Electoral Competition as a Determinant of Fiscal Decentralization*

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Abstract

This paper estimates the effect of government electoral strength on fiscal decentralization. Using a panel of democracies, we find that government electoral strength at the central level, measured by the share of seats held by the governing party in the legislature, reduces expenditure centralization. Revenue centralization is less affected by electoral strength.

Keywords: Fiscal decentralization; Fiscal federalism; Vertical interactions; Partial Decentralization; Elections

JEL codes: H77, D72, H11

< **Tables and figures at end** >

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1 Introduction

Sub-central governments worldwide enjoy rising degrees of competence in expenditure and revenue decisions, a trend that has now been well documented. What are the determinants of this trend? And what are the channels through which decentralization is achieved?

These questions, while on top of the policy agenda, have been surprisingly little explored empirically. In an early demonstration exploiting cross-sectional country data, Panizza (1999) showed that a country's degree of fiscal centralization is negatively related to that country's size, income, ethnic fractionalization and degree of democracy. Similar results have been obtained by Arzaghi and Henderson (2005) using panel data. More recent studies have explored the role played by specific political institutions on the degree of decentralization.[1]

This paper's contribution is to introduce electoral politics in the empirical analysis of decentralization's determinants. Our endeavour is directly rooted in recent theories of the political economy of fiscal federalism. A key message of that theoretical literature is that institutional frameworks resulting from recent decentralization reforms, often characterized by instances of partial decentralization, are especially prone to political influences (Devarajan *et al.*, 2009; Jametti and Joanis, 2009; Joanis, 2014).[2] Yet, while an important literature has documented an empirical relationship between electoral competition and fiscal policy – either from the

[1] For instance, Feld *et al.* (2008) show that centralization is negatively related to the availability of direct democratic decision-making (referenda) using panel data from Switzerland, while Funk and Gathman (2011), exploiting a longer panel for the same country, do not find such an effect. The role of political integration as a force behind both fiscal centralization and decentralization has been studied by Stegarescu (2009) for OECD countries.

[2] The recent literature on partial decentralization is devoted to studying instances of multi-level governance departing from the binary allocation of fiscal responsibilities. In most of the standard theoretical fiscal federalism literature, the allocation problem is assumed to be a binary decision. Based on the "Decentralization Theorem" (Oates, 1972), it is guided by a trade-off between internalizing inter-jurisdictional spillovers and scale economies and catering to local preferences – see Epple and Nechyba (2004) for a survey. Notably, even what is known as the Second Generation Theory of Fiscal Federalism (Oates, 2003; Weingast, 2009) still essentially remains within a binary choice framework. For key recent theoretical contributions on the political economy of partial decentralization, see Brueckner (2009) and Hatfield and Padro i Miquel (2012).

macro perspective of electoral budget cycles[3] or the micro perspective of redistributive politics[4] – the conceptually close empirical research on the determinants of decentralization has, to our knowledge, not accounted for the effect of electoral competition variables on decentralization. Our paper aims at filling this gap by including electoral competition variables in fiscal centralization regressions. Our work can thus be seen as an extension of Panizza's (1999) and Arzaghi and Henderson's (2005) pioneering work by introducing in a structured way politics as a determinant of decentralization.[5]

Based on a simple theoretical framework, our empirical analysis links the electoral prospects of central governments to the degree of fiscal centralization observed in a country at a given point in time. Using data from a panel of democracies, we estimate the role of electoral conditions prevailing at the central level on the degree of both expenditure and revenue centralization. Fixed effects regressions reveal that the seat share of central governments – which we hereafter label 'government strength' – tends to be associated with lower levels of expenditure centralization. This negative correlation between expenditure centralization and electoral strength is in line with the main prediction of our theoretical model, in which strong central governments have less of an incentive to court voters by spending centrally and, hence, are more likely to agree to devolving spending powers to lower levels of government. However, the link between electoral concerns and revenue centralization appears to be much weaker. Nevertheless, our results suggest that electoral variables rightly belong in the set of determinants of fiscal decentralization.

The paper proceeds as follows. Section 2 presents some theoretical preliminaries and dis-

[3] For example, see Brender and Drazen's (2005) important cross-country work.

[4] For example, on the role played by electoral competition in the geographical allocation of public infrastructure expenditures, see Knight (2004), Cadot *et al.* (2006) and Joanis (2011).

[5] The paper is also related to the large body of empirical research investigating decentralization as a determinant of various economic variables. For example, Oates (1985) relates the size of government to the degree of decentralization, a question that has been taken up by a number of studies (for a survey, see Feld *et al.*, 2010).

cusses empirically-testable predictions. Section 3 describes the data, with empirical results being presented in Section 4. The last section concludes.

2 Theoretical Preliminaries

Political economy aspects of decentralization are often introduced in an *ad hoc* way in empirical analyses of the determinants of decentralization.[6] Here, before turning to the empirical analysis, we provide a theoretically-rooted justification for why we should expect an empirical relationship between politics and decentralization. Our empirical analysis is based on a formal (yet simple) political economy model of decentralization that highlights one channel through which elections might affect the degree of decentralization. The model's intuition is given in the paragraphs that follow, but the technical details can be found in the Appendix.

Let us focus on the behaviour of a central government that faces a choice between spending centrally and devolving some spending responsibilities to a local level of government (fiscal decentralization). Central politicians, who seek to maximise rents in the model, may tend to increase their spending on the central public good for electoral purposes. As a consequence, the tradeoff between spending centrally and devolving responsibilities is shaped by the central politicians' electoral environment. We adopt a standard perspective on how the central politicians react to electoral uncertainty: when a close election becomes less likely (i.e. reelection uncertainty decreases), the expected electoral return on spending by the central government decreases.[7] Hence, *ceteris paribus*, an increase in the central government's electoral strength

[6] An exception is Panizza (1999), who presents a theoretical model in which the degree of centralization is endogenously determined. However, that model does not feature political aspects.

[7] This is a rather standard modelling assumption in the Downsian tradition, where an incumbent should be expected to spend most when the election is most uncertain – see, for example, Lindbeck and Weibull (1987). However, a competing view of government behaviour would support the opposite prediction. According to the alternative 'machine politics' view, public spending is a safer investment for strong electorally-motivated governments than for weak ones. This view of government behaviour is consistent with a theoretical perspective first developed by Cox and McCubbins (1986). In our framework, taking into account such machine politics

makes decentralization more likely.

Central politicians are also likely to engage in the decentralization of spending powers to local governments regardless of electoral concerns because voter welfare is part of their objective function. This is the case because citizen welfare depends, in our model, on a combination of public goods produced by both the central government and local governments.

The degree of decentralization is thus affected by two conflicting incentives: the central politician's desire to earn reelection by increasing central public good provision (leaving less resources available for decentralization), and its willingness to engage in decentralization to increase voter welfare. Our model predicts that the central government's electoral strength should, all else being equal, decrease that government's share of total spending. Decentralization will occur if the central government's reelection prospects are high – i.e. if government strength is high – and if local spending is sufficiently welfare-improving from citizens' perspective.

The model thus predicts a negative relationship between central government strength and expenditure centralization (monotone and non-linear) – see Proposition 1 in the Appendix. It is interesting to note that the negative effect of central government strength on expenditure centralization does not carry through when revenue centralization is considered: in the model, the level of revenue centralization is independent of the central government's electoral strength.

It must be acknowledged that the theoretical channel highlighted by our model most certainly interacts with other channels in the complex nexus that connects fiscal decentralization to electoral politics.[8] The existence of potentially confounding channels reinforces the appeal

motives could reverse the sign of the predicted correlation between centralization and government strength. The empirical relevance of machine politics motives will thus tend to make it harder to detect the negative correlation stemming from the mechanism outlined in the model.

[8] For instance, a rather strong assumption in our model is the passivity of local governments. While this assumption is in line with recent studies documenting the relatively low degree of autonomy of local governments (e.g. Stegarescu, 2005; Blöchliger and King, 2006), a more complete model would also take into account the electoral objectives of local politicians. In a closely related model, Joanis (2014) models the vertical interactions

of an empirical test of the relationship between electoral considerations and centralization, to which we now turn.

3 Empirical Framework

An innovative feature of the theoretical perspective developed in the previous section is its focus on the central government's key role in influencing the equilibrium degree of decentralization. The empirical analysis to which we now turn is a test of this theoretical conjecture.

We estimate the following model for country j in year t:

$$CENTRAL_{jt} = f\left(\gamma_{jt}|\mathbf{P}_{jt}, \mathbf{X}_{jt}\right), \tag{1}$$

where $CENTRAL$ stands either for expenditure or revenue centralization, γ corresponds to the theory's variable measuring central government strength, $\mathbf{P}$ are political controls and $\mathbf{X}$ other control variables.

