

The size of government and the political economy of decentralized spending

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Abstract

The relationship between fiscal decentralization and the size of government has been extensively explored in the empirical literature on fiscal federalism since Wallace Oates's seminal article (Oates, 1985). However, the results tend to be contradictory and no consensus has yet emerged. One weakness of existing empirical studies is that they generally do not offer a rigorous theoretical derivation of the hypotheses that are tested. Instead, they are usually motivated by rather general arguments such as Brennan and Buchanan's famous Leviathan argument (Brennan and Buchanan, 1980). In particular, the political environment and the spatial distribution of ideologically motivated voters is usually either ignored, or only discussed in passing. We therefore develop a model that explicitly links the spatial distribution of voters and their party affiliations to the size of government under (i) centralized and (ii) decentralized public sectors. The primary aim of the model is to derive a number of empirical implications with regard to the political economy of decentralization and the size of government. We then test these implications with data on OECD countries.

Keywords: Electoral competition, Fiscal decentralization, Size of government
(H41, H71, H77)

1 Introduction

A major part of recent empirical research in the field of fiscal federalism is concerned with the question of whether fiscal decentralization leads to a reduction in the size of government. The theoretical starting point of this literature is the famous conjecture by Brennan and Buchanan which states that government intrusion into the economy will be smaller when the public sector is decentralized (Brennan and Buchanan, 1980). Several authors have attempted to test this “Leviathan hypothesis”, partly because Brennan and Buchanan explicitly invite researchers to do so¹, partly because the validity of the hypothesis is based on a rather controversial view of government. Indeed already Oates (1985) offers a number of competing hypotheses. One, which he credits to the economic historian John Wallis, states that citizens’ willingness to delegate responsibility to the government might increase when the public sector is decentralized. And a second argument that is based on the insight that decentralization might lead to a loss in economies of scale, thus increasing the budgetary costs of public goods. Facing two competing theories, Oates explores this question empirically. However, his regressions suggest neither a robust nor a significant relationship between fiscal decentralization and government size.

Oates’ study, while being seminal, is highly idiosyncratic. He runs two sets of cross-section regressions, first with data on US States and then with international data, using three different measures of (de)centralization², and a number of specifications which he himself considers to be somewhat ad hoc. The articles which build upon his seminal research try to consider additional facets of how decentralization might be related to government size. The overarching aim seems to be to discount the disappointing finding of no significant relationship by using better data, an improved specification, considering alternative sets of countries, or other measures of decentralization. For example, one issue that is ignored in Oates’s study is whether the federal and subnational governments are capable to circumvent the competitive pressure of decentralization by colluding with each other. Grossman and West (1994) address this possibility in a study on the Canadian Provinces with time series data. They indeed find that collusion increases the size of government.³

Marlow (1988) explores the relationship for the United States at the national level by using time-series data. His empirical model is rather straightforward: He measures the combined federal and subnational size of government with the ratio of total government expenditures to GNP, and regresses this variable on a measure of decentralization and two other controls. The results indicate that decentralization is negatively related to government size.

¹ “There are, then, clear empirical implications here that could be tested to determine the extent to which this explanation of revenue sharing and the structure of grants is an appropriate one” (Brennan and Buchanan, 1980, p.182)

² Which were: the share of state/central government government revenues to local/state government revenues, the share of state/central government expenditures to local/state government expenditures, and the number of local governments within a state in the state-level regressions.

³ Even though their study is concerned with “federalism” and not with decentralization, the argument they make points to an important problem for empirical research on fiscal federalism: that the terminology is sometimes confusing. In their terminology, collusion basically means the sharing of revenues from harmonized and federally collected taxes. Thus, collusion is clearly something different than fiscal decentralization which in essence is defined as the degree of autonomy of subnational governments to independently set tax rates or to define bases. However, it is usually difficult to disentangle “own-source” revenues from other revenue sources such as automatic distributions of shared taxes in the widely used GFS data. We will address this issue in more detail in the empirical part of this paper.

Other studies emphasize the importance of the fiscal constitution for how decentralization impacts government size. The argument is that providing subnational governments with certain types of intergovernmental transfers might actually increase the size of the public sector when the federation is characterized by soft budget constraints and horizontal equalization schemes. For example, Grossman (1989) finds that while decentralization indeed has led to a smaller public sector in the US, intergovernmental grants have contributed to the growth of government. Jin and Zou (2002) obtain similar results in a panel data study on 32 industrial and developing countries. They find that expenditure decentralization leads to a larger aggregate government, whereas revenue decentralization seems to have the opposite effect. Vertical fiscal imbalances created by vertical transfers are found to expand the public sector. Overall, their results support the Leviathan hypothesis for the revenue but reject it for the expenditure side. Stein (1998) goes one step further in the rejection of the hypothesis. His study on South American countries concludes that decentralization, when financed through central transfers, leads to an expansion of the public sector.

A different and somewhat more fundamental perspective on the problem is taken in Anderson and Van Den Berg (1998). They argue that the variables which are traditionally used to measure government size, i.e. both tax revenue and total government expenditures as a ratio of GDP, might be inaccurate and therefore lead to biased estimates. Their surprisingly simple argument is that GDP is an inaccurate measure of the size of the economy because it does not take non-market activities into account. However, while their criticism of earlier studies is probably valid, they too fail to find a significant relationship even though they take household and non-market activities into account.

Compared to these studies, the scope of analysis is somewhat broadened in Rodden (2003). His main focus still is the impact of the intergovernmental transfer scheme on the eventual association between decentralization and size of government, but he also considers a number of political and institutional variables. He finds that fiscal decentralization tends to decrease the size of government, but that governments grow faster when subnational expenditures are financed with intergovernmental grants. However, his key insight is that the overall impact of decentralization might be determined by how different tax bases are allocated to the various tiers of government. The argument is that fiscal decentralization will lead to smaller sizes of government particularly in such regimes where the fiscal constitution allocates those bases which are mobile to the subnational tier. He thus points to the possibility that the suppliers of different factors which are distinguished by the ability to move between jurisdictions (that is laborers and capitalists) might be locked in a battle to pass the financial burden of national and regional public goods onto each other by structuring the fiscal constitution appropriately. Even though his exposition is enlightening, it is made rather informally and its implications are not fully explored. This paper therefore attempts to elaborate on his argument by constructing a formal model that links the degree of mobility of factors of production to the fiscal preferences of their suppliers. In our model, we take the fiscal constitution (that is the allocation of tax bases between tiers of government) as given, and endogenize tax rates and thus the size of government. We also explore the relationship between the degree of segregation of the factor suppliers and government size.

This paper contributes to the literature twofold. Firstly, by providing a formal and quantitative derivation of a number of empirical hypotheses, something which is rarely done in this field. Even

though there exist a few models which indirectly provide implications with regard to the relationship between decentralization and public sector expansion (e.g. Lorz and Willmann (2005)), it is save to state that this subject has received rather scant attention in theoretical research. Secondly, the interactions of the ideological position of ruling parties at the federal and subnational levels with fiscal decentralization are explicitly considered. We derive, for example, in the theoretical section that a decentralized public sector leads to a larger size of government than centralization when the federal government is formed by a left-wing party, but that with a right-wing federal government, decentralization results in a smaller government size. We also find evidence to this effect in the empirical part of this paper.

The remainder of this paper is organized as follows. In the next section, we develop a theoretical model that will be used to explore the relationship between institutional regimes, ideological position of parties, and the size of government. In section 2.1, we describe the general framework of the model and introduce the notation, in sections 2.2 and 2.3 we derive the optimal size of the public sector with a benevolent government under centralized and decentralized regimes. These results will serve as our benchmark in evaluating the public sector size under “political” governments in section 3. Based on the theoretical results, we start our empirical investigation in section 4. In section 4.1 we introduce our hypotheses, in section 4.2 we describe our data. The results are presented in section 4.3. In section 5, we conclude.

2 The basic model

2.1 General framework

Assume a federation that consists of a continuum of jurisdictions whose measure is normalized to 1. The population in each jurisdiction is also normalized to have a measure of 1. Then, the number of inhabitants in the federation is unity. In each jurisdiction, there are two types of inhabitants who are distinguished by the factor of production they supply. There are (i) “capitalists” who each supply inelastically 1 unit of capital and zero labor, and (ii) “laborers” who each supply inelastically 1 unit of labor and zero capital. In order to ensure consistency with later sections, we will in the following dub these two groups as right-wing (capitalists) and left-wing (laborers) inhabitants or, alternatively, voters. We refer to right-wing inhabitants with a r subscript and to left-wing inhabitants with a l subscript. The share of right-wing inhabitants in jurisdiction j is denoted with $a_r(j)$, and thus the share of left-wing inhabitants in j is $a_l(j) = 1 - a_r(j)$.

In each jurisdiction j , an industry consisting of a number of firms produces with a constant returns to scale technology an output good $y(j)$ by using capital and labor. We assume that the price of output is normalized to 1. One implication of this assumption is that the price is not determined endogenously in the “home” market, and it is appropriate if output can be traded globally, in which case supply is completely elastic.

Net-income of a right-wing and a left-wing inhabitant in j is respectively

$$I_r(j) = \rho(j) \text{ and } I_l(j) = \omega(j) \tag{1}$$

where $\rho(j)$ denotes the net-of-taxes interest and $\omega(j)$ the net-of-taxes wage income of inhabitants in region j . We assume that capital is mobile throughout the federation. In a market economy,

this assumption implies that the net return of capital must be the same in all jurisdictions, i. e. $\rho(j) = \rho$. We further assume that capital cannot leave the country. Whilst this assumption is primarily made for simplicity, it conforms to the empirical observation that capital is generally more mobile within than between states. We assume, as is customary, that inhabitants and therefore labor is immobile between jurisdictions.

There is a federal government which is responsible for the whole federation, and in each sub-national jurisdiction a local government. It is assumed that the fiscal constitution allocates to the federal government the authority to tax returns on capital whereas subnational governments are allowed to tax wages which are paid within their jurisdiction. Such neatly disjoint tax bases ensure that vertical tax competition due to shared bases cannot emerge. One (perhaps rather weak) argument for this assumption is that a rational constitutional assembly should allocate tax bases between tiers of government precisely in this fashion. The primary reason for making this assumption is, however, that we are interested in the inefficiencies generated by the “political economy” of decentralization. Since inefficiencies due to vertical tax competition and tax sharing arrangements are already well understood (e. g. Keen and Kotsogiannis (2002), Weingast et al. (1981)), we want to construct a public sector which operates under an “economically efficient” fiscal constitution. We show further below that there is indeed no difference between centralization and decentralization in terms of efficiency if governments are welfare-maximizers. Thus, the model is deliberately structured in such a way that any inefficiencies in the federation can only be caused by the the political process.

Taxes are assumed to be per item, and the federal tax rate is given by t_K whilst the labor tax rate in jurisdiction j is $t_l(j)$. The federal government is therefore constrained to be “uniform” in its tax rate whereas regional tax rates may vary. Given these assumptions, the gross return for capital is given by $r = \rho + t_K$, and the gross wage in j by $w(j) = \omega(j) + t_l(j)$.

Capital and labor demand in a firm in jurisdiction j are determined by

$$F_k(j) = (\rho + t_K) \text{ and } F_l(j) = (\omega(j) + t_l(j)), \quad (2)$$

where $F_k(j)$ and $F_l(j)$ denote the marginal product of capital and labor in jurisdiction j , respectively. Capital and labor demand in region j are therefore a function of federal and regional taxes on capital and labor. Denoting capital demand in region j with $k(j)$ and labor demand with $l(j)$, the last result implies $k(j) = k(j)[\rho + t_K]$ and $l(j) = l(j)[\omega_j + t_l]$.

The net return to capital is given by the following equilibrium condition⁴:

$$\int_0^1 a_r(j) dj = \int_0^1 k(j) dj. \quad (3)$$

By totally differentiating and using the assumption that capital is supplied inelastically, it is easy to show that the incidence of the federal tax is completely on capital, i. e.

$$\frac{d\rho}{dt_K} = -1. \quad (4)$$

⁴ Each capitalist in the federation supplies one unit of capital, and there are $R = \int_0^1 a_r(j) dj$ inhabitants. Thus, the gross supply of capital is also $R = \int_0^1 a_r(j) dj$.

Using the assumption that labor is supplied inelastically, the equilibrium condition for the labor market in jurisdiction j is given by

$$a_l(j) = l(j). \quad (5)$$

Again, it is easy to show that the incidence of the regional tax on labor is completely on labor.

$$\frac{d\omega(j)}{dt_l(j)} = -1. \quad (6)$$

On the consumption side of the economy, both right-wing and left-wing voters have identical preferences irrespective of the jurisdiction in which they live. These preferences are defined over private consumption, and two different public goods. There is a national public good G which is provided by the federal government, and financed with federal revenues from taxes on capital. Secondly, each subnational government provides a local public good $g(j)$ which is financed with regional revenue from wage taxes.

We model the utility of inhabitants as quasilinear in private and public consumption. An inhabitant in jurisdiction j has the following utility

$$U_i(j) = c_i(j) + v(g(j)) + W(G) \quad i = r, l. \quad (7)$$

with $g(j)$ denoting the level of the local public good, G the national public good and $c_i(j)$ private consumption by group $i = r, l$ in jurisdiction j . Inhabitants in each jurisdiction are distinguished by their budget constraints. That is, a right-wing inhabitant in j faces

$$c_r(j) = \rho = (r - t_K), \quad (8)$$

whereas a left-wing supporter faces

$$c_l(j) = \omega(j) = w(j) - t_l(j), \quad (9)$$

The budget constraint of the federal government is

$$G = t_K \int_0^1 a_r(j) dj, \quad (10)$$

and that of regional government j is

$$g(j) = t_l(j) a_l(j). \quad (11)$$

One interesting implication of the assumption that taxes are per unit is that the equilibrium level of wages and interest receipts is irrelevant for tax revenues. Since right- and left-wing inhabitants are assumed to supply their factors inelastically, all available labor and capital is employed, thus making government revenues somewhat detached from equilibrium factor prices.

2.2 Benchmark conditions

As a benchmark, we derive the conditions which describe the level of public goods when the public sector is centralized *and* the government is a welfare-maximizer. Under centralization, the level of both the subnational and the national public goods is set by the federal government. We define social efficiency as a situation where the sum of the individual utilities is maximized. The objective function of the federal government is

$$U^s = \int_0^1 \sum_i a_i(j) (c_i(j) + v(g(j)) + W(G)) dj, \quad i = r, l \quad (12)$$

The budget constraint of the government at the federal tier and in each subnational jurisdiction j is given by equation 10 and 11. Obviously, the national good is “pure” in the sense that every inhabitant in the country is able to consume it without reducing the consumption of other inhabitants, whereas the local public good $g(j)$ is local in the sense that it does not generate any spillovers in other jurisdictions.

By differentiating equation 12 with regard to $g(j)$ and G and taking the various budget constraints into account, we obtain the following first order conditions for the optimal provision of the two public goods

$$1 - \frac{dv}{dg(j)} = 0, \text{ and} \quad (13)$$

$$1 - \frac{dW}{dG} = 0. \quad (14)$$

These conditions determine the optimal levels of the regional and federal public goods. We denote the solutions to these equations with $g^*(j)$ and G^* . For $g^*(j)$ to be viable, however, it must hold that the gross income of labor in jurisdiction j is sufficient to pay the taxes associated with $g^*(j)$. It must therefore hold that

$$a_l(j)w(j) \geq g^*(j). \quad (15)$$

We assume throughout this paper that this condition holds except when $a_l(j) = 0$. That is, every government is assumed to be able to provide the optimal level of the public good as long as at least one laborer is present in the jurisdiction. If there are no laborers at all ($a_l(j) = 0$), the government is forced to set $g(j) = 0$. Similarly, for G^* to be viable, it must hold that

$$\rho \int_0^1 a_k(j) dj \geq G^*. \quad (16)$$

We assume that this condition always holds.

Note also that taxes are residually determined by the provision of the national and subnational public goods. In particular, whereas the capital tax is the same throughout the federation, the wage tax varies between jurisdictions when governments are benevolent. The tax burden on the laborers in jurisdiction j is given by $t_l(j) = \frac{g(j)}{a_l(j)}$, and depends on the number of laborers living in the jurisdiction.

2.3 Equilibrium under decentralization with welfare maximizing governments

We now derive the equilibrium under a decentralized public sector. We understand decentralization as a situation where each tier of government maximizes the utility of its constituency independently. Due to the assumptions that the utility function is quasi-linear in the regional and federal public goods, and that regional public goods do not generate any spillovers, strategic interactions are irrelevant.

The objective function of a welfare-maximizing subnational government in jurisdiction j is therefore

$$U^s(j) = \sum_i a_i(j) (c_i(j) + v(g(j)) + W(G)), \quad (17)$$

where $c_i(j), i = r, l$ is given by equations 8 and 9, and the budget constraint of the regional government by equation 11. The first order condition pertaining to the equilibrium level of the local public good is

$$1 - \frac{dv}{dg(j)} = 0. \quad (18)$$

Thus, regional provision is determined according to a condition that is identical to equation 13. Therefore the first best level is provided by all jurisdictions. The fact that a decentralized public sector is generally efficient when governments are welfare maximizers is not surprising given that vertical and horizontal interactions are assumed away.

Similarly, it can be shown that the level of national public good provided by the federal government is determined according to

$$1 - \frac{dW}{dG} = 0. \quad (19)$$

Thus the same condition as in equation 14 is obtained, implying that the federal government provides the efficient level of the national public good.

Overall, we obtain that (i) if the allocation of taxing powers is such that the federal government may tax mobile and subnational governments immobile factors and (ii) federal and subnational governments are welfare-maximizers, then the first best equilibrium can be achieved. This follows firstly from the fact that the burden of the regional wage tax is completely borne by labor suppliers, implying that regional labor demand is not reduced by wage taxes, and secondly because the federal capital tax is borne completely by capital suppliers, implying that capital demand in region j is not reduced by an increase in the federation wide capital tax.

3 The political economy of (de)centralization

In the last section, we assumed that the level of the public goods is determined by welfare-maximizing governments. This might be an unrealistic assumption, and is therefore abandoned in this section. Instead, we model the regional and federal governments as being elected by their electorates. The electorate of the federal government is the total population in the federation, the electorate of the regional government j are all inhabitants of this jurisdiction.

Once elected, each party implements the “favored policy” of the voters it represents.⁵ A right-wing party is elected into office in jurisdiction j when $a_r(j) \geq 1/2$.⁶ Otherwise, the left-wing party is elected into office. Similarly, a right-wing party controls the federal executive if $R = \int_0^1 a_r(j) dj \geq 1/2$. We also define $L = 1 - R = \int_0^1 a_l(j) dj$. Thus, a left-wing party controls the federal executive when $L > 1/2$.

By “favored policies”, we mean that each party implements the level of the regional and federal public goods preferred by its voters. Qualitatively, this assumption implies that if a jurisdiction j is ruled by a right-wing government, the level of the regional public good will be set as high as possible because the associated tax burden is completely borne by left-wing voters. On the other hand, if the federal government is controlled by the right, it will provide a sub-optimally low level of the national public good because its constituency has to bear the full costs of provision but disregards the benefits that accrue to left-wing voters.

Conversely, if the left controls the government in jurisdiction j , it will set the level of the regional public good too low because it ignores the benefits that accrue to the right-wing supporters living in that jurisdiction. On the other hand, if the federal executive is in the hands of a left-wing party, the national public good will be over-provided. We will assume in the following that there is some upper limit to the level of public goods, for example because of a constitutional provision which has been established to prevent expropriatory taxation or because public expenditures which generate only marginal benefits might become politically unfeasible from a certain point on.⁷

To obtain quantitative results, we will consecutively impose more structure on the problem. We start by assuming that the utility functions in equation 12 are given by customary logarithmic functions, i. e. $v = \ln(g)$ and $W = \ln(G)$. Then, we obtain for the optimal level of each regional public good $g^*(j) = 1$, and for the national public good $G^* = 1$. The optimal government size is given by $S^* = \int_0^1 g^*(j) dj + G^* = 2$.

Because we assume that governments only consider the utility of their voters, a left-wing government in jurisdiction j strives to maximize

$$U_l(j) = a_l(j) (c_l(j) + v(g(j)) + W(G)), \quad (20)$$

i. e. the sum of the utilities of all its voters. Thus, the level of the local public good is determined by the following condition

$$\frac{1}{a_l(j)} - \frac{dv}{dg(j)} = 0. \quad (21)$$

When the logarithmic utility function is used for $v(\cdot)$, this equation gives $g_l(j) = a_l(j) \leq 1$ for the level of the regional public good under a left-wing subnational government.

⁵ This assumption therefore conforms to the citizen-candidate model of elections.

⁶ Since we have a continuous measure of inhabitants, it does not matter whether we define that an election victory of the right-wing party occurs when $a_r(j) > 1/2$ or $a_r(j) \geq 1/2$.

⁷ It might seem strange that one seeks to prevent over-taxation through an upper limit on the level of public goods rather than through a limit on tax rates. However, expenditures and taxes are clearly related, and formulating the constitutional restrictions in this way simplifies the exposition considerably. The assumption might be further rationalized by the fact that over-provision of a public good might be interpreted by the electorate as government inefficiency. Politicians usually try to *appear* frugal and efficient because lavish and unnecessary spending, and not so much high taxation, are often the cause for public discontent. This is especially true in rich societies where marginal increases in tax rates result in high amounts of revenue, thus causing expenditures to be a more obvious signal for government inefficiency than the associated tax rates.

On the other hand, if the right controls the local government it will set the level of the regional public good as high as possible. We assume, somewhat arbitrarily, that the the highest possible level of the regional public good $g_r(j)$ is the optimal level $g^*(j)$, that is $g_r(j) = g^*(j) = 1$. Even though this assumption is ad hoc, we need to make *some* kind of assumption to obtain closed form solutions for the size of government, and this seems to be a reasonable one. While in this case left-wing supporters have to pay more taxes than they would like to, right-wing local governments can “justify” the tax burden from a “moral” perspective on the grounds that it maximizes aggregate welfare. An associated assumptions for $g_r(j) = 1$ to be viable is that the number of left-wing voters times their wage incomes in jurisdiction j must be sufficient to pay the taxes associated with $g_r(j) = 1$. According to condition 15, this implies that there is at least of laborer present in the jurisdiction. Otherwise, the level of the regional public good is $g(j) = 0$ even if the jurisdiction is ruled by the right.

At the federal level, the amount of the regional public good provided by an executive controlled by the right is given by

$$\frac{1}{R} - \frac{dW}{dG} = 0, \quad (22)$$

with $R = \int_0^1 a_k(j) dj$ denotes the total number of right-wing voters in the federation. Using the logarithmic utility function, we obtain for the level of the public good when the right is in control of the federal government $G_r = R < 1 = G^*$. When the left controls the federal government, it will strive to provide the highest possible level of the federal public good. We again impose that the maximum level cannot be higher than the socially optimal level, that is $G_l = G^* = 1$. Obviously, the gross income of capitalists must be sufficient to pay for this level of the national public good (see condition 16).

