Reviving Leviathan:
Fiscal Federalism and the Growth of Government

Jonathan Rodden

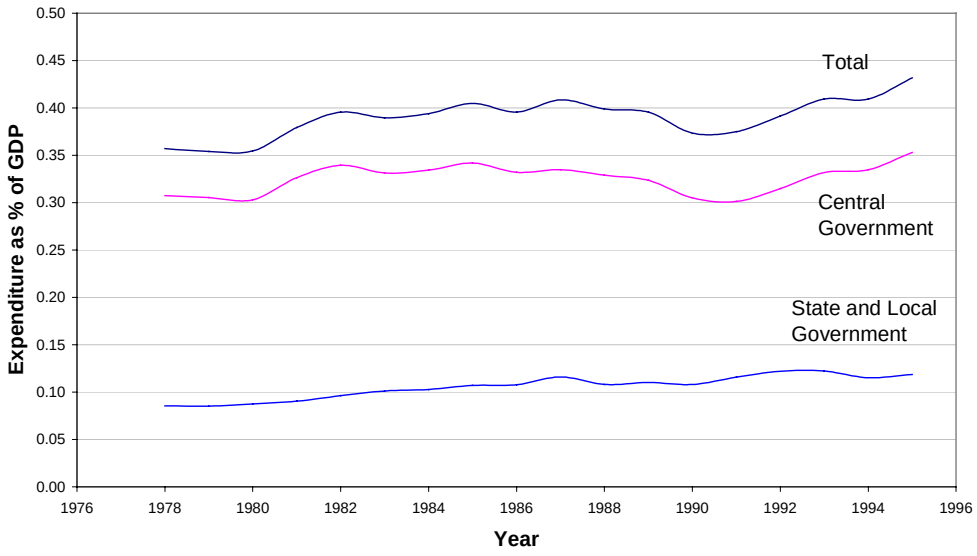
Assistant Professor
Department of Political Science
MIT
E53-433
77 Massachusetts Avenue
Cambridge, MA 02139
Phone: 617-253-6261
Fax: 617-258-6164
E-mail: jrodden@mit.edu

Draft Completed:
May 11, 2001

Abstract: This paper revisits the influential "Leviathan" hypothesis, which posits that tax competition limits the growth of government spending in decentralized countries. Cross-national empirical research has discovered that, on the contrary, more decentralized countries have larger public sectors. Rather than using cross-section averages, this paper uses panel data to examine changes over time within countries, attempting to distinguish between decentralization that is funded by intergovernmental transfers and local taxation. First, the results lend strong support to a "common pool" hypothesis—governments grow faster as they fund a greater portion of public expenditures through intergovernmental transfers. Second, this paper breathes new life into a modified version of the Leviathan hypothesis. It argues that decentralization should only restrict government spending over time if subnational governments have wide-ranging authority to set tax bases and rates on mobile assets. In countries where this is the case, revenue decentralization retards the growth of government.

Throughout the latter part of the 20th century, public sectors have grown faster than private sectors around the world. On average, government expenditures accounted for around 35 percent of GDP in 1978, while by 1995 the average had increased to around 43 percent for a sample of 53 countries (See Figure 1). Although most pronounced at the central government level, state and local public sectors have grown as well. But the global averages presented in Figure 1 mask a good deal of cross-national variation. For instance, government spending at all levels has grown much more quickly in several Scandinavian countries, but has actually fallen as a percent of GDP in some Latin American countries. More generally, government is smaller in developing countries.

Figure 1: Government Expenditure as Percent of GDP, Average for 53 Countries



Sources: Government Finance Statistics (IMF), International Finance Statistics (IMF), and author's calculations.

Political scientists and economists have long sought to explain cross-national variation in levels and changes in government expenditure, often with mixed success. This paper returns to one of the oldest and perhaps least successful of such arguments with a new perspective and new

data. With their famous "Leviathan" hypothesis, Geoffrey Brennan and James Buchanan posit that "total government intrusion into the economy should be smaller, *ceteris paribus*, the greater the extent to which taxes and expenditures are decentralized" (1980, p.15). Depicting government as a revenue-maximizing Leviathan, Brennan and Buchanan (1980) argue that as long as some individuals and firms are mobile, fiscal decentralization forces governments to engage in tax competition, thus destroying Leviathan's monopoly on taxation and bringing government spending closer to the preferences of citizens. This argument dovetails with other, less cynical arguments suggesting that decentralization helps resolve an inherent agency problem between citizens and government.

This hypothesis was the subject of several empirical analyses in the 1980s. Though decentralization has been linked to lower government spending in some American and Canadian case studies (Marlow 1988, Joulfaian and Marlow 1990, Grossman 1989), cross-national studies have been unable to demonstrate the hypothesized relationship. Indeed Wallace Oates has declared Leviathan to be a "mythical beast" (1985). More recently, Ernesto Stein (1999) demonstrates that fiscal decentralization is actually associated with *larger* government in Latin America.