3.1 Data

We assembled a new database combining information from four sources: the IMF's Government Financial Statistics (GFS); the World Bank's Dataset of Political Indicators (DPI) and World Development Indicators (WDI); and the Polity 2 dataset from the University of Maryland. We avail of a panel of a total of 107 countries (j) with yearly observations (t) for the period 1990 to 2006. However, data are missing in many instances, which leaves us with at most 64 countries

between two levels of government that are involved in the provision of a public good, in an environment where imperfect voter information creates a shared accountability problem. This model predicts that the degree of centralization is associated with the *ratio* of the electoral uncertainty prevailing at the local level on the electoral uncertainty at the central level. Thus, the sign of the correlation between central government strength and centralization predicted above could be reversed by vertical interactions between the center and the local governments.

in the sample.[9] Table 1 presents summary statistics.

From GFS we included data on expenditures and revenues of different levels of government (central, state and local). We have used this information to construct our measures of centralization.[10] DPI contains information on the political system of each country as well as a vast array of electoral variables, such as party composition and strength of national governments and oppositions. We used this information to construct our measure of electoral strength and our political controls. The WDI dataset contains variables concerning economic indicators and constitutes our basis for additional control variables. Finally, we used Polity 2 (*polity index* > 0) to restrict our sample to democracies as adopt a political economy theoretical framework.

Our dependent variables are, in all specifications, *centralization ratios*:

$$CENTRAL = \frac{g^c}{g^c + g^s + g^l}, \tag{2}$$

where g is government expenditure (or revenue where appropriate) by the central government (c), the state or sub-federal governments (s) or the local governments (l), respectively. Thus, we contrast central government decision making with choices taken at any sub-central unit.[11] We exclude observations with either expenditure or revenue centralization ratios equal to one, since we are unable to distinguish between absence of sub-central spending and missing data.[12]

[9] A total of 104 countries present at least one year of central government expenditure. The countries of former Yugoslavia are considered individually in our dataset. Note that our dataset includes all the countries of Panizza (1999) except, because of data limitations: Central African Republic, Guatemala, Honduras, Iraq, Jordan, Kenya, Malawi, New Zealand, Senegal, Sri Lanka, Yemen and Zaire.

[10] It is well know that the GFS data presents some reliability issues. However, they are essentially the only source if one wants to look at determinants of decentralization in a cross-country context including less developed countries. In the absence of better data, GFS data are widely used. Key contributions based on GFS data include the directly related Panizza (1999) and Arzaghi and Henderson (2005), and the more recent Enikolopov and Zhuravskaya (2007) and Neyapti (2010).

[11] Data is taken from the GFS-Series 2 "Cash expenditure" for central, state and local governments. We computed overall public expenditure as indicated in (2). Additionally, we have run our regressions using the Series 7 "Outlays". Results do not vary significantly and are available upon request.

[12] Inspection of the data showed that the expenditure centralization ratio in Romania for 1990 was less than 1%. We dropped this observation as well.

Our main explanatory variable is defined as the share of seats held by the government in the legislature.[13] This variable represents the absolute political strength of the government, and as such, we would argue, is the closest measure to our theoretical concept of government strength (γ).

We include a range of other political variables as controls ($\mathbf{P}_{jt}$). These are: *government* and *opposition Hirschmann-Herfindahl Indices (HHI)*, *left wing* government and *election year*. The *HHI*'s, i.e. the sum of squared seat shares of government or opposition respectively, measure the breadth of the political spectrum that is part of both government and opposition.[14] The *left wing* dummy controls for potentially different preferences for decentralization across political views, while spending might be different in an *electoral year*.

The economic controls ($\mathbf{X}_{jt}$) correspond to *income* (real GDP per capita), *population* and *area*,[15] all taken from WDI. Furthermore, we interact *income* with a dummy for *developed countries*, which correspond to countries belonging to the OECD.[16] The effect of income on centralization might indeed be different between developed and less-developed countries.[17]

3.2 Estimation and inference

Figure 1 provides a first empirical illustration of our theoretical prediction. For 2006, the last year in our dataset, we plotted the degree of expenditure centralization on *government seat*

[13] All political variables are taken directly from DPI without transformation. Share of seats by government corresponds to the variable MAJ in the database.