In the following subsections, we will analyze the size of government under various policy regimes and administrations. We will also analyze how the spatial distribution of a given number of right and left-wing voters determines the number of jurisdictions controlled by either of the two groups, which in turn will lead to conclusions about the the size of government. We start by discussing the case of a centralized executive, which is fairly easy and move on to discuss the impact of decentralization. In discussing decentralization, we will find that we have to impose some amount of regularity on the spatial distribution of the two groups in order to reach definite conclusions. Otherwise, the degrees of freedom inherent in the problem become too large and unamenable to analysis.

3.1 Government size under centralization

We first derive the size of government under a centralized regime. Under centralization, the federal government chooses both the level of the national and that of each subnational public good. Thus, we need to discuss two separate cases: the case where the left has a majority in the whole federation, and the case where the federal government is controlled by the right. Keeping in mind that the number of right-wing voters is given by $R = \int_0^1 a_r(j) dj$, the federal executive is controlled by the right when $R \geq 1/2$. In this case, the size of the federal government is given by R .⁸ The aggregate size of all subnational governments is given by $\int_0^1 1 dj = 1$ because the maximum

⁸ We use equation 22 and the assumption that the utility function $W(\cdot)$ is logarithmic to obtain this result.

level of the local public good will be chosen in all jurisdictions.⁹ Thus the total government size when the right is in control and the country is centralized is given by $S_r^c = 1 + R$.

On the other hand, when labor is in control, the size of the government is given by $S_l^c = 1 + \int_0^1 a_l(j) dj = 1 + (1 - R) = 1 + L$. This expression is obtained by recognizing that a left-wing federal government will choose the maximum level of the national public good, and in each jurisdiction the level of the subnational public good that is preferred by its constituency.

We can therefore reach two conclusions from these expressions. First, the political equilibrium leads to a larger than efficient aggregate government size, both when the federal government is controlled by the right and when it is controlled by the left. Secondly, there is no systematic difference in the size of aggregate government chosen by the two parties. However, there are differences in the distribution of spending between tiers of government. If the left is in the majority, the aggregate size of subnational governments will be lower and the size of the federal government larger than in the first-best equilibrium. The opposite results are obtained when the right has the majority.

3.2 Government size under decentralization

When the public sector is decentralized, the situation is different. The federal government continues to be controlled by the party which has the federation-wide majority. The determination of the number of jurisdictions controlled by the left- and the right-wing parties is more complicated than in the case of centralization, however. This number depends on both the relative shares of the two groups in the federation, and their spatial distribution between jurisdictions. On the most basic level, the two groups could be “equally” or “unequally” distributed. If both groups are equally distributed, each jurisdiction is populated by R right-wing and L left-wing voters. Thus if the right has the federation-wide majority ($R \geq 1/2$), it will not only control the federal executive but also *all* subnational governments and vice versa. Obviously, when the two groups are equally distributed, the number of jurisdictions controlled by either group and in turn the size of government is the same as under centralization. This case therefore does not need further analysis.

The more interesting case is the one where right- and left-wing voters are unequally distributed, and it is here where decentralization makes the critical difference. Without imposing more structure on the distribution of the R capitalists and L laborers, however, it is impossible to derive any definite conclusions with regard to the size of government. The problem is that all kinds of distributions are possible, each leading to vastly different numbers of jurisdictions controlled by either of the two groups. Therefore, we will assume some degree of regularity in the spatial distribution of the two groups in the following subsections.

⁹ Note that even if some subnational jurisdictions has no laborers, it will nonetheless exhibit the maximum level of the local public good. This is so because the central government taxes all laborers in the federation as a group and then allocates the revenues in such a way between the jurisdictions that each has the maximum level of the subnational public good. For this to be viable, it must hold that $\int_0^1 a_l(j)w(j) \geq 1$.

3.2.1 Decentralization under a left-wing federal government

We assume that the number of right-wing voters in jurisdiction j is given by

$$a_r(j) = (1 - a_l(j)) = \begin{cases} (2R/J^2)j & \text{if } 0 \leq j \leq J \\ 0 & \text{else.} \end{cases} \quad (23)$$

This equation states that the number of right-wing voters increases linearly up to jurisdiction $J < 1$. All jurisdictions from J onwards are completely populated by left-wing voters. Assuming such a “distribution function” ensures that the total number of right-wing supporters in the federation is R since $\int_0^J (2R/J^2)j dj = R$. However, in order to ensure that $a_r(j) \in [0, 1]$, we need make an additional assumption: it must hold that $R \leq J/2$. Because $J < 1$, we then obviously analyze the case where right-wing voters are the federation-wide minority, and the federal government is controlled by the left. Note also that the share of left-wing inhabitants can be obtained by $a_l(j) = 1 - a_r(j)$.

Under these assumptions, the “variance” of the distribution of right-wing voters is given by

$$Var(a_r) = \int_0^J ((2R/J^2)j - R)^2 dj + \int_J^1 (0 - R)^2 dj = ((4/3J) - 1) R^2. \quad (24)$$

In calculating this expression of dispersion, we have used the fact that if right-wing voters were equally distributed between jurisdictions, each jurisdiction would be populated by R right-wing voters (since the number of right-wing voters is R and the federation has size unity). Obviously, this measure of dispersion decreases in the number of jurisdiction J where at least one right-wing voter lives at given levels of R , and increases in R at given levels of J .

The dispersion of left-wing voters is given by

$$Var(a_l) = \int_0^J ((1 - (2R/J^2)j) - L)^2 dj + \int_J^1 (1 - L)^2 dj = ((4/3J) - 1) R^2. \quad (25)$$

Thus the dispersion of left-wing voters is the same as that of right-wing voters. Therefore, it too decreases in J and increases in R .

Next, we calculate the number of jurisdictions under the control of right-wing voters. A jurisdiction j is controlled by the right if $a_r(j) \geq 1/2$. The critical jurisdiction where right-wing voters make up exactly 1/2 of the electorate is given by

$$j^{crit} = (J^2/4R). \quad (26)$$

Since the critical jurisdiction has to be smaller or equal to the last jurisdiction (which has an index $j = 1$), it must obviously hold that $R \geq (J/2)^2$. Together with the above condition that $R < (J/2)$ must hold, we obtain the following interval for permissible values of R : $(J/2)^2 \leq R < (J/2)$.

Using the expression for the critical jurisdiction, the following equation is obtained for the number of jurisdictions controlled by right-wing voters

$$N_r = J - j^{crit} = J - (J^2/4R). \quad (27)$$

By simply differentiating and keeping in mind that by assumption $(J/2)^2 \leq R \leq (J/2)$, it is easy to show that the number of jurisdictions controlled by the right (weakly) decreases in J and increases in R .¹⁰ Therefore, we have derived a straightforward relationship between the dispersion of right-wing voters (see equation 24) and the number of jurisdictions they control: the higher the dispersion of right-wing voters, the more jurisdictions will be controlled by them.

Next, we relate the number of jurisdictions controlled by both parties to the size of government. Since we have assumed that the federal executive is in the hand of a left-wing party, the level of the national public good chosen by the federal government is $G_l = 1$. At the subnational level, the N_r jurisdictions controlled by the right will each provide $g_r(j) = 1$ whereas the $(1 - N_r)$ jurisdictions controlled by the left will each provide $g_l(j) = a_l(j)$. The aggregate size of government when the left holds the federation-wide majority is therefore

$$S_l^d = 1 + (1 - J)1 + \int_0^{j^{crit}} a_l(j) dj + \int_{j^{crit}}^J 1 dj. \quad (28)$$

The size of subnational governments under a left-wing rule at the federal tier is illustrated in figure 1(a). In this figure, the amount of the regional public good in jurisdiction j (that is, the size of government) decreases linearly up to the critical jurisdiction j^{crit} because the number of left-wing voters is also continuously decreasing. At the critical jurisdiction, the level of the regional public good jumps to $g_r(j) = 1$, the maximum public good level, because now right-wing voters are in the majority and therefore control the government. The level of the local public good stays at 1 until jurisdiction J since all jurisdiction up to this point are governed by the right. After jurisdiction J , the level *remains* at 1 because all jurisdictions from J onwards are completely populated by laborers, so that the optimal level of the local public good from the perspective of this constituency is also the socially optimal level.