However, this paper argues that existing cross-national studies are insufficient to dispel the myth of Leviathan for two reasons. First of all, they employ cross-section averages or single-year snapshots. Thus they shed little light on the dynamic nature of decentralization and the growth of government—both of which are clearly processes that unfold over time. Second, until very recently, insufficient attention has been given to the precise institutional incentives created by different forms of decentralization. The incentive effects of federal and unitary political institutions have largely been ignored. More importantly, if decentralization is to have a constraining effect on the growth of government, it must occur on both the expenditure and revenue sides. In the vast majority of countries, however, state and local expenditures are funded primarily by grants, shared revenues, or other revenue sources that are controlled and regulated

by the center. Expenditure decentralization without corresponding local tax powers will not engender the tax competition that drives the Brennan/Buchanan model, nor will it strengthen the agency relationship between local citizens and their representatives.

On the contrary, decentralization funded by "common pool" resources like grants and revenue-sharing might have the opposite effect. By breaking the link between taxes and benefits, mere expenditure decentralization might turn the public sector's resources into a common pool that competing local governments will attempt to over-fish. Depending on whether funded by local or common pool resources, decentralization might either retard or intensify the growth of government. Thus meaningful cross-national analysis requires data on transfers, revenue-sharing, and local taxation which have heretofore not been examined.

This paper reexamines the link between decentralization and the growth of government by addressing each of these problems. First, rather than concentrating exclusively on cross-country variation, this paper uses panel data from over 40 countries spanning the years from 1978 to 1997 and uses first-differences to examine within-group dynamics. Second, separate effects are estimated for federal and unitary countries. Third, while expenditure decentralization is rather easy to measure across countries, subnational revenue autonomy is often swept under the rug in empirical research because it is conceptually complex and difficult to capture with cross-national data. As a corrective, this paper uses data from several sources, each of which captures a different aspect of subnational revenue autonomy.

The analysis lends strong support to the "common pool" hypothesis. That is, other things equal, higher levels of subnational expenditure funded through common pool resources are associated with larger overall government spending. This lends further support to findings obtained by Stein (1999) in an examination of cross-section averages on a smaller sample of countries. Unlike earlier studies, this paper does find some qualified support for the Leviathan hypothesis as well. Within federal systems especially, increases in subnational *revenue* autonomy are associated with a smaller public sector.

The rest of this paper proceeds as follows. Section one reviews and expands on existing theories linking decentralization and the size of government. Section two explains this paper's empirical approach and provides descriptive statistics. Section three provides the results of several regressions for which overall government size is the dependent variable, while section four examines the growth of subnational and central government expenditures separately. The final section concludes.

I. Decentralization and Government Spending

Demand-Side Explanations of Fiscal Scale

A good deal of variation across countries in the size of government can be explained by examining the demands of citizens for public spending, which are to a large extent shaped by demographic and geopolitical factors. For instance, countries with a large portion of the society above or below the working age tend to have larger governments. According to "Wagner's Law," demands for government expenditure increase with per capita income. Alternatively, the distribution of wealth within a country might shape the strength of demands for redistribution (e.g. Meltzer and Richard 1981, Bolton and Roland 1997). An important literature examines the role of international trade and demands for government spending. Cameron (1978) argues that small, open economies have been more likely to develop strong labor movements and left-wing parties, and in turn these political conditions have been conducive to the growth of the public economy. Rodrik (1998) argues that increasing trade and interdependence heighten insecurity, which in turn strengthen demands for public sector risk-sharing.

The Institutional Supply Side

While the demands of citizens for spending are clearly an important part of the story, such demands must be transformed into policy by their governmental agents. This agency relationship is often fraught with difficulties. By no means does governmental policy necessarily represent the ideal point of the median voter. First of all, officials might abuse the natural information asymmetry between rulers and ruled and line their own pockets, leading to a larger public sector than citizens would prefer. This has been the concern of the vast public choice literature on "rent-seeking." Second, a more recent literature assumes that politicians might be primarily interested in reelection rather than rents, and their electoral incentives might lead them to tax and spend more (or less) than the median voter would prefer. Persson and Tabellini (1998) argue that majoritarian—as opposed to proportional—elections increase competition between parties by focusing it in some key marginal districts, which leads to more redistribution and larger government. They also argue that presidential—as opposed to parliamentary—regimes increase competition between politicians, which leads to fewer rents, less redistribution, and smaller government.

Such "supply side" arguments hold constant demands for expenditure—as determined by demographics, trade, etc.—and examine the role of institutional incentives that structure the agency relationship between citizens and politicians. Perhaps the most common thread in these supply-side arguments is the idea that institutions can strengthen or undermine the ability of citizens to discipline government's "natural" tendency towards excess. Institutions can give citizens the information and the authority to identify and discipline shirking among their agents. If we assume that the natural tendency of government is to over-spend, improved oversight should lead to smaller government.

But institutions might affect the size of government in a second way that does not require rent-seeking assumptions about politicians. Institutions might systematically provide politicians with incentives to favor one group over another—rural over urban dwellers, residents of marginal or "swing" districts, the middle class, or perhaps capital over labor. If institutions favor voters

with strong preferences for public goods or redistribution, we might expect these institutions to be associated with larger government.

Decentralization as a Constraint on Leviathan

Variations on both supply-side arguments have been made about fiscal decentralization. First, to the extent that fiscal decentralization brings government "closer to the people" and makes possible a better match between local preferences and local policies, it may enhance the information available to voters about government activities and put them in a better position to sanction poor performance or rent-seeking. However, such an argument requires hefty assumptions about the quality of the local democratic process. Under plausible conditions, decentