

# Fiscal federalism, jurisdictional competition, and the size of government

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**Abstract** Fiscal federalism is commonly held to reduce the size of government, but how does it do so: through shrinking the welfare state, cutting government consumption, or reducing public investment? This paper examines tax competition under fiscal federalism through the lens of imperfect competition theory, derives new empirical implications from different theories of fiscal federalism, and tests those hypotheses with new variables and data. Cross-national statistical results show that jurisdictional competition under fiscal federalism is associated with reductions in the administrative expense of government but not the size of the welfare state. Moreover, the apparent impact of fiscal federalism with a high degree of jurisdictional competition is larger than that estimated in previous research. Once the models have been appropriately specified, the United States is no longer an outlier among high-income democracies on either government consumption or social spending. Close examination of the data reveals that some fiscally federal systems better approximate a “market-preserving model” and others a “capital-privileging” or “state-corroding” model.

**Keywords** Political economy · Fiscal federalism · Decentralization · Government spending

**JEL Classification** H11 · H77 · P16

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## 1 Introduction

Wealthy democracies differ widely in the share of national income consumed by government. The size and role of government in these countries have also changed substantially over time. In most of them, total government expenditures as a percentage of gross domestic product (GDP) increased dramatically from 1950 to about 1985, fueled by a rise in social spending. Government consumption, spending on the current operations of government, was higher as a share of GDP in 2006 than in 1970 in every Organization for Economic Cooperation and Development (OECD) country except three: Canada, Ireland, and the United States.

Recently, scholars have taken up the task of explaining long-run differences in government spending with formal political institutions and persistent features of the social structure (e.g., Castles 1998; Lijphart 1999; Tanzi and Schuknecht 2000; Persson and Tabellini 2003; Alesina and Glaeser 2006). In keeping with this new literature, this paper treats the macro-level determinants of government spending across countries and over time. It revisits theoretical debates over the role of fiscal federalism in constraining government growth that have never been empirically resolved. Previous literature has examined the correlation between fiscal decentralization and government spending, but this approach does not capture the effects of fiscal federalism understood as a set of formal institutions, nor does it take into account imperfections in competition among subnational governments. The paper also endeavors to test, in a necessarily limited fashion, different mechanisms by which fiscal federalism constrains government spending, by looking at components of spending.

The estimated association between fiscal federalism with many jurisdictions and government consumption share of GDP is substantively significant. For instance, a move on fiscal federalism and jurisdictional competition from Dutch to American levels is estimated over the long run to associate with a decrease in government consumption from Dutch to American levels. Competitive fiscal federalism appears to suppress government consumption, not social transfers, subsidies, or government investment. Expenditure decentralization, capturing well-known arguments about “vertical fiscal imbalance,” appears to have contrary effects, boosting government consumption and subsidies.

The next section turns to the theoretical logic for fiscal federalism’s constraint on the public sector. The following section describes the data used in the empirical analysis. Section four presents the empirical models and results, and section five concludes with a discussion of the results’ implications.

## 2 Theoretical perspectives

### 2.1 Defining fiscal federalism

Fiscal federalism refers to a cluster of institutions with the following characteristics: (1) politically autonomous subcentral governments enjoy primary authority over some economic policy-making; (2) subcentral governments must fund their own

programs largely out of their own taxation, over which they have discretion as to rates; (3) goods, services, and people may flow freely across the borders of the subcentral governments (Weingast 1995). A fiscal federation is more decentralized the greater the policy and fiscal autonomy enjoyed by the jurisdictions. Researchers agree that fiscal federalism reduces the size of government (taking all levels of government together), while expenditure decentralization funded through grants increases the size of government, but they disagree on causal mechanisms and normative evaluations of the system (Brennan and Buchanan 1980; Weingast 1995; Rodden 2003a).

## 2.2 Public expenditure categories

One way to test different perspectives is to draw out their differing implications for the relationship between fiscal federalism and *type* of government spending. Government consumption is a common dependent variable in this literature, but government consumption could be higher for multiple reasons. To the extent that there is “slack” in public administration (too many public employees being paid too much or too much waste, fraud, and abuse in procurement), it would show up in government consumption. However, the converse does not follow: government consumption does not simply reflect administrative inefficiency. For instance, hiring teachers or soldiers increases government consumption. If fiscal federalism reduces government consumption, there are two possible interpretations: either inefficiencies are being weeded out, or competing jurisdictions are foregoing worthy collective goods provision in order to attract wealthy taxpayers. Can these two interpretations be distinguished empirically with disaggregated spending data?

Total government expenditure can be broken down into consumption, fixed capital formation, and transfers. Consumption includes the wage bill and consumption spending on goods and services, while transfers include social transfers, other transfers to individuals, and subsidies. Fixed capital formation or “public investment” includes infrastructure spending.

An alternative way to break down government spending is by function. Social spending is of interest in this article, including transfer payments on unemployment insurance, active labor market programs, family, housing, survivors, incapacity, health, pensions, and other social policies, plus the costs of running these programs.

Does fiscal federalism encourage lower-level governments to cut just the fat in government or the muscle and bone as well? Does the system privilege the wealthy or handicap rent-seekers, or both? The next sections examine the major perspectives on fiscal federalism and draw out their different empirical implications.

## 2.3 Market-preserving federalism

Drawing on Brennan and Buchanan (1980), Weingast (1995) and Qian and Weingast (1997) propound “market-preserving federalism.” In a common market with decentralized policy-setting, taxpayers and businesses can move across jurisdictional lines to escape confiscatory taxation and regulation, a process known as “jurisdictional arbitrage.” Fiscal federalism therefore makes governments more

efficient and squeezes rents by forcing subnational jurisdictions to compete for tax base.

The central empirical implications of market-preserving federalist theory are that more fiscally federal countries will have lower government final consumption expenditures (that is, public expenditures on wages and goods and services for consumption) and redistributive transfers, especially subsidies. Valuable collective good provision shows up in government consumption, and market-preserving theory might predict that fiscal federalism promotes that kind of government spending. Still, previous empirical studies of Brennan and Buchanan (1980) “Leviathan” hypothesis have assumed it predicts a negative relationship (Oates 1985; Stansel 2006). One justification for this assumption is that while much government expenditure is not wasted, the residual cross-national *variance* in government consumption, after controlling for public demands for spending captured by variables such as GDP and ideological polarization, correlates with wastage and rents.<sup>1</sup>

The theory’s implications with respect to social spending are two-edged. If competing jurisdictions in a federal system cut spending on the poor, unemployed, retired, and disabled, this process might be not just questionable on equity grounds but also inefficient, if there are imperfections in financial markets that render provision of social insurance through public transfers more efficient than market provision. On the other hand, poorly designed transfer programs can discourage labor supply through high effective marginal tax rates on recipients. Thus, it is unclear what market-preserving federalism predicts on social spending. By contrast, government subsidies to business are inefficient unless necessary to correct a positive externality. Market-preserving federalism should generally suppress this kind of spending.