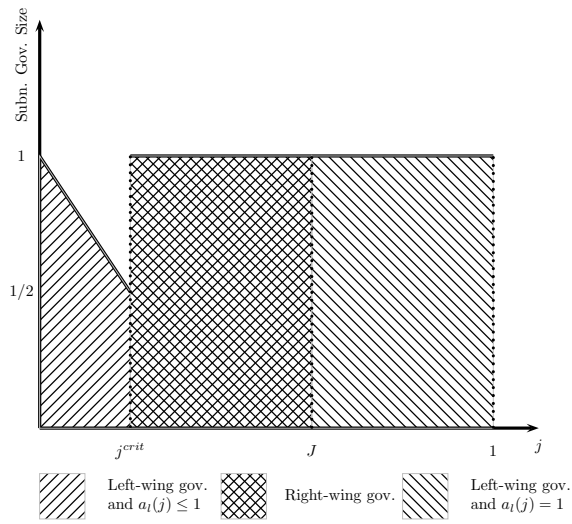
Using Leibnitz's rule for differentiation under the integral sign and the fact that $a_l(j) = 1 - a_r(j) = 1 - (2R/J^2)j$ for all $j \leq J$, we obtain for

$$\frac{dS_l^d}{dJ} = -(1/8)(J/R) < 0 \text{ and} \quad (29)$$

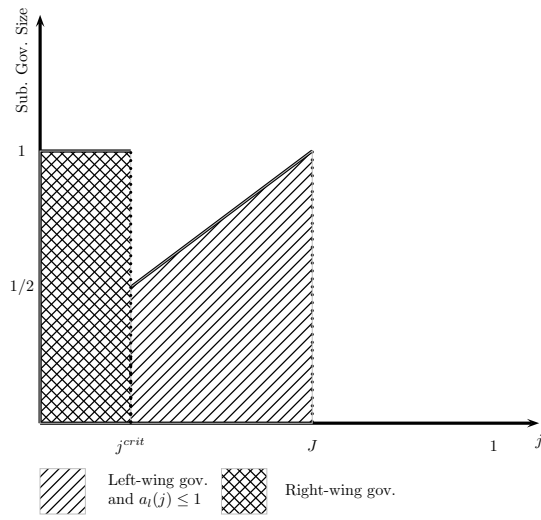
$$\frac{dS_l^d}{dR} = (1/16)(J/R)^2 > 0. \quad (30)$$

Obviously, equation 29 is negative at all times. That is, government size decreases in the number of jurisdictions in which at least on right-wing voter is present. On the other hand, equation 30 is positive at all times, implying that the size of government increases in the federation-wide share of right-wing voters. Using these results, we can relate the dispersion of the R capitalists and L laborers to the size of government. Since both the dispersion and the size of government decrease in J and increase in R , we obtain as an empirical prediction that the size of government and the dispersion of right-wing voters within the country are positively correlated *if* labor holds the majority at the federal level.

¹⁰ The qualifier "weakly" is used to address the special case where $R = J/2$. In this case $\frac{dN_r}{dJ} = 0$. If $R < J/2$, however, $\frac{dN_r}{dJ} < 0$ always holds.



(a) Decentralization under a left-wing federal government



(b) Decentralization under a right-wing federal government

Fig. 1: Decentralization and Size of Government

3.2.2 Decentralization under a right-wing federal government

Having derived a number of predictions for the case where the federal government is controlled by a left-wing government, it is only natural to investigate the case where the federal government is run by the right-wing party. Again, if left-wing and right-wing voters were distributed equally between jurisdictions, decentralization would lead to the same size of government as centralization would. We will therefore focus the case of unequal distribution. For comparability with our results in the last section, we use an adapted version of the “distribution function” described in equation 23, i. e.

$$(1 - a_r(j)) = a_l(j) = \begin{cases} (2L/J^2)j & \text{if } 0 \leq j \leq J \\ 0 & \text{else.} \end{cases} \quad (31)$$

It is easy to show that $\int_0^J (2L/J^2)j dj = L$. If we make the assumption that $L \leq J/2$ (and thus that the federal government is controlled by the right), it is ensured that $a_l(j) \in [0, 1]$. Note also that the number of right-wing voters in jurisdiction j can be obtained by $a_r(j) = 1 - a_l(j)$.

Since this distribution function is identical to the one in the case of where right-wing voters were in the minority, the variance of the distribution and the expression for the critical jurisdiction are also identical. The variance is given by

$$Var(a_l) = \int_0^J ((2L/J^2)j - L)^2 dj + \int_J^1 (0 - L)^2 dj = ((4/3J) - 1) L^2, \quad (32)$$

and is the same as the variance of the distribution of right-wing voters (see the discussion in the last section).

The critical jurisdiction where left-wing voters make up just 1/2 of the electorate is defined by

$$j^{crit} = (J^2/4L). \quad (33)$$

The number of jurisdictions controlled by left-wing parties is therefore given by a similar expression to 26. However, the expression which relates the number of jurisdictions controlled by either group to the size of government is now different. This is due to the fact that there must be at least one left-wing voter in any given jurisdiction in order to guarantee a positive level of the regional public good. But since for all $j > J$ it holds that $a_l(j) = 0$, we obtain for these jurisdictions that $g(j) = 0$ even if they are controlled by right-wing governments. Because a right-wing federal government sets $G_r = R$, and subnational governments in jurisdictions where right-wing voters are in the majority choose $g_r(j) = 1$ (the maximum amount of the subnational public good), the aggregate size of government is given by

$$S_r^d = R + (1 - J)0 + \int_0^{j^{crit}} 1dj + \int_{j^{crit}}^J a_l(j)dj. \quad (34)$$

The size of government under a right-wing federal is illustrated in figure 1(b). The level of the regional public good stays at $g(j) = 1$ until the critical jurisdiction because all jurisdiction up to this point are controlled by right-wing parties. At the critical jurisdiction, it jumps to 1/2 and then increases steadily because from this jurisdiction on laborers make up more than 50% of the electorate and therefore vote a left-wing government into office, which then chooses the

level of public goods that is preferred by its constituency. This level increases linearly up until jurisdiction J because the number of left-wing voters also increases. At J , the level of the public good jumps to 0 and stays there until the last jurisdiction because there are no laborers present in these jurisdiction and thus the tax revenue from wage taxes is 0.

By using Leibnitz's rule, it can be easily shown that

$$\frac{dS_r^d}{dJ} = (3/8)(J/L) > 0, \text{ and} \quad (35)$$

$$\frac{dS_r^d}{dL} = -(3/16)(J/L)^2 < 0. \quad (36)$$

We obtain that the size of government increases in the number of jurisdiction where at least one left-wing voter is present and decreases in the total amount of laborers in the federation – *if* the federal government is controlled by a right-wing party. Since the dispersion decreases in J and increases in L , there is in this case a negative correlation between the variance and the size of government.

3.3 The size of government under centralization and decentralization

By explicitly solving equations 28 and 34, we can compare the size of government under centralization and decentralization. Under a left-wing rule at the federal level, the size of government when the public sector is decentralized is given by

$$S_l^d = 2 - (1/16)(J^2/R), \quad (37)$$

and under a right-wing federal government

$$S_r^d = 1 + (3/16)(J^2/L). \quad (38)$$

Recalling the results from section 3.1, the size of government under centralization is given by

$$S_l^c = 2 + L, \text{ and} \quad (39)$$

$$S_r^c = 2 + R. \quad (40)$$

Now since $(J/2)^2 \leq L, R \leq (J/2)$, decentralization under a left-wing government leads to the largest, and decentralization under a right-wing government to the smallest size of government.¹¹ Centralization takes an intermediate position and displays no systematic difference between left- and right-wing governments. We therefore conclude that $S_l^d > S_l^c = S_r^c > S_r^d$.