[14] Such measures have been used by some authors to test for the "weak government hypothesis" in studies of a single government's fiscal discipline, stating that a government formed by a larger number of actors is more prone to the adverse consequences of a common-pool resource problem (Elgie and McMenamin, 2008). On the empirical relationship between fiscal discipline and political fragmentation, see Roubini and Sachs (1989), de Haan and Sturm (1997), de Haan *et al.* (1999) and Volkerink and de Haan (2001). We prefer the HHI, the standard measure of market concentration in Industrial Organization, to the simple number of parties in government. Alternatively, fractionalization, defined as 1 - HHI, is also used in the literature (see e.g. Elgie and McMenamin, 2008).

[15] *Area*, while captured by the fixed effects for most countries, varies within 10 countries in our dataset.

[16] We thank an anonymous referee for this suggestion.

[17] Bodman and Hodge (2010) find that the effect of income on decentralization is statistically significantly different (with opposite sign) for OECD versus middle- and lower-income countries.

share finding a slightly negative correlation.

Clearly, the countries in our sample differ in many other relevant aspects than political strength. In order to move beyond unconditional correlations we estimate the following version of equation (1):

$$CENTRAL_{jt} = \alpha + \beta_1 \boldsymbol{\gamma}_{jt} + \boldsymbol{\beta}_2 \mathbf{P}_{jt} + \boldsymbol{\beta}_3 \mathbf{X}_{jt} + \mathbf{COUNTRY}_j + \mathbf{YEAR}_t + \varepsilon_{jt}, \qquad (3)$$

where $\mathbf{COUNTRY}_j$ and $\mathbf{YEAR}_t$ correspond to country and year effects, respectively. We estimate the model for both expenditure and revenue centralization.

We use fixed effects estimation to control for any country-specific constant characteristics. This is a departure from Panizza (1999) and Arzaghi and Henderson (2005), although they also use GFS data. The first only considers a cross-section while the latter use a random effects model. Their focus is mainly on aspects that are country-specific and fixed over time, while our focus is on time varying central government seat share. Many of the variables used in these earlier papers enter our fixed effects and thus cannot be accounted for directly here. We argue that relying on fixed effects regressions is especially important, in our case, given that unobserved preferences of the electorate might jointly determine political strength and the level of decentralization, thus creating a potential endogeneity problem. Provided that these preferences can be assumed fairly stable over the period covered by our data, country fixed effects will adequately attenuate that potential issue. Fixed effects will also capture, for the most part, the constitutional assignment of duties across levels of government. Thus, our fixed effects regressions can be thought of as estimating the effect of changes (over time and within a given country) in political strength on the degree of centralization, over and above constitutional assignment.

On a final note regarding inference, the political variables are constant for a particular country over the election cycle (e.g. 4 years). We take this into account by clustering standard errors over the electoral cycle.[18] The *electoral year* dummy further controls for political business-cycle effects.

4 Results

Table 2 presents our main regression results pertaining to expenditure centralization, in addition to some robustness checks. The base regressions are presented in columns (1) to (3). The number of observations varies across models between 457 and 530, including 60 to 64 countries (depending on small differences in data availability for some variables). We include the R^2 as goodness-of-fit measures for each regression.

In the most basic specification, column (1), where we only include *government seat share* (γ) and the fixed effects, we find a negative effect of *government strength* on centralization. This is as predicted by theory, however the effect is not statistically significant. In column (2) we include economic controls ($\mathbf{X}_{jt}$). We use the logs of *income per capita*, *population* and *area*. Further, we lag *income* one period anticipating the time elapsing between economic and political decision making. Finally, as mentioned above, we include the interaction between the *developed country* dummy and *income*. Including economic controls improves the fit of the model significantly, as illustrated by the increase in the R^2. The coefficient on *seat share* remains negative, is larger in absolute value, and is now significant at 10%. The coefficients on *population* and *area* are in line with expectations. A larger country, both in terms of population and size, tends to have lower levels of centralization, *ceteris paribus*. Interestingly, the effect

[18] Note that standard errors are more conservative using this level of clustering than clustering over countries (results available upon request).

of income on centralization depends largely on whether the country is part of the OECD or not. The effect of income on centralization is not significant for a developed country, while it is positive and highly significant for less-developed countries. Hence, our results are suggestive that the negative effects of income on centralization that were found by Panizza (1999) and Arzaghi and Henderson (2005) might have been driven by developed countries.

In column (3), our preferred specification, we include the political control variables ($\mathbf{P}_{jt}$). Our variable for government strength remains negative and is now significant at the 5% level. None of the other political controls are significant, highlighting the key role played by our electoral strength variable. The coefficients on the economic controls remain essentially the same.

Our results are robust to a number of specification changes presented in columns (4) to (6) of Table 2. In columns (4) and (5) we split the sample into *developed* (OECD, column (4)) and *less-developed* (column (5)) countries. The *developed countries* sample consists of 213 observations for 25 countries, while 35 countries with 244 observations constitute the *less-developed* countries sample. Most importantly, the coefficient on government seat share is negative (and significant at the 5% level) in both samples. Actually, the values of the two coefficients are similar, hence confirming that no interaction with the *developed country* dummy is required for our main estimation. Some interesting results can be identified for the political controls. The effect of a *left-wing* government is reversed across groups. In a developed country, a *left-wing* government tends to foster centralization, while in less-developed countries they tend to foster decentralization. Both coefficients are significant at the 5% level. Further, the government HHI is negative and significant in the OECD sample. Regarding economic controls, only *population* is significant within the *developed* sample, whereas *income* and *area* are significant for the *less-developed* sample.

In column (6), we return to the full sample but estimate a more flexible functional form for *government seat share*, including squared and cubed terms. This is indeed suggested by our simple theoretical model, where the relation between government strength and centralization is non-linear. Intuitively, this seems plausible: governments that are at either side of the range of γ might be exposed to other incentives than governments with medium strength. Column (6) reveals that potential non-linearities might be at play, as all three *government seat share* terms are significant at the 1% level. Evaluated at the mean, the overall effect of *government seat share* in column (6) is -0.20, i.e. the negative effect is confirmed although with a larger (absolute) value. However, we prefer the specification in column (3), which is a more conservative estimate of the average effect suitably controlling for other determinants and country-level heterogeneity. In light of our dataset and limited number of control variables, we present the non-linear results as a robustness check, worthy to be pursued with better suited data.[19] Finally, note that none of the other coefficients is significantly altered.

Overall, we consistently find, across all specifications, that more central government strength leads to a lower degree of expenditure centralization. In our preferred specification, column (3) of Table 2, this effect is significant at the 5% level, even under a conservative approach to inference (clustering at the electoral cycle). Given the coefficient estimate of -0.043 a 10-percentage point increase in the share of seats held by the central government implies a reduction of 0.43 percentage points in the degree of centralization. Stated differently, an increase in government strength from the first decile (0.56) to the ninth decile (0.94) implies a decrease in the level of centralization of 1.6 percentage points, representing about 2% evaluated at the mean ($= 0.77$). Our results thus confirm our theoretical prior. The other political controls that we include have much weaker effects, while economic controls such as income and population contribute

[19] It should be noted that both the specification in column (3) and (6) might be plagued by omitted variables, as both specifications reject the RESET test for omitted variables (results available upon request).

importantly to the explanatory power of the model.

As mentioned before, we also estimated all the models with revenue centralization as the dependent variable. Recall that we would expect a weaker effect for revenue centralization from our theoretical results, since taxes are exogenously given in the model (but not necessarily in the data). Overall, the results presented in Table 3 confirm this expectation. We consistently find a negative effect of *government seat share* on centralization across all specifications, but it is statistically significant only in the non-linear specification. Evaluated at the mean, the overall effect in column (6) is now -0.17. Most of the control variables have similar effects to Table 2. *Income* has a positive effect on centralization, but only for non-OECD countries. Similarly, both *population* and *area* have a significantly negative effect on centralization, the former only for *developed countries* (see column (4)), while a *left-wing* government still has opposing effects depending on the degree of development (columns (4) and (5)). Additionally one political control variable is significant across most specifications. A fractionalized opposition fosters revenue decentralization, illustrated by the negative effect of *opposition HHI*,.

5 Conclusion

Fiscal decentralization is high on the agenda in policy forums. In this paper, we have argued that variations in the degree of fiscal centralization observed in a country might depend in important ways on the political forces that it faces. More specifically, based on a simple theoretical model, we would expect that a politically stronger central government has an incentive to contribute less to the provision of a central public good, leading to a lower degree of centralization, *ceteris paribus*. We tested the model's predictions using a panel of countries with yearly observations between 1990 and 2006. Our fixed effects estimates show that political strength

indeed matters. In our estimates, we consistently find that electoral strength, measured as the share of seats held by government in parliament, reduces the level of expenditure (but not revenue) centralization. These empirical results are compatible with the theoretical discussion of Section 2.