Finally, the theory’s predictions with respect to government investment are ambiguous. Jurisdictional competition should undercut wasteful projects but favor infrastructure projects inadequately provided in markets. According to a recent IMF working paper by Arslanalp et al. (2010), most OECD countries now have public capital stocks sufficiently low that more public investment would be productive. If so, then market-preserving federalism should predict that fiscal federalism will correlate with more investment spending in these countries.

## 2.4 Capital-privileging federalism

Rodden (2003a) puts the Leviathan model on a more positivist footing. Rodden argues that jurisdictional competition may or may not reduce rents, but should privilege the more geographically mobile factors of production: capital and skilled labor. Thus, the “capital-privileging” model predicts that fiscal federalism causes burden-shifting from relatively mobile to relatively fixed factors. Since wealthier individuals support lower taxation and government spending overall, a fiscally

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<sup>1</sup> Recent empirical work tends to find a negative association between government consumption and growth (Fölster and Henrekson 2001; Barro 2001; Afonso and Furceri 2010). Some societies evince stronger preferences for redistribution over growth, leading to larger governments that may be optimal in a broader sense (Mirrlees 1971), but the models aim to control for these preferences.

federal system reduces the size of government. As Boadway and Shah (2009, 40) point out, under the benevolent-government assumption, this kind of tax competition has negative efficiency consequences, as lower-level governments perceive a higher “marginal cost of public funds” than the actual deadweight loss from taxation. Rodden (2002) cites the literature on the “flypaper effect” to support the notion that vertical fiscal imbalance incentivizes government growth.

Like Weingast’s model, Rodden’s approach suggests that fiscal federalism reduces government consumption, but it could also imply a “race to the bottom” in which competition also suppresses collective good provision and social spending. These processes will not occur if capitalists view collective goods provision and public assistance as desirable means for ensuring a productive, content work force, as some scholars of capital mobility in high-income democracies have argued (Garrett 1998). The dominant view, however, holds that social welfare spending benefits the poor and middle class at the expense of the rich; therefore, a system that politically privileges the rich will reduce social welfare spending. There is no clear implication for government investment, while capital-privileging federalism could increase subsidies to business, provided those subsidies are paid for by taxing labor, not capital.

## 2.5 State-corroding federalism

Cai and Treisman (2004) model of “state-corroding federalism” builds upon the burden-shifting logic of the Leviathan theory. Jurisdictional competition may allow individual, mobile firms to seek out special treatment, such as light regulatory treatment or lower tax burdens, which regional governments can provide by interfering with central enforcement. While Cai and Treisman believe that the model is more applicable to developing countries, they provide illegal mountaintop removal mining in West Virginia as an example of the baleful effects of interjurisdictional competition for capital. The general idea is that competition under fiscal federalism, *when central government law enforcement is endogenous*, causes governments to provide fewer collective goods and instead offer private benefits to specific firms. State-corroding federalism could entail reduced spending on collective goods, social transfers, and public investment but increased business subsidies.

## 2.6 Pareto-inferior fiscal federalism

In a federal system, lower-level governments will want to offer public services for the benefit of their residents only. Some public services will yield interjurisdictional externalities. While these spillovers could be either positive or negative, the most obvious examples are of positive spillovers from government activity, such as roads, education, controls on pollution and invasive species, and welfare benefits (Oates 1972; Boadway and Shah 2009).<sup>2</sup> A state that increases welfare benefits helps to reduce the welfare burden in neighboring states by inducing migration (Oates 1999).

<sup>2</sup> “Tax exporting”—offloading tax incidence onto nonresidents—is an example of a negative spillover that might cause decentralized systems to have overly high taxation and spending, but its importance is fairly small (Boadway and Shah 2009, 41).

These tax externalities would encourage inefficient policies even if governments did not compete for capital, so long as regional voters reward politicians for lower taxes or higher spending, but competition for capital could worsen the problem. Regional governments may under-provide positive externalities in order to keep taxes low on mobile factors of production. This kind of federal system makes everyone worse off relative to one in which the externality problem is resolved, for instance by central government matching grants (Dahlby 1996) or by interjurisdictional agreements, such as the Nurse Licensing Compact in the U.S.

Pareto-inferior fiscal federalism should result in lower government consumption, social transfers, social spending, and investment, while central government grants to lower-level governments should encourage welfare-improving spending. Regional government subsidies have negative externalities on other jurisdictions, but the taxation needed to pay for them has positive externalities on other jurisdictions, so the overall implication of this theory for the relationship between fiscal federalism and subsidies is ambiguous.

Table 1 lays out each perspective's expectations about the effects of fiscal federalism on government spending categories: positive (+), negative (−), zero (0), or uncertain (?).

Each of these perspectives on fiscal federalism surely holds true under particular domain conditions that we might specify, but the question for this paper is which interpretation tends to be more broadly applicable in high-income democracies.

## 2.7 Imperfect interjurisdictional competition

Fiscal federalism theorists have paid little attention to the structure of the “jurisdictional market.” Scholars have focused on the ways in which the center may hinder or solve competition among regions, depending on one's perspective, but have not often investigated the possibility that regional governments may collude among themselves or simply enjoy monopoly power.

In any real-world federation, taxpayers must incur costs to move across regional borders. Therefore, we can think of regional governments as operating in an imperfectly competitive market in which they supply collective and quasi-private goods for a “price” in taxes and fees, and those prices can differ across regions because of the costs of mobility. A tax increase in one jurisdiction will cause some taxpayers to move to another jurisdiction.

The degree of monopoly power a government enjoys depends upon individual residents' elasticity of demand for its services. When individual demand is perfectly elastic, a tax increase causes *all* residents to emigrate, and the government enjoys no monopoly power. When individual demand is highly inelastic due to difficulty of migration, the government enjoys substantial monopoly power.

It is easier to migrate when there are more, smaller jurisdictions. In principle, perfect competition is possible even when there are only two regional governments. In practice, regional governments offer differentiated products. Jurisdictions may differ in the availability of agglomeration economies, geographic orientation toward other markets, pre-existing human and social capital, “sticky” institutional characteristics such as reliability of the legal system, and many other relevant characteristics. New

**Table 1** Expected effects of Fiscal federalism

Perspective	Consumption	Subsidies	Social	Investment
Market-preserving	–	–	?	0/+
Capital-privileging	–	0/+	–	?
State-corroding	–	+	–	–
Pareto-inferior	–	0	–	–

York does not compete with Kansas for export-import firms or stockbrokers. The greater the number of jurisdictions, the more likely it is, *ceteris paribus*, that each jurisdiction faces competition from one or more similar jurisdictions.

Facing competition, governments may try to form cartels to keep prices (taxes) and rents high. These cartels may either take the form of tacit collusion or formal, institutionalized arrangements, such as equalization grants in Germany (Rodden 2003b; Döring and Voigt 2006). Tacit collusion is an  $N$ -person Prisoner's Dilemma, in which the temptation to defect—and reap the rewards of taxpayer in-migration—can be severe, and it is generally thought that the probability of mutual cooperation declines with  $N$  (Tirole 1988). This is a second reason why the number of competing jurisdictions in a federal system flattens the taxpayer's demand curve and heightens competition. Following prior empirical work (Rodden 2003a, 2006; Fiva 2006; Sorens 2011), this study measures formal collusion with “expenditure decentralization,” the subcentral share of government spending. In a multiple regression framework, controlling for fiscal federalism or tax decentralization allows expenditure decentralization to capture the association of fiscal collusion (equalization grants and mandatory revenue sharing) with size of government.

Competition among regional governments should be less intense than among private firms in an imperfectly competitive market for the simple reason that unilateral entry into the “regional government market” is typically impossible. In private markets, the threat of entry may curb monopoly power, but unless there is a right of unilateral secession for new regional governments, there is no threat of entry in fiscal federations.

Therefore, economic decentralization engenders tax competition only when the regional government market is deconcentrated (that is, less oligopolistic or more competitive). Previous research has almost exclusively focused on fiscal decentralization while ignoring the structure of the regional government “market.” For instance, a well-known study by Rodden (2003a) and a later one by Fiva (2006) look only at fiscal decentralization. At the local level a number of studies have looked at the number of competing jurisdictions, but not at their conditional relationship with fiscal decentralization as in this paper (Oates 1985; Forbes and Zampelli 1989; Stansel 2006).

## 2.8 Hypotheses

This section summarizes the observable implications of the foregoing theories of fiscal federalism (Table 1).

**Hypothesis 1** Fiscal federalism is associated with lower government consumption when and only when the regional government market is deconcentrated (competitive). (all theories)<sup>3</sup>

**Hypothesis 2a** Fiscal federalism is associated with *lower* subsidies when and only when the regional government market is deconcentrated. (market-preserving)

**Hypothesis 2b** Fiscal federalism is associated with *higher* subsidies, especially when the regional government market is deconcentrated. (state-corroding, capital-privileging)

**Hypothesis 2c** Fiscal federalism is not appreciably associated with subsidies. (capital-privileging, Pareto-inferior)

**Hypothesis 3** Fiscal federalism is associated with lower social spending and transfers when and only when the regional government market is deconcentrated. (capital-privileging, state-corroding, Pareto-inferior)

**Hypothesis 4a** Fiscal federalism is associated with *lower* public fixed capital formation, especially when the regional government market is deconcentrated. (state-corroding, Pareto-inferior)

**Hypothesis 4b** Fiscal federalism is associated with *higher* public fixed capital formation, especially when the regional government market is deconcentrated. (market-preserving)

**Hypothesis 4c** Fiscal federalism is not appreciably associated with public fixed capital formation. (market-preserving)

**Hypothesis 5** Expenditure decentralization is positively associated with all forms of government spending.

### 3 Data

The sample consists of high-income democracies, and data availability constrains the estimations to at most 39 countries from 1963 to 2006.<sup>4</sup> Results reported within the paper are for a smaller set of OECD country-years for which data on tax decentralization are available; other results are in the Appendix. Each dependent variable measures government spending, central and subcentral, in the specified category, as a percentage of GDP.

The government consumption data come from *World Development Indicators* (WDI).<sup>5</sup> The other public spending data come from the OECD. Social spending consists of the categories mentioned in the previous section. The online Appendix

<sup>3</sup> Fiscal federalism should reduce central government spending only when the central government decentralizes policy-setting authority to subcentral governments. Otherwise, if both central and regional governments had fully overlapping competencies, fiscal federalism would constrain only subcentral spending. I am indebted to an anonymous reviewer on this point.

<sup>4</sup> My source for fiscal federalism data ends in 2006.

<sup>5</sup> I also try using OECD data, which yields very similar results.



shows the countries included in the analysis with their average scores on key variables.

The key independent variables are fiscal federalism, regional concentration, and their interaction. Fiscal federalism ( $F$ ) is created at the regional level as follows:

$$F = \frac{\text{Programmatic autonomy}}{3} \times \frac{\text{Fiscal autonomy}}{4} \times \frac{\text{Representation}}{4} \times \frac{2 - \text{Central veto}}{2} \times \text{Tax decentralization}. \quad (1)$$

*Programmatic autonomy*, *Fiscal autonomy*, *Representation*, and *Central veto* come from Hooghe et al. (2010). *Programmatic autonomy* measures regional government economic policy authority, ranging from 0 to 3 (Hooghe et al. also have a “4” code for regional control of immigration or citizenship policies, but it is not used for the *Fiscal federalism* index). *Fiscal autonomy* measures regional tax-setting and -raising powers, ranging from 0 (none) to 4 (control of base and rate of both minor and major taxes). *Representation* measures regional electoral autonomy, where “0” means that the central government appoints the regional legislature and executive, if any, and “4” means that regional government and legislature are both directly elected. *Central veto* is a dummy variable for whether the central government can veto regional laws. *Tax decentralization* comes from Stegarescu (2005) and measures the proportion of total taxes that are levied by subcentral governments that have authority over either base or rate of the tax.<sup>6</sup>

*Fiscal federalism* is constructed so that the maximum possible score is 1 (maximum score on components, no central veto, complete tax decentralization), and the minimum is 0, which is achieved whenever any *one* of the components is zero. In practice, it ranges from zero to about 0.6. The logic behind this formulation is that a regional government that fully lacks autonomy in any of these areas (may not make economic policies, is fully appointed by the central government, or may not vary tax rates or base) is not at all fiscally autonomous: it will have no ability or incentive to engage in tax competition. A regional score is halved if the central government can veto its laws; this provision constrains regional autonomy but does not efface it, given that political constraints may often prevent national parliaments from overriding regional legislatures at will.<sup>7</sup>

<sup>6</sup> *Fiscal federalism* is then aggregated into country-level scores by the following procedure. First, the most autonomous level of regional government is identified. For instance, states in the U.S. are more autonomous than counties, and county scores therefore do not count toward the United States’ score. If autonomy is symmetric in this tier, then the *Fiscal federalism* score of this regional tier is the score of the country. In some countries, however, some regions enjoy more autonomy than others. For instance, Scotland enjoys more autonomy than English county and metropolitan governments, which are the highest-level governments in England since there is no English regional government. In these cases, the country score is the population-weighted average of the top-tier regional scores.

<sup>7</sup> I have tried various means of weighting the subcomponents without appreciable differences in the estimation results presented below. I have tried eliminating *Tax decentralization* from the equation to get more years of data, and the results are similar (unsurprisingly, since the correlation between the two measures is 0.89). Finally, I have also tried using multiple imputation to get more years of data, and again, most of the results are quite similar, with one exception on public investment noted below. Many of these estimations are available in the online Appendix.

As a measure of states' constitutional features, fiscal federalism is sticky over time. Where significant changes have occurred, in Italy, Spain, Belgium, and the UK, the impetus was in each case the accommodation of minority nationalist movements. In most cases, expectations of future government spending do not apparently affect constitutional decisions about fiscal federalism.

Finally, the concentration of the regional government market is measured with a Herfindahl index ( $H$ ) of regional populations. The Herfindahl index of firms' market shares is a common measure of industrial concentration. It is measured in this paper as follows, where  $r$  indicates regional share of national population:  $H = \sum r^2$ .<sup>8</sup>  $H$  approaches one in monopolistic markets and zero in highly deconcentrated, competitive markets. It is also coded one when no regional governments have any autonomy.<sup>9</sup> Figure 1 shows the distribution of the Herfindahl index in the dataset.

The distribution of the variable appears "bimodal," with observations clustering at high and low values. We want to make sure particular cases are not driving the results. Therefore, I have tried dropping all observations where fiscal federalism is zero (and  $H$  one) and, alternatively, dichotomizing fiscal federalism. The results, qualitatively similar to those reported here, are in the online Appendix.

The key variables  $H$  and  $F$  are interacted so that hypotheses about the conditional association of fiscal federalism with public expenditure can be tested, as follows:

$$Y_t = \alpha + \beta_1 F + \beta_2 H + \beta_3 F \times H + \sum_N^k \gamma_k Z_k + \varepsilon, \quad (2)$$

where  $Z_k$  is a vector of  $N$  control variables. Hypothesis testing on  $\hat{\beta}_1 + \hat{\beta}_3 H$  tells us whether fiscal federalism is associated with government spending at particular values of  $H$ . When  $H$  is low, all theories expect fiscal federalism to be negatively associated with government consumption. When fiscal federalism is high, all theories expect regional concentration to be positively associated with government consumption. Therefore, in the government consumption models, we should also expect  $\hat{\beta}_1$  alone to be negative. The correlation between *Fiscal federalism* and *Herfindahl index*, country-averaged, is  $-0.59$ , while these two variables' respective correlations with their interaction term are  $0.83$  and  $-0.46$ .

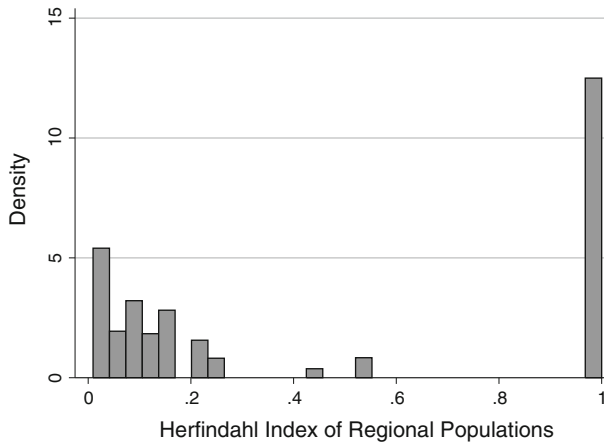
Hypothesis 5 is tested with *Expenditure decentralization*, subcentral share of total government spending, from the IMF. This variable reduces sample size and correlates with fiscal federalism at  $r = 0.66$ .<sup>10</sup>

The models include a large array of control variables. All reported regressions include logged *Real GDP per capita* in dollars at purchasing power parity from the

<sup>8</sup> Regional populations are measured at the earliest year in the panel to reduce endogeneity by which tax competition might affect population flows.

<sup>9</sup> In addition to  $H$  as defined here, I have also tried using the log of a simple count of the number of regional governments, with substantively quite similar results.

<sup>10</sup> Missing within-series values of expenditure and tax decentralization have been linearly interpolated for the estimations reported here. Six observations on tax decentralization are interpolated, and 89 observations on expenditure decentralization are interpolated. An alternative approach is multiple imputation, the results of which are reported in the Appendix.



**Fig. 1** Distribution of Regional Concentration Index

Penn World Table 6.2 (PWT).<sup>11</sup> *Age dependency ratio*, the proportion of the population under 18 or over 65 (OECD), is included for consumption and social spending regressions.

Other controls attempted include a *Postsocialist* dummy, *Trade/GDP* (PWT), logged *Population* (PWT), logged *Area* (PWT), *Ethnic*, *Religious*, and *Linguistic fractionalization* (Alesina et al. 2003), dummy for first-past-the-post electoral system for lower house (*Plurality rule*), log of average district magnitude (*Mean dist. magnitude*) from the Database of Political Indicators (DPI), *Presidentialism* (0–2 scale from DPI), *Gini ratio* (Solt 2009), *Executive ideology* (0, 1, or 2 for left, center, or right) (DPI), citizen *Opinion polarization* on the role of government from the World Values Survey (Lindqvist and Östling 2010), country involvement in *Wars* (a variable constructed by summing the intensities of all interstate and intrastate conflicts in which a country was involved in each year, based on the UCDP-PRIO v4-2009 dataset (Gleditsch et al. 2002)<sup>12</sup>), and year dummies.

## 4 Identification and results

### 4.1 Cross-sectional regressions of government consumption

As an initial look at the data, especially since fiscal federalism changes significantly over time in just a handful of countries, it makes sense to look at purely cross-sectional estimates. Balanced country panels are created for the period 1991–1999 (23 countries). These models take the form

<sup>11</sup> GDP might be endogenous. The results presented here are robust to the exclusion of GDP.

<sup>12</sup> If a country joins a conflict in a supportive role, then its intensity for that conflict is the conflict's intensity divided by the number of countries with which it has joined the conflict. However, if the country is the United States, it is accorded the full intensity of each conflict it joins, since the U.S., as military hegemon, has generally contributed vastly more troops to the missions it joins than its allies.

$$Y_i = \alpha + \beta_1 F_i + \beta_2 H_i + \beta_3 F_i \times H_i + \sum_k^N \gamma_k Z_{ik} + \varepsilon_i, i = 1, \dots, n, k = 1, \dots, N, \tag{3}$$

where  $i$  subscripts each country and  $k$  subscripts each of the  $N$  control variables  $Z$ . To reiterate, if tax competition constrains government spending, then  $\hat{\beta}_1 + \hat{\beta}_3 H$  should be negative at low values of  $H$ , and  $\hat{\beta}_2 + \hat{\beta}_3 F$  should be positive at high values of  $F$ . In order to test Hypothesis 1 in light of the interaction term, hypothesis tests are conducted on fiscal federalism holding regional concentration a standard deviation below its mean and on regional concentration holding fiscal federalism a standard deviation above its mean (Table 2).

These estimates also include *Expenditure decentralization*, expected to have a positive coefficient reflecting bailout expectations. The second model adds citizen opinion polarization. Fiscal federalism, meanwhile, is statistically significantly associated with smaller government when jurisdictional concentration is low. The second set of estimates suggests that increasing fiscal federalism from minimum (0) to maximum (0.56) at  $H = 0.036$  is associated with a reduction in government consumption as a percentage of GDP of about 7.1 percentage points. Expenditure decentralization is not associated with government consumption here. As Lindqvist and Östling (2010) report, opinion polarization is strongly negatively associated with government consumption.

#### 4.2 Time-series cross-sectional regressions of government consumption

While the cross-sectional results are suggestive, they do not take into account the over-time variance in a few countries in fiscal federalism. Thus, the next step is to analyze the time-series, cross-sectional (TSCS) correlation between fiscal

**Table 2** Cross-sectional models of government consumption

Variable	Coef. (Robust SE)	Coef. (SE)
Fiscal federalism	-25.3 (6.4)**	-15.9 (7.2)*
Herfindahl index	-2.5 (2.1)	-1.9 (1.9)
FF-HI	91.4 (15.8)**	87.2 (35.2)*
Expenditure decentralization	9.4 (8.0)	1.3 (6.2)
Opinion polarization		-11.5 (3.7)**
Constant	18.6 (2.0)**	49.0 (9.8)**
Adj. $R^2$	20.9 %	44.3 %
B-P/C-W het. test	0.083	0.661
N	23	23
$p(\beta_F + 0.036\beta_{F-H} \geq 0)$	0.001	0.031
$p(\beta_H + 0.260\beta_{F-H} \leq 0)$	<0.001	0.017

Coef. t-tests two-tailed. OLS regression estimates

\*\*  $p < 0.01$ ; \*  $p < 0.05$ ; †  $p < 0.1$

federalism and government consumption using annual data. Unsurprisingly, both contemporaneously and serially correlated errors are present in ordinary least squares (OLS) regression, even with a one-year lag of the dependent variable. Therefore, an autoregressive distributed-lag (ADL) model is chosen by selecting acceptable restrictions from a general model, as recommended by DeBoef and Keele (2008). ADL models take the following general form:

$$Y_t = \alpha_0 + \sum_{i=1}^p \alpha_i Y_{t-i} + \sum_{j=1}^n \sum_{i=0}^q \beta_{jq} X_{jt-i} + \varepsilon_t \quad (4)$$

where  $\varepsilon_t$  is an i.i.d. error term,  $|\sum_{i=1}^p \alpha_i| < 1$  so that  $Y_t$  is stationary,  $X_j$  are weakly exogenous independent variables,  $p$  is the number of lags of  $Y_t$ ,  $q$  is the number of lags of  $X_j$ , and  $n$  is the number of independent variables. The long-run asymptotic effect of a one-unit change in  $X_j$  can be calculated as  $\sum_{i=0}^q \beta_{jq} / (1 - \sum_{i=1}^p \alpha_i)$ .

First, the government spending dependent variables were regressed on five lags of both the dependent and independent variables. Then, restrictions to this general model were tested by  $F$ -testing clusters of individually insignificant coefficients. For instance, if the three furthest-out lags were individually insignificant, then all three were tested for joint significance. If still insignificant, all three were dropped. If significant, then the closest lag was retained and the remaining two tested jointly, and so on. The most parsimonious unbiased model of government consumption required lags to  $t - 3$  on the dependent variable and GDP, while no lags of the fiscal federalism and jurisdiction variables and their interaction were needed (model fit was slightly best when only a one-year lag of each of these three variables, rather than the current value, was used, a model that De Boef and Keele call the “Dead Start Model”). It is unnecessary to include GDP growth in the models when these lags are included, since GDP growth is simply one-year change in GDP: the coefficient on present-year GDP should be interpreted as the effect of the current state of the economy on government spending. It should be negative if government spending is countercyclical. Wagner’s Law predicts that the cumulative effect of lagged GDP will be positive. Once this specification was adopted, testing on the error term vindicated the assumption of weak exogeneity and revealed no remaining serial correlation. For other information on nonspherical errors and data heterogeneity, see the online Appendix. Some models include a time trend or extra lags of the dependent variable to ensure stationarity of the dependent variable.

Table 3 presents the key estimates on government consumption models. Unless otherwise noted, analyses cover the years 1975–2001.

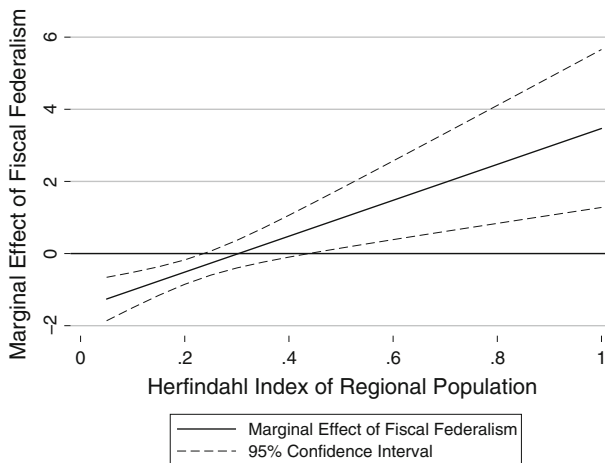
The last two rows of this table show hypothesis testing on the interaction terms at critical values of the other (Herfindahl index one standard deviation below its mean and fiscal federalism one standard deviation above its mean). The results on fiscal federalism are consistently statistically significant at the 95–99.99 % confidence level, when regional concentration is low, confirming theoretical expectations. The second, third, and fourth estimations reported in this table add new control variables. The dependent proportion of the population and expenditure decentralization associate with higher government consumption. The addition of ethnic, linguistic, and religious fractionalization variables does not affect the coefficient

**Table 3** TSCS Models of Government Consumption

Variable	Coef. (SE)	Coef. (SE)	Coef. (SE)	Coef. (SE)
Fiscal Federalism <sub><i>t</i>-1</sub>	-1.29 (0.30)***	-1.52 (0.37)***	-1.44 (0.41)***	-1.51 (0.37)***
Herfindahl index <sub><i>t</i>-1</sub>	-0.020 (0.064)	0.043 (0.064)	-0.061 (0.068)	-0.066 (0.068)
FF <sub><i>t</i>-1</sub> · HI <sub><i>t</i>-1</sub>	5.12 (1.39)***	4.49 (1.48)**	4.81 (1.50)***	4.98 (1.43)***
Real GDP per capita <sub><i>t</i></sub>	-0.72 (0.05)***	-0.70 (0.05)***	-0.70 (0.05)***	-0.70 (0.05)***
RGDPPC <sub><i>t</i>-1</sub>	1.08 (0.09)***	1.02 (0.09)***	1.01 (0.09)***	1.01 (0.09)***
RGDPPC <sub><i>t</i>-2</sub>	-0.34 (0.06)***	-0.31 (0.06)***	-0.29 (0.06)***	-0.29 (0.06)***
Age dependency ratio <sub><i>t</i>-1</sub>	1.25 (0.48)**	1.13 (0.56)*	1.14 (0.59)†	1.02 (0.56)†
Expenditure decentr. <sub><i>t</i>-1</sub>		0.54 (0.23)*	0.61 (0.28)*	0.62 (0.23)**
Ethnic frac.			-0.16 (0.22)	
Religious frac.			-0.36 (0.10)***	-0.36 (0.10)***
Linguistic frac.			0.18 (0.16)	
Time trend	-0.010 (0.004)*	-0.007 (0.004)	-0.006 (0.005)	-0.007 (0.004)
Y <sub><i>t</i>-1</sub>	1.17 (0.06)***	1.15 (0.06)***	1.14 (0.06)***	1.14 (0.06)***
Y <sub><i>t</i>-2</sub>	-0.20 (0.05)***	-0.19 (0.06)***	-0.18 (0.06)**	-0.18 (0.06)**
Constant	0.2 (0.3)	0.2 (0.4)	0.4 (0.4)	0.5 (0.4)
Partial R <sup>2</sup> (%)	29.8	29.2	30.3	30.3
N (countries)	730 (24)	637 (24)	637 (24)	637 (24)
$p(\beta_F + 0.036\beta_{F,H} \geq 0)$	<0.0001	<0.0001	0.0004	<0.0001
$p(\beta_H + 0.260\beta_{F,H} \leq 0)$	<0.0001	0.0006	0.0011	0.0005

Coef. t-tests two-tailed. OLS estimates with panel-corrected SEs

\*\*\*  $p < 0.001$ ; \*\*  $p < 0.01$ ; \*  $p < 0.05$ ; †  $p < 0.1$



**Fig. 2** Marginal effect of Fiscal federalism on government consumption, conditional on regional concentration

estimate on the key interaction term. Testing on both ethnic and linguistic fractionalization coefficients together accepts the null, but religious fractionalization is significant. Therefore, religious fractionalization is kept in remaining models. Note that this measure does not change at all over time, which means that in a pooled estimation its standard errors are probably biased downward somewhat, because they do not take into account our uncertainty due to random measurement error (Honaker and King 2010).

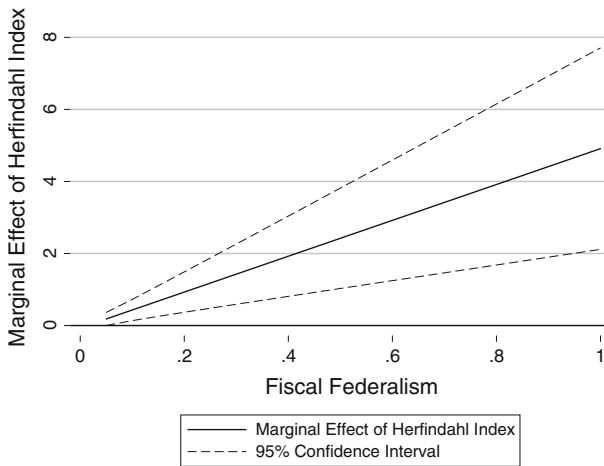
To demonstrate the statistical significance of fiscal federalism and jurisdictional concentration over the entire range of the conditioning variable, marginal effects with confidence intervals are plotted. Figure 2 does this for fiscal federalism, conditional on regional concentration, while Fig. 3 does this for regional concentration, based on the estimates from the fourth model of Table 3. We can be highly confident of fiscal federalism's negative association with size of government once the Herfindahl index falls below about 0.25—and as Fig. 1 shows, conditional on a positive level of fiscal federalism, the vast majority of observations indeed fall below this threshold. Meanwhile, we can be highly confident that regional concentration is positively associated with government spending at virtually all values of fiscal federalism.

Long-run asymptotic effects of fiscal federalism can also be calculated and plotted, holding all other variables at their means (Fig. 4).

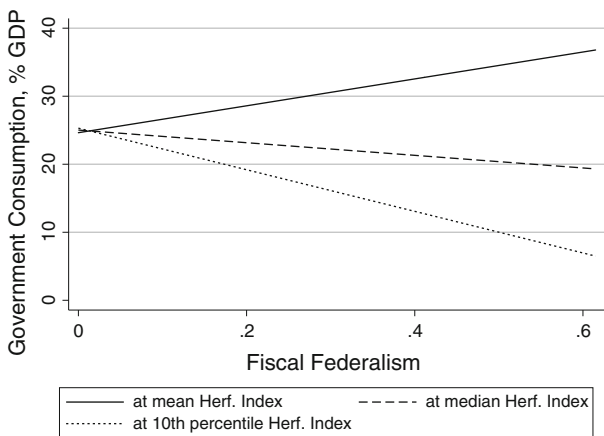
At the mean value of the Herfindahl index, corresponding to extreme regional concentration (two roughly equally sized regions), fiscal federalism has no constraining effect on government. Belgium is the only federal country similarly regionally concentrated. When the regional government “market” is highly deconcentrated, at the tenth-percentile value of the index, an increase in fiscal federalism from its minimum to its maximum is associated with a long-run reduction in government consumption in the average country by nearly 17 percentage points of GDP. This effect is stunningly large. It is larger than the difference in government consumption in 2004 between the United States and Sweden (15.8 and 27.4 %, respectively).

This estimate is misleading, however, since it holds expenditure decentralization constant, even though fiscally federal countries are by necessity expenditure-decentralized as well. The maximum expenditure decentralization score in the dataset is 0.64, and the minimum is 0.01. This difference is associated with a long-run *increase* in government consumption of more than nine percentage points of GDP. Thus, an increase in fiscal federalism from zero to maximum and a decrease in regional concentration from its maximum to its tenth percentile should actually, on average, cut government consumption by seven or eight percentage points of GDP over the long term, about the difference between the U.S. and the Netherlands. This estimate is quite consistent with the estimates from the cross-sectional regressions.

This effect is not implausibly large. A move to full fiscal federalism could reduce the central government share of consumption by as much as 60 % (Sweden and Canada lie in that vicinity on tax and expenditure decentralization). If the average fully centralized country has 25 % government consumption share of GDP, this decline would be about 15 percentage points. Subcentral jurisdictions then have to fund themselves and their programs. If they are able to slash half of the consumption



**Fig. 3** Marginal effect of regional concentration on government consumption, conditional on Fiscal federalism



Long-run asymptotic effects plotted. All other independent variables held at their means.

**Fig. 4** Fiscal federalism and government consumption

costs that the central government would otherwise have paid, that leaves a 7.5 percentage point drop in government consumption due to fiscal federalism.

However, fiscal federalism may correlate with other institutional or social features that constrain government growth. Fiscal federalism correlates most strongly with ethnic and linguistic diversity and with country population and land area. When these variables are included in the government spending models, they are invariably statistically insignificant. Unfortunately, fixed effects are not feasible because fiscal federalism rarely changes much over time. However, random-effects models show extremely similar results (Appendix). The statistical significance of fiscal federalism conditional on low regional concentration is also robust to the



inclusion of year dummies, to the exclusion of any one country from the dataset, to the exclusion of all fully centralized countries, to specifying a log-linear format, to various alternative operationalizations of fiscal federalism and regional concentration, and to multiple imputation of missing data, permitting a significantly larger estimation sample.

#### 4.3 TSCS regressions of social spending, transfers, and investment

As predicted by all theories, fiscal federalism correlates with lower government consumption when jurisdictional competition is intense. The next step is to investigate whether fiscal federalism correlates negatively with other categories of government spending: social spending, social transfers, subsidies, and government investment (Table 4). Age dependency ratio is included only in the social spending models, and population and area are added to the investment model since less densely populated countries may need to spend more on roads and similar infrastructure.

In the social spending equation, the interaction term has the wrong sign from the perspective of Hypothesis 3 and is not close to statistical significance, but when fiscal federalism is tested at a value of the Herfindahl index a standard deviation

**Table 4** Models of government spending categories

Variable	Coef. (SE)	Coef. (SE)	Coef. (SE)	Coef. (SE)
<i>Dependent variable</i>	<i>Social spending</i>	<i>Social transfers</i>	<i>Subsidies</i>	<i>Investment</i>
Fiscal federalism <sub>t-1</sub>	-0.44 (0.27)†	-0.59 (0.25)*	-0.04 (0.11)	0.01 (0.11)
Herfindahl index <sub>t-1</sub>	-0.07 (0.13)	0.05 (0.10)	-0.03 (0.03)	0.04 (0.05)
FF <sub>t-1</sub> · HI <sub>t-1</sub>	-0.21 (1.39)	0.59 (1.08)	-0.12 (0.67)	-0.62 (0.65)
Real GDP per capita <sub>t</sub>	-0.92 (0.10)***	-0.81 (0.07)***	-0.091 (0.026)***	-0.026 (0.044)
RGDPPC <sub>t-1</sub>	0.96 (0.10)***	0.84 (0.07)***	0.089 (0.027)***	0.030 (0.045)
Age dependency ratio <sub>t-1</sub>	-1.0 (1.2)	-0.3 (0.9)		
Expenditure decentr. <sub>t-1</sub>	0.17 (0.36)	0.05 (0.36)	0.34 (0.11)**	-0.05 (0.20)
Religious frac.	-0.68 (0.16)***	-0.26 (0.17)	-0.13 (0.06)*	-0.08 (0.11)
Population				0.007 (0.018)
Area				0.016 (0.012)
Time trend	-0.10 (0.10)			
Y <sub>t-1</sub>	1.13 (0.07)***	1.30 (0.06)***	0.96 (0.02)***	1.05 (0.08)***
Y <sub>t-2</sub>	-0.19 (0.11)†	-0.33 (0.07)***		-0.11 (0.08)
Y <sub>t-3</sub>	0.01 (0.07)			
Constant	1.9 (0.8)*	0.6 (0.6)	0.10 (0.08)	-0.17 (0.17)
Partial R <sup>2</sup> (%)	30.4	40.6	5.5	0.8
N (countries)	420 (24)	359 (23)	599 (24)	590 (24)
$p(\beta_F + 0.036\beta_{F.H} \geq 0)$	0.028	0.007	0.330	0.440
$p(\beta_H + 0.260\beta_{F.H} \leq 0)$	0.640	0.760	0.645	0.745

See Table 3

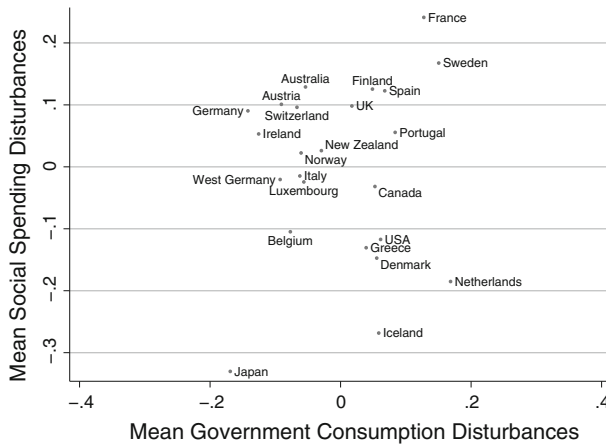
below the mean, it is statistically significant and negative. The Herfindahl index is never statistically significant. Thus, we can be somewhat confident that fiscal federalism is associated with lower social spending when the regional government market is moderately deconcentrated, but there is no evidence that regional deconcentration is associated with lower social spending at any values of fiscal federalism. We find very similar results on social *transfers*. This pattern of results suggests that there might be some characteristic of decentralized countries that discourages social spending, but jurisdictional competition does not encourage cuts to social programs.