¹¹ Except in the marginal case where $R, L = (J/2)^2$. Here, the sizes of government are both given by $S_l^d = S_r^d = 7/4$ and are therefore equal.

4 Empirics

4.1 Empirical hypotheses

The discussion in the theoretical part suggests a number of empirical implications. We summarize them in the following hypotheses.

- H1: Fiscal decentralization will lead to a larger aggregate government size than centralization when a left wing party controls the federal government and to a smaller aggregate government than centralization when a right-wing party controls the federal government
- H2: The spatial distribution of the two groups is irrelevant under centralization but is the more important the more the public sector is decentralized
- H3: Given a level of decentralization, the size of government will increase in the the degree of spatial segregation of left- and right wing voters when the federal government is controlled by the left. If the federal government is controlled by the right, the size of government will increase in the degree of spatial segregation.¹²

One major problem that emerges when one attempts to test these hypotheses empirically is that “real-world” countries almost never match the assumptions upon which the theory was built. We have, for example, treated centralization in the theoretical part of this paper as a regime in which subnational governments have absolutely no role to play. This assumption is surely inappropriate given that even the most centralized states allow for some amount of local self-rule. Secondly, we have continuously talked about “federal” and “subnational” governments, thus evoking the impression that only federations can be decentralized. In reality, this is not the case. Whether a country is decentralized or not is primarily determined by the prevailing political reality and not by whether the constitution designates the country as a federation or a unitary state (even though, of course, the constitutional standing of subnational governments is an important indicator of their autonomy). Thirdly, we assumed that there are only two parties in the country, and that each individual could be associated with one of these two, and furthermore that this association depends only on the supplied factor of production.

We therefore have to provide a reasonable “translation” of the concepts used in the theoretical part in order to specify a meaningful empirical model. In this empirical section, we treat decentralization as a continuous concept which is based on the amount of fiscal autonomy of subnational governments. By fiscal autonomy, we mean the extent to which subnational governments may decide on expenditures and revenues. To capture the fact that both federations and unitary states can be decentralized, we will therefore not distinguish between the two distinct constitutional regimes. In order to account for multi-party systems, we assume that parties can be divided into two different political camps. We will thus measure the ideological affiliation of the central government with an index that takes the party affiliation of its members into account. The use of a continuous measures also enables us to consider coalition governments and intermediate regimes

¹² With spatial segregation of voters we mean the phenomenon that in many federations, the inhabitants in certain regions traditionally favor one end of the political spectrum, to the point that only members of one particular party stand a reasonable chance of obtaining important offices in that region. For example, in the US, coastal states tend to be more left-wing than landlocked states; in Germany, southern states tend to favor conservative parties whereas northern and eastern states are generally more left-leaning.

given that the clear distinction of governments into left and right put forward in the theoretical section is seldom observed in the messy realm of reality.

Data on the ideological position of subnational governments is not easily available, and in order to keep the sample size reasonably high we use an indirect measure to capture the amount of spatial segregation of voters. We use a measure that is based on the inter-regional variation of the share of citizens over 65 years. The idea behind this approach is that older voters tend to possess higher levels of capital and thus should be more prone to support right-wing parties whereas younger individuals usually rely on wage income and thus should support left-wing parties. Indeed there is some anecdotal evidence that older voters tend to vote for conservative parties, and given this positive correlation the share of over 65 year olds might arguably be a good proxy for the systematic support of right-wing parties in a jurisdiction.

4.2 Data

In this section, we describe the data. The regressions are conducted with a panel dataset of 23 OECD countries¹³ which covers the time span of 1990-2001. The number of countries and years in individual models is sometimes lower because of the availability of data, especially at the subnational level. The variables and their definitions are summarized in table 1. Summary statistics of all variables are provided in table 2.

In measuring decentralization, we take a dual approach. There are two types of fiscal decentralization, one that is related to the expenditure and one that is related to the revenue side of the budget. Expenditure decentralization is hence defined as the share of subnational expenditures to total government expenditures and calculated with the IMF's GFS data. These calculations are provided by the World Bank in a decentralization dataset.

However, many authors have criticized the IMF's GFS data because it only captures how much is eventually spent by subnational governments and not whether the spending is based on autonomous decisions or central government regulation (Ebel and Yilmaz, 2002). While recognizing this shortcoming, we are unaware of any other data that could solve this particular problem for the expenditure side and therefore use the IMF's GFS data as a second best approach.

While the IMF's GFS data for revenue decentralization suffers from a similar problem (it does not distinguish between completely autonomous and shared taxes, for example), there are in this case fortunately viable alternatives. The OECD has published a volume in 1999 in which it classifies subnational taxes according to the degree of subnational autonomy, thus enabling the calculation of more accurate measures of revenue decentralization than with the IMF's GFS data (see OECD (1999)). One drawback of the original OECD data is that it is only available as a cross-section. However, Stegarescu (2005) extends this dataset to a panel context whilst using the same classification. See table 1 for a definition of this revenue decentralization measure and his paper for further details.

We measure the spatial segregation of ideological voters into politically homogeneous jurisdictions by the coefficient of variation of the share of inhabitants who are over 65 years old. One rationale for this approach is that "older" inhabitants typically have on average more savings (i. e.

¹³ Which are: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Japan, Luxembourg, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom, United States.

Tab. 1: DEFINITION AND SOURCE OF VARIABLES

Label	Description	Source
Dependent Variable		
Size of government	Logistic transformation of government share of GDP	Penn World Tables 6.2
Decentralization Measures		
Exp. decentralization	Subnational share of total government expenditures	IMF / World Bank
Rev. decentralization	Subnational revenue from taxes for which subnational governments determine rates <i>and/or</i> define bases as share of gen. government tax revenue	Stegarescu / OECD
Political Measures		
Left	Index which measures to what extent the central government is leaning to the left on a 1-5 scale (1 = extreme right, 5= extreme left)	CPDS I 1960-2004
Segregation	Coefficient of variation of the share of over 65 year old individuals among subnational jurisdictions	Own calculations based on OECD data
Interactions		
Left-Exp.Dec.	Interaction between left-index and expenditure decentralization	Own calculations based on original data
Left-Rev.Dec.	Interaction between left-index and revenue decentralization	Own calculations based on original data
Segregation-Exp.Dec.	Interaction between age segregation variables and expenditure decentralization	Own calculations based on original data
Segregation-Rev.Dec.	Interaction between age segregation variables and revenue decentralization	Own calculations based on original data
Economic Controls		
Openness	Openness	Penn World Tables 6.2
Investment share	Investment share of GDP	Penn World Tables 6.2
Population	Population	Penn World Tables 6.2
Unemployment	Unemployment rate	OECD
GDP per worker	GDP per worker (labor productivity)	Penn World Tables 6.2