Our analysis provides an important demonstration of the role played by political factors on the degree of fiscal decentralization. It has interesting implications for policy design, highlighting the need for decentralization reforms to take into account the reality of the political process. With decentralization of expenditure responsibilities being an increasingly pervasive institution in both developed and developing countries, our results indicate a need to shift the policy focus from whether or not decentralization is desirable to *how* decentralization is actually implemented. Of course, our panel of countries did not allow us to address all of the aspects of the relationship between electoral considerations and decentralization – e.g. the strategic interactions between central and sub-central governments. The use of detailed within-country data will most likely prove to be a fruitful avenue for future research.

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Appendix: A Simple Political Economy Model of Fiscal Decentralization

In each of two periods, a central government chooses a spending policy to maximize a linear combination of expected discounted rents and of voter welfare, subject to the constraint that it needs to seek reelection at the end of the first period.[20] Rents associated with holding office and citizen welfare are substitutes in the central politician's objective function. Specifically, the government makes decisions over spending on a central public good ($g^c \geq 0$) and on the decentralization of some spending responsibilities ($g^l \geq 0$) – and the corresponding revenues – to a local level of government. The problem of the politician in power is:

$$\max_{g^l, g^c} \theta \left[s_1 + \beta \sigma s_2 \right] + (1 - \theta) W(g^l, g^c) \tag{4}$$

$$\text{s.t. } s_1 = T - g^l - g^c \tag{5}$$

$$s_2 = T - g^l, \tag{6}$$

where s_t is the political rent extracted at $t = 1, 2$, W is social welfare, which is increasing (at a constant rate) in spending at both the central and regional levels, and θ is the weight of rent extraction. The two constraints determine the amount of rents taken by the central politician in each period, where T represents the (exogenous) fiscal base. The period-1 decentralization decision is durable and reduces the amount of rents that he can take in both periods. Second-period rents are discounted by a time preference factor (β) and by the politician's perception of his reelection probability (σ). We assume that he is limited to only two terms in office, as

[20] Our two-period rent-extraction problem is reminiscent of Besley (2006). Yet, we follow Treisman (2007), Brülhart and Jametti (2007) and others in assuming that politicians are neither extreme revenue maximizing Leviathans nor pure welfare maximizers. Similarly, in Hindriks and Lockwood (2009) politicians are benevolent with probability π and Leviathan with probability $1 - \pi$.

such he becomes a lame duck if reelected.[21] This is reflected in the period-2 constraint.

The probability of reelection is increasing in spending at the central level and in its electoral strength. We assume a simple form of probabilistic voting, with $\sigma = G(\gamma + g^c)$. G is an increasing and concave function of electoral capital $\gamma + g^c$.[22] The parameter γ captures the electoral strength of the incumbent central politician. Previously accumulated political capital weakens the incentive for strong central politicians to court their electorate by spending on the central public good – thus, *ceteris paribus*, political capital allows the central politician to extract more rents.

With these assumptions on the electoral process, the federal government's problem yields the following first order conditions:

$$\hat{g}^c = G^{-1}\left(\frac{1}{\beta}\left[\frac{1-\theta}{\theta}W_l' - 1\right]\right) - \gamma \equiv B - \gamma, \tag{7}$$

$$\hat{g}^l = \frac{1}{\beta G'(\gamma + \hat{g}^c)}\left[\frac{1-\theta}{\theta}W_c' - 1\right] + T, \tag{8}$$

where W_j' is the partial derivative of social welfare with respect to spending by government j, and G' is the first derivative of G. Together, these two equations imply:

$$\hat{g}^c = B - \gamma, \tag{9}$$

$$\hat{g}^l = \frac{1}{\beta G'(B)}\left[\frac{1-\theta}{\theta}W_c' - 1\right] + T \equiv A, \tag{10}$$

where A and B are functions of exogenous model parameters if W has constant partial derivatives (which we have assumed above). Note that, in equilibrium, $\hat{g}^l$ is independent of γ and that the nonnegativity of $\hat{g}^c$and $\hat{g}^l$ imply the nonnegativity of A and $B - \gamma$.

