13.88	27.50	76.75
TaxRevDec	Sub-central government own tax revenue divided by general government total tax revenue. Only tax revenue from taxes where the sub-central government autonomously can change the tax rate, tax base or both are included in the nominator.	D	21.460	16.931	0.278	59.058
ExpDec	Sub-central government expenditure divided by general government expenditure.	E	33.773	13.120	3.463	58.821
Unemployment	Unemployment rates, standardized as far as possible according to OECD criteria	F	6.768	4.105	0.380	20.900
Left	Cabinet composition: Percent of government from left parties, weighted by days	F	36.799	33.259	0.000	100.000
Center	Cabinet composition: Percent of government from center parties, weighted by days	F	25.607	28.369	0.000	100.000
Under 15	Percent of population 0-14 years of age	G	21.100	3.392	15.676	31.267
Over 65	Percent of population 65 years of age and above	G	13.359	2.254	7.482	17.860
Population	Total population in millions	G	36.355	57.938	3.054	275.189
Rural population	Percent of population living in rural areas	G	27.008	13.088	3.020	71.270
GDP_95us	GDP per capita in 10 000, 1995-US dollars	G	2.242	0.774	0.685	4.508
Growth	Growth rate in GDP	G	2.878	1.394	-0.523	9.790
Openness	Total trade (export + imports), in percent of GDP	H	56.398	28.428	11.990	165.890

Note: The data are collected from eight different data sources: (A) OECD's Historical Statistics, section 6, (B) OECD's Social Expenditure Database, (C) Benefit and Wages, OECD Indicators (OECD, 2004), (D) Dan Stegarescu's data set (2005), (E) IMF Government Finance Statistics[24], (F) The Comparative Political Data Set (Armingeon et al. 2004), (G) The World Development Indicators and (H) The Penn World Table Version 6.1 (Heston et al. 2001). Descriptives based on periods averages, 98 observations, except for non-pension social expenditure (69 observations) and net replacement rates (18 observations).

[24] Downloadable from: http://www1.worldbank.org/publicsector/decentralization/fiscalindicators.htm

Appendix Table A.2

Descriptive Statistics for the Main Dependent Variables

Country	Government Size				Transfers				Government Consumption			
	Mean	St. Dev	Minimum	Maximum	Mean	St. Dev.	Minimum	Maximum	Mean	St. Dev	Minimum	Maximum
AUSTRALIA	33.19	3.17	27.31	35.96	7.19	1.44	4.65	8.63	18.34	1.21	16.05	19.54
AUSTRIA	48.00	4.06	40.64	51.74	17.65	1.36	15.69	18.91	18.80	1.56	15.85	20.03
BELGIUM	51.87	5.52	43.26	60.03	16.34	1.91	12.92	18.73	21.46	1.49	19.06	23.60
CANADA	42.78	4.60	35.98	49.07	10.61	2.34	7.55	13.76	21.56	1.29	19.47	23.22
DENMARK	51.06	5.99	41.10	56.55	16.26	2.92	11.53	19.73	25.51	1.53	22.77	27.49
FINLAND	43.11	8.62	31.70	56.28	14.52	5.23	7.80	22.20	20.25	2.80	15.95	24.16
FRANCE	46.28	4.87	38.23	50.50	17.06	1.14	15.44	18.43	21.98	2.30	17.90	23.70
GERMANY	45.96	2.15	41.91	47.92	16.66	1.62	14.13	19.05	19.55	0.81	18.08	20.46
IRELAND	43.17	7.02	32.80	53.85	12.60	2.40	9.84	15.62	17.74	2.02	14.58	20.50
JAPAN	30.77	4.68	22.32	36.34	8.91	1.96	5.61	10.92	13.70	1.37	11.55	15.77
NETHERLANDS	53.58	7.10	43.66	61.39	22.47	5.30	13.21	27.78	25.02	1.63	22.88	27.26
NORWAY	45.89	2.87	43.11	50.22	13.91	1.69	11.99	16.50	19.59	1.48	17.25	21.53
PORTUGAL	37.50	7.77	23.62	44.50	10.29	2.81	4.81	12.80	15.39	2.79	12.76	19.28
SPAIN	35.70	8.19	22.88	44.77	13.93	2.72	9.46	16.91	15.16	2.92	10.54	18.27
SWEDEN	57.36	6.94	44.95	64.44	18.05	3.19	12.74	22.38	27.05	1.97	23.54	29.19
SWITZERLAND	30.74	4.03	23.92	35.28	11.88	1.49	9.66	13.38	13.13	1.20	11.07	14.52
UNITED KINGDOM	41.72	2.41	38.80	45.49	12.71	2.15	9.32	15.26	20.17	1.14	18.54	21.77
UNITED STATES	33.45	2.11	30.60	35.76	11.13	1.48	8.93	12.78	16.65	1.15	14.53	17.67