Tab. 2: SUMMARY STATISTICS

Variable	Variance Component	Obs.	Mean	Std. Dev.	Min.	Max.
Gov. Size (Logistic)	overall	-159.790	31.684	-243.287	-94.694	N = 264
	between		31.749	-239.650	-108.087	n = 23
	within		6.280	-176.837	-140.745	T = 11.478
Invest. Share	overall	23.615	3.383	16.400	36.390	N = 264
	between		2.921	18.688	32.236	n = 23
	within		1.747	19.142	32.519	T = 11.478
Population	overall	366.950	599.801	2.548	2870.040	N = 264
	between		601.149	2.691	2711.383	n = 23
	within		21.767	210.958	525.608	T = 11.478
GDP per worker	overall	471.264	129.341	279.237	1147.339	N = 264
	between		121.696	295.854	916.727	n = 23
	within		46.343	294.986	701.876	T = 11.478
Unemployment	overall	7.224	3.593	0.504	19.108	N = 264
	between		3.104	2.505	14.545	n = 23
	within		1.856	-0.478	12.839	T = 11.478
Openness	overall	73.001	45.742	15.990	288.740	N = 264
	between		44.909	18.537	226.367	n = 23
	within		10.862	38.826	135.374	T = 11.478
Rev. Dec.	overall	20.033	16.540	0.170	58.670	N = 264
	between		16.719	0.215	55.365	n = 23
	within		2.056	12.228	28.187	T = 11.478
Exp. Dec.	overall	34.761	13.858	8.599	61.038	N = 181
	between		13.614	11.600	58.909	n = 20
	within		1.617	30.608	41.845	T = 9.05
Left	overall	2.545	1.474	1.000	5.000	N = 264
	between		0.828	1.000	4.000	n = 23
	within		1.224	-0.455	5.545	T = 11.478
Segregation	overall	0.146	0.080	0.002	0.363	N = 220
	between		0.080	0.011	0.345	n = 22
	within		0.013	0.096	0.187	T = 10

¹ Summary statistics are always calculated using the number of observations in the largest available sample in the various sets of regressions.

² The number of within observations is uneven because of the unbalanced nature of the panel.

capital) and should therefore be more likely to support right-wing parties, but older inhabitants might favor right-wing parties also for other reasons. Thus, if there are inter-regional differences in the age structure, this should be mirrored to some extent in ideological preferences and eventually in voting patterns.

The ideological position of the central government is measured by an index from the CPDS I database provided by Armingeon et al. (2006)¹⁴. This index assumes the value 1 when the government is considered to be far-right and 5 when it is considered to be far to the left. We construct several interactions between the ideology and decentralization variables in order to test the implications of the theory. Interactions are also constructed with decentralization and the segregation variables. In all, we use three different interactions terms.

All other variables are quite standard. We follow Oates (1985) and Marlow (1988) by applying a logistic transformation to our measure of government size. This transformation is motivated by the fact that the government share variable in its level form is constrained to lie between 0 and 1, thus obviously contradicting the assumptions for OLS to be efficient. On the right hand side, we include a number of variables which, in addition to the political and decentralization variables, might influence the size of government. That is, we also consider the unemployment rate, the population size, the “share of investments” in the economy, GDP per worker, and the degree of openness. For simplicity, we refer to these variables as “economic controls”. We also include cross-section and time-fixed effects.

4.3 Results

We estimate the following general model in various individual specifications.

$$\begin{aligned} \text{Gov. Size} = & a_i + \gamma_t + b_1 \text{Decentralization} + b_2 \text{Left} + b_3 \text{Segregation} \\ & + b_4 \text{Decentralization*Left} + b_5 \text{Decentralization*Segregation} + b_6 \text{Left*Segregation} \\ & + \mathbf{b} \text{Economic Controls} + \epsilon_t, \end{aligned} \tag{41}$$

where the interactions are indicated with asterisks. The decentralization variable is either the expenditure or the revenue decentralization measure. The a and γ coefficients indicate the cross-section and time-fixed effect. The estimates on these intercepts are suppressed in the regression tables but available upon request.

The number of observations varies greatly between the models. In the expenditure decentralization regressions in table 3, models 3-6 have about 30 observations less than models 1 and 2. This is primarily due to the fact that data on regional age structure is unavailable for a large number of years. There are also differences between the expenditure and the revenue decentralization measures, because the IMF’s GFS data are missing for a number of countries in certain years. We have therefore to choose between either discarding all observations for which this variable is missing and thus to diminish our sample size to a great extent, or to estimate models with a varying number of observations and thus to risk that conclusions are driven by changes in sample sizes and not by the inclusion of additional explanatory variables. We choose the second strategy,

¹⁴ The original source is the Political Data Yearbook (various issues) published by the European Journal of Political Research.

because the presence of the economic control variables might function as an early warning system. If these coefficients should be significantly different between individual models, changes in sample sizes have clearly an influence on the estimates. If they remain essentially the same, we can be reasonably sure that our results are robust. Indeed, in both table 3 and 4 the coefficients of the economic control variables have consistently the same sign and magnitude, suggesting that the varying sample sizes are probably unproblematic.

Tab. 3: REGRESSIONS OF GOVERNMENT SIZE ON EXPENDITURE DECENTRALIZATION MEASURES; 1990-2001

	FE1	FE2	FE3	FE4	FE5	FE6
	b/se	b/se	b/se	b/se	b/se	b/se
Invest. Share	-0.772*** (0.230)	-0.659*** (0.230)	-0.138 (0.315)	-0.127 (0.312)	-0.486 (0.312)	-0.155 (0.316)
Population	-0.089*** (0.012)	-0.088*** (0.011)	-0.084*** (0.012)	-0.079*** (0.012)	-0.084*** (0.012)	-0.079*** (0.012)
GDP per worker	-0.039** (0.018)	-0.037** (0.018)	-0.105*** (0.032)	-0.107*** (0.031)	-0.096*** (0.033)	-0.105*** (0.032)
Unemployment	0.886*** (0.270)	1.003*** (0.270)	1.071*** (0.311)	0.879*** (0.325)	0.828** (0.322)	0.919*** (0.334)
Openness	-0.414*** (0.052)	-0.416*** (0.051)	-0.575*** (0.068)	-0.545*** (0.069)	-0.550*** (0.071)	-0.539*** (0.071)
Exp. Dec.	0.386** (0.177)	0.234 (0.184)	-0.083 (0.225)	-0.542 (0.337)	0.165 (0.241)	-0.507 (0.344)
Left	-0.529** (0.214)	-2.086*** (0.650)	-2.676*** (0.726)	-2.323*** (0.745)	-0.511 (0.522)	-2.087** (0.856)
Left-Exp.Dec.		0.045** (0.018)	0.059*** (0.019)	0.046** (0.020)		0.046** (0.021)
Segregation			37.612 (23.483)	-34.453 (46.058)	46.128* (25.254)	-33.303 (46.244)
Segregation-Exp.Dec.				2.524* (1.392)		2.611* (1.405)
Left-Segregation					-0.280 (2.699)	-1.467 (2.601)
N	181	181	152	152	152	152
F	27.054	26.936	23.781	23.263	21.541	22.085
\bar{R}^2	0.714	0.725	0.743	0.749	0.722	0.747
RMS error	2.891	2.838	2.772	2.745	2.884	2.753

¹ All models have been estimated with cross-section and time fixed effects, coefficients are suppressed in the tables

² Stars indicate significance levels at 10% (*), 5% (**) and 1% (***)

Table 3 presents the models which are concerned with expenditure decentralization. The economic controls perform reasonably. The investment share variable has a negative coefficient. The fact that higher private investments seem to be negatively correlated with the size of government has the obvious interpretation that (debt financed) public expenditures tend to crowd out private investments. The GDP per worker variable has a negative coefficient, which is not surprising given that GDP enters the denominator of the left-hand side variable. The coefficient of the unemployment rate variable is consistently positive, indicating that automatic stabilizers and countercyclical policies lead to a relative expansion of the public sector during recessions. Openness is negatively

related to government size, which is also expected given that globalization should restrict the ability of governments to tax.

The political and decentralization variables, which are our main concern, display a less robust but still strikingly consistent relationship. First, we observe that the expenditure decentralization variable is positive and significant in model 1 and 2, but that it loses its significance in the following models where the various interactions are included. As predicted by the theory, the interaction between expenditure decentralization and the extent to which the ruling party at the national level is left-leaning (the Left variable) is positive in all models, and significant in models 3, 4 and 6. Thus, hypothesis 1 seems to be corroborated by these estimates. With regard to the impact of segregation, we obtain an equally convincing result. The coefficient on the interaction between segregation and expenditure decentralization in model 4 and 6 is positive and significant, indicating that the impact of a segregated electorate on the size of the public sector is significantly positive if it is decentralized. Thus, we find that hypothesis 2 is also approved by our results. The third hypothesis, which states that segregation should lead to a larger government when the federal government is controlled by the left is neither confirmed nor rejected. Though the estimated coefficient on the interaction is negative, it is insignificant.