[21] This is an assumption for simplicity. Alternatively, one could assume that spending decisions at the central level (g^c) are made over two periods. This complicates the analysis but does not change the general results.

[22] See Joanis (2011) for a discussion of this particular functional form

Combining the above results, we obtain the following condition for the degree of expenditure centralization:

$$\text{Expenditure centralization} \equiv \frac{\hat{g}^c}{\hat{g}^c + \hat{g}^l} = \frac{1}{\frac{A}{B-\gamma} + 1}. \tag{11}$$

This leads to the model's main testable prediction, embodied in the following hypothesis.

Proposition 1 *The level of expenditure centralization depends negatively on the central government's electoral strength (γ).*

It is straightforward to show that revenue centralization is, in this model, given by the following condition, which does not depend on γ:

$$\text{Revenue centralization} \equiv \frac{T - \hat{g}^l}{T} = \frac{T - A}{T}. \tag{12}$$

This leads to a second testable prediction of the model:

Proposition 2 *The level of revenue centralization does not depend on the central government's electoral strength (γ).*

Figure 1: Government Strength and Centralization

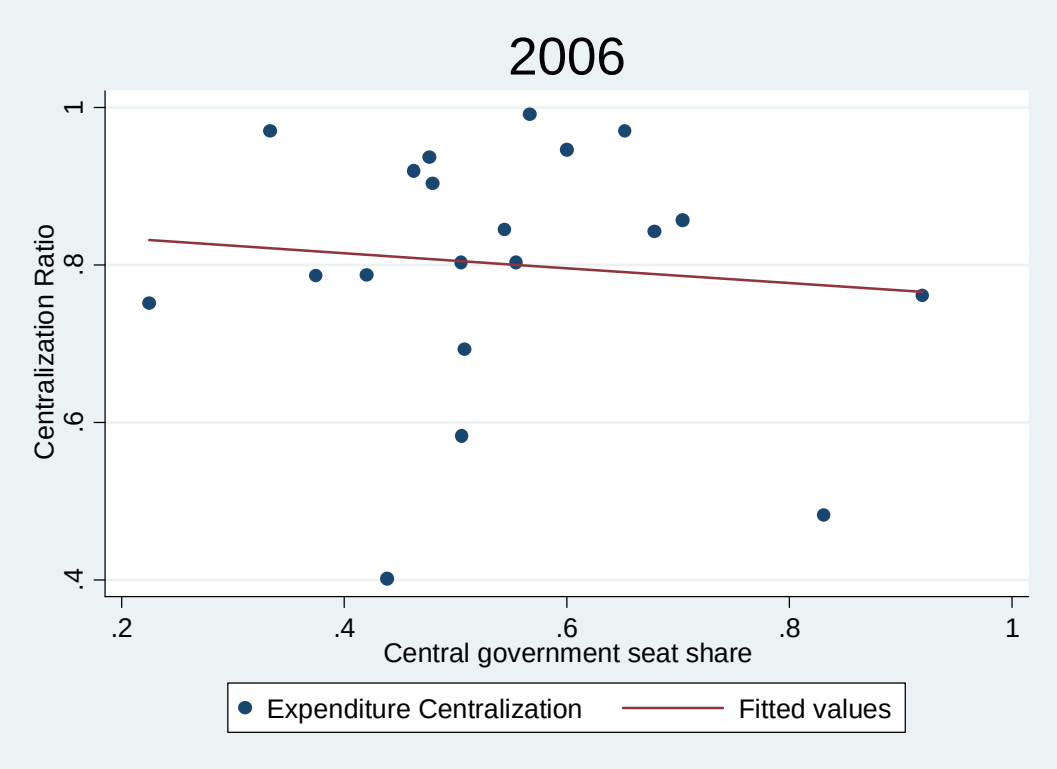

Table 1
Summary Statistics

Variable	Observations	Mean	Std. Dev.	Min	Max
Expenditure Centralization	532	0.77	0.14	0.40	0.99
Revenue Centralization	531	0.74	0.15	0.39	0.99
Government seat share (γ)	535	0.57	0.14	0.17	0.97
Government Herfindahl index	537	0.67	0.28	0.11	1.00
Opposition Herfindahl index	534	0.46	0.22	0.07	1.00
Left Wing	537	0.37	0.48	0	1
Election Year	537	0.26	0.44	0	1
Developped Country (OECD)	537	0.45	0.50	0	1
GDP per capita (constant 2000 US$)	537	10566	10636	129	38407
Population (in millions)	537	53.40	162.00	0.25	1080.00
Area (in thousand km^2)	537	1332.12	2884.13	0.32	16400.00