Other control variables have been tried, such as trade (which evinces a positive relationship to social spending, consistent with the “compensation hypothesis” (Kim 2007; Down 2007)), index of traditional-secular values from the previous World/European Values Survey (Inglehart and Welzel 2005) (insignificant), a dummy for New World countries (insignificant), the Gini ratio from Solt (2009) (statistically significant and negative), and year dummies, but none of these estimations alter these basic conclusions about the association with fiscal federalism.

Next, fiscal federalism is not associated with subsidies. Expenditure decentralization, reflecting fiscal collusion, correlates with larger subsidies but not social spending or transfers. Interestingly, two highly fiscally federal countries are at opposite ends of the spectrum in subsidy expenditure. In Switzerland, total subsidies consistently top 3.5 % of GDP, one of the highest figures in the world. Most of those subsidies are indeed from cantonal governments. In the United States, by contrast, subsidies are typically lower than 0.5 % of GDP, one of the lowest figures in the world, and almost all of that is spent by the federal government. Intriguingly, Switzerland conforms to the predictions of capital-privileging or state-corroding federalism, while the United States looks more like the market-preserving model. In the Appendix, results of various sensitivity analyses suggest that jurisdictional competition might be associated with either more or less subsidy spending. Apparently, a few outlier cases are driving differing results here.

Religious fractionalization strongly and negatively predicts social spending and transfers and subsidies, a result that does not disappear when religiosity is included. When a dummy for New World countries is included in the social *transfers* model only, both the dummy and religious diversity are negative but not quite significant.

Finally, fiscal federalism lacks a strong association with public gross fixed capital formation. However, in the Appendix, estimates from several models, including that using multiple imputation of missing data, show that jurisdictional competition correlates with more public investment (equivalently, regional concentration with *less* investment). This finding would cut strongly against the Pareto-inferior theory, which would predict that with a small number of jurisdictions, regional governments would internalize more of the positive externalities of infrastructure production, and it tends to support market-preserving theory. The derisory partial  $R^2$  for this equation shows how little we know about the determinants of public fixed capital formation, though the multiple-imputation results are somewhat better.



**Fig. 5** Outliers

Now that we have valid models of government consumption and social spending, we can examine whether some countries are outliers. Figure 5 plots country-averaged residuals from the key government consumption and social spending models. One important finding is a lack of “American exceptionalism.” The United States is about average on both variables. The outliers are France and Sweden (more social spending and government consumption than expected), the Netherlands (more government consumption and less social spending than expected), Germany (less government consumption than expected), Iceland (less social spending than expected), and Japan (less social spending and government consumption than expected).

#### 4.4 Discussion

That fiscal federalism combined with jurisdictional competition may suppress government consumption should not surprise us, given that it is consistent with all major theoretical perspectives on fiscal federalism. Moreover, the United States’ experience shows that centralization of economic policies is often pursued precisely to permit the expansion of the public sector. In 1932, state and local government total own-source revenues as a share of all national revenues stood at 74 % (United States Census Bureau 2012). Following the New Deal and Supreme Court decisions that held that states enjoyed no exclusive economic policy competencies, that percentage fell to 29 % by 1948. Similarly, the German *Länder* governments agreed in the 1960’s to give up taxing powers in exchange for revenue-sharing in order to put an end to tax competition (Döring and Voigt 2006; Hooghe et al. 2010).

The capital-privileging and Pareto-inferior theories have more difficulty explaining the lack of a correlation between fiscal federalism and social spending and transfers. A response might be that fiscal federalism *would* encourage reductions in social transfers, if such programs were actually decentralized, but since they generally are not, we do not observe the expected association in this dataset. But while old-age pensions are indeed a near-exclusive responsibility of

national governments, other categories of social spending, such as public health insurance/care, individual social aid, and family allowances, are controlled mostly by regional governments in the most decentralized systems.

Fiscal federalism is also unrelated to the level of subsidies. This finding contradicts both market-preserving federalism on the one side and capital-privileging and state-corroding federalism theories on the other, which had opposing expectations. One problem with the subsidy data, which are drawn from national accounts figures, is that they do not include concessionary loans or tax abatements. It is possible that jurisdictions compete differently in fiscally federal systems, some going a subsidy route and others trying to maintain consistently low taxes and nondistortionary policies. The crucial cases here are Switzerland and the United States. Switzerland has the highest subsidy spending in the sample, while the U.S. has one of the lowest, and state governments make up a trivial share of even that number. Perhaps greater interregional labor mobility in the U.S. helps constrain subsidy spending and the concomitant taxes. But this is speculative: anecdotally, U.S. state governments *do* use tax exemptions, credits, and deductions to attract businesses.

Meanwhile, the strong positive relationship between expenditure decentralization and subsidies may imply that grant-funded decentralization promotes this kind of spending, a finding that should not be surprising to advocates of “hard budget constraints” (Rodden et al. 2003) or to critics of “uncontrolled rent-seeking” in highly complex, decentralized systems (Fan et al. 2009).

Finally, jurisdictional competition’s nonrobust but likely positive association with government investment at high levels of fiscal federalism tends more to support market-preserving federalism. Looking at the two “crucial cases,” we see that Switzerland has had below-average public fixed capital formation, while the United States has among the highest figures. The only countries with more public investment than the U.S. in the sample are either postsocialist countries, microstates, or New Zealand. This observation fortifies the speculation that U.S. federalism conforms more to the market-preserving model, while Switzerland conforms more to the capital-privileging or state-corroding model.

## 5 Conclusions

The principal contribution of this paper turns out to be the discovery that jurisdictional competition enhances the consequences of economic decentralization on size of government. The results do not adjudicate clearly among different theories of fiscal federalism. Fiscal federalism is negatively associated with lower government consumption, but not with the size of the welfare state or subsidies to business, and it may be positively associated with public investment. The first association seems likely to be causal, as other variables associated with fiscal federalism—country population, land area, and ethnic diversity—are not independently associated with government spending.

Treisman (2007) view that federalism is too variegated to allow consistent generalizations over any broad domain can draw added support from these findings.

In particular, a simple comparison between two highly fiscally federal systems, the U.S. and Switzerland, shows that these countries differ dramatically in some of their fiscal policies, though they share relatively low government consumption and average social spending. While I have speculated that high inter-cantonal capital mobility without much labor mobility in Switzerland may explain why it fits better the “capital-privileging” or “state-corroding” model, additional testable implications of this hypothesis would need to be developed and tested before social scientists could draw any firm conclusions. If one believes that, at most of the relevant margins in developed economies, government consumption and subsidies are largely inefficient while government investment is largely efficient, then at most one can conclude from these results that more jurisdictional competition is better, and less grant-funded local expenditure is better.

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