What do these results imply for the Leviathan hypothesis? If one were to consider only the first two models, it would seem that the Brennan and Buchanan hypothesis is soundly rejected. The coefficient on decentralization is either insignificant or even positive. However, once the political and segregation variables are included, the impact of decentralization is found to be far more subtle and highly influenced by whether a left- or a right-wing party is responsible for the process of decentralization.

This conclusion is corroborated by table 4 where we collect the estimates that are concerned with revenue decentralization. The revenue decentralization variable is positive in model 1 and 2 but loses its significance in the following models. The results with regard to the political interaction variables are less clear cut, however. The interaction between the revenue decentralization and the Left variable is insignificant, and the sign of the coefficient is unstable. Thus, hypothesis 1 is not confirmed by these results. On the other hand, the interaction between segregation and the revenue decentralization variable is positive in model 4 and 6, thus supporting hypothesis 2. Last, the interaction between the Left- and segregation variables is insignificant. That is, hypothesis 3 is not confirmed.

While the first set of regressions provided reasonably strong evidence for our hypotheses, the revenue decentralization models are somewhat less convincing and seem to approve hypothesis 2 only. One possible explanation for this result is that our theory might not apply in the same manner to revenue than it did to expenditure decentralization. In addition, our data might be unsuitable for the methods we apply. One drawback of the decentralization measures is that they display very little within-time variation (see table 2). Given that we use cross-section fixed effects, it is not surprising that much of the impact of decentralization is simply purged out by the country-specific intercept. Thus even though the fixed effects models are consistent, they might suffer from a variant of the multicollinearity problem- making the cure potentially worse than the disease.

Tab. 4: REGRESSIONS OF GOVERNMENT SIZE ON REVENUE DECENTRALIZATION MEASURES; 1990-2001

	FE1	FE2	FE3	FE4	FE5	FE6
	b/se	b/se	b/se	b/se	b/se	b/se
Invest. Share	-0.685*** (0.210)	-0.690*** (0.211)	-0.471* (0.259)	-0.402 (0.254)	-0.478* (0.261)	-0.391 (0.257)
Population	-0.060*** (0.013)	-0.059*** (0.013)	-0.057*** (0.014)	-0.050*** (0.014)	-0.057*** (0.014)	-0.051*** (0.014)
GDP per worker	-0.013 (0.016)	-0.013 (0.016)	-0.101*** (0.033)	-0.120*** (0.032)	-0.099*** (0.032)	-0.121*** (0.033)
Unemployment	0.846*** (0.215)	0.834*** (0.217)	0.411 (0.309)	0.336 (0.302)	0.394 (0.310)	0.325 (0.305)
Openness	-0.235*** (0.050)	-0.230*** (0.051)	-0.387*** (0.072)	-0.355*** (0.072)	-0.376*** (0.069)	-0.357*** (0.072)
Revenue Dec.	0.652*** (0.144)	0.667*** (0.148)	0.534*** (0.180)	-0.167 (0.287)	0.557*** (0.175)	-0.174 (0.288)
Left	-0.483** (0.220)	-0.360 (0.345)	-0.727* (0.403)	-0.895** (0.397)	-0.620 (0.546)	-1.060 (0.645)
Left-Rev.Dec.		-0.008 (0.017)	0.010 (0.018)	0.012 (0.018)		0.012 (0.018)
Segregation			-3.621 (26.158)	-89.460** (37.738)	-3.207 (27.999)	-93.323** (39.656)
Segregation-Rev.Dec.				3.655*** (1.183)		3.674*** (1.187)
Left-Segregation					0.385 (2.970)	0.949 (2.920)
N	264	264	220	220	220	220
F	24.053	22.718	14.970	15.397	14.934	14.628
\bar{R}^2	0.599	0.598	0.541	0.562	0.541	0.560
RMS error	3.976	3.983	4.050	3.956	4.053	3.966

¹ All models have been estimated with cross-section and time fixed effects, coefficients are suppressed in the tables

² Stars indicate significance levels at 10% (*), 5% (**) and 1%(***)

5 Conclusion

This paper was concerned with the relationship between fiscal decentralization and the size of government. We first provided a short overview of the state of the literature. Recognizing that the theoretical implication between fiscal decentralization and public sector expansion have not yet been fully explored, we then developed a model in which we linked the political affiliation of voters and their segregation into different jurisdiction to the size of government. The model offered us a number of hypotheses, and we attempted to these with data on OECD countries. The results tend to support the first two hypotheses which state (i) that decentralization will lead to a larger government when the federal government is controlled by a left-wing party and vice versa, and (ii) that the segregation of voters is more important when the public sector is decentralized. The third hypothesis which linked the political affiliation of the federal government with regional segregation was not confirmed.

Even though the empirical results seem to be by and large in favor of our theory, we have to be careful not to read too much out of them. There are obvious shortcomings in both the theoretical model and the estimations, and we should not gloss over these. On the theoretical side, we made relatively strong assumptions about the fiscal constitution. Even though we believe that they are reasonable, more effort must be devoted in order to confirm that “real” countries operate under an efficient fiscal constitution. One possibility is to endogenize the formulation of this constitution, but while this is an interesting task, it is clearly outside the scope of this paper. The other possibility is to empirically verify that existing fiscal constitutions are efficient. But given that efficiency is an elusive concept for empirical research, this is easier said than done.

On the empirical side, we made several assumptions when we tried to test the theory which might or might not be true. Again, we believe that they are reasonable, but we cannot be sure. One such assumption was that voters could be neatly separated according to which factor they supply, and that their voting pattern was solely determined by the supplied factor. Clearly, both assumptions are only an approximation of reality, and any discrepancies are delegated into the error term. Whether the specification of the models in such a way does lead to a *serious* omitted variables, we cannot know for sure given that it is impossible to fully specify a model of voting in which *all* determinants are considered. It is hence a possibility we should keep in mind.

This paper is therefore a first shot. It points to the importance of considering the political environment when discussing the impact of decentralization on government size, and presents empirical evidence to this effect. But there is still much left to be done. On the theoretical side, there is some room for enriching the model by using more elaborate utility functions to study whether complementarity in the consumption of the private and public goods does change the results. Also, as pointed out, the fiscal constitution itself was rather rudimentary. Equalization schemes and intergovernmental grants have not been considered in the model and their inclusion might lead to different conclusions.

On the empirical side, the biggest drawback of this analysis was the unavailability of data. We were unable to collect data on political affiliation of regional governments for all countries in our sample and were thus forced to settle with an indirect measure. To make matters worse, this measure was plagued by a number of missing observations. Thus, devoting more effort into

collecting appropriate data might also be beneficial and lead to the estimation of even more robust results.

In conclusion, we find that fiscal decentralization *is* an important determinant of government size, but that its impact is not straightforward. The simple, linear Leviathan hypothesis by Brennan and Buchanan was found to be too broad to be approved empirically. When the details of the political environment are considered, however, we find that we can trace some of its implications in the data. That is, decentralization indeed seems to lead to a smaller public sector when a right-wing government rules the center. But we should also be careful in concluding that this result reaffirms Brennan and Buchanan's theory, albeit in a diminished manner. The Leviathan hypothesis is based on a distinct normative assumption: that government intervention is bad and that therefore a small government is always "good". In our framework, on the other hand, both "too large" *and* "too small" governments should be avoided. That right-wing administrations seem to be associated with smaller government does not imply that they are better. It simply implies that they are different.

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