Sources: GFS, DPI, WDI

Table 2
Expenditure Regressions

Dependent Variable = Ratio of Expenditure Centralization	Base Regressions			Robustness Checks		
	(1)	(2)	(3)	(4)	(5)	(6)
Government seat share (γ)	**-0.040**	**-0.048***	**-0.043****	**-0.046****	**-0.056****	**-1.202****
	(0.032)	(0.029)	(0.022)	(0.020)	(0.027)	(0.471)
γ^2						**2.273*****
						(0.868)
γ^3						**-1.361*****
						(0.513)
Government Herfindahl index			0.002	-0.037**	0.006	0.007
			(0.015)	(0.018)	(0.015)	(0.011)
Opposition Herfindahl index			-0.015	-0.022	-0.014	-0.018
			(0.016)	(0.016)	(0.024)	(0.015)
Left Wing			-0.007	0.010**	-0.024**	-0.004
			(0.006)	(0.004)	(0.011)	(0.005)
Election Year			-0.001	0.002	-0.003	-0.001
			(0.003)	(0.003)	(0.004)	(0.002)
Income (lag of log(GDP per capita))		0.097***	0.089***	-0.089	0.129***	0.077***
		(0.032)	(0.032)	(0.070)	(0.045)	(0.028)
Developped Country (OECD) * Income		-0.043	-0.027			-0.030
		(0.067)	(0.071)			(0.061)
Log(Population)		-0.167**	-0.179**	-0.375**	-0.073	-0.164**
		(0.081)	(0.085)	(0.165)	(0.088)	(0.081)
Log(Area)		-1.665***	-1.588**	9.303	-2.447***	-1.300**
		(0.593)	(0.716)	(9.253)	(0.899)	(0.619)
R-squared	0.003	0.40	0.39	0.30	0.44	0.39
Number of Observations	530	459	457	213	244	457
Number of Countries	64	60	60	25	35	60

* p<0.1, ** p<0.05, *** p<0.01

Notes: A constant, time effects and country fixed effects included in all regressions.
Standard errors clustered across the electoral cycle.
R-squared presented from fixed effect panel regression.

Table 3
Revenue Regressions

Dependent Variable = Ratio of Revenue Centralization	Base Regressions			Robustness Checks		
	(1)	(2)	(3)	(4)	(5)	(6)
Government seat share (γ)	**-0.017**	**-0.021**	**-0.022**	**-0.006**	**-0.031**	**-1.093****
	(0.032)	(0.027)	(0.023)	(0.026)	(0.031)	(0.471)
γ^2						**2.106****
						(0.869)
γ^3						**-1.264****
						(0.512)
Government Herfindahl index			-0.001	-0.019	-0.007	0.003
			(0.015)	(0.023)	(0.016)	(0.013)
Opposition Herfindahl index			-0.038**	-0.047*	-0.030	-0.040**
			(0.019)	(0.027)	(0.026)	(0.018)
Left Wing			-0.004	0.011*	-0.020*	-0.001
			(0.006)	(0.006)	(0.011)	(0.005)
Election Year			0.000	0.000	0.003	0.000
			(0.003)	(0.003)	(0.004)	(0.002)
Income (lag of log(GDP per capita))		0.088**	0.087**	0.070	0.091*	0.077**
		(0.038)	(0.035)	(0.088)	(0.050)	(0.032)
Developped Country (OECD) * Income		0.057	0.077			0.075
		(0.083)	(0.083)			(0.074)
Log(Population)		-0.281***	-0.292***	-0.263	-0.237**	-0.276***
		(0.098)	(0.099)	(0.266)	(0.110)	(0.096)
Log(Area)		-2.226***	-1.969**	24.804*	-2.108**	-1.695**
		(0.677)	(0.794)	(14.189)	(1.005)	(0.673)
R-squared	0.00	0.36	0.35	0.32	0.46	0.35
Number of Observations	529	458	456	209	247	456
Number of Countries	64	59	59	24	35	59

* p<0.1, ** p<0.05, *** p<0.01

Notes: A constant, time effects and country fixed effects included in all regressions.
Standard errors clustered across the electoral cycle.
R-squared presented from fixed effect panel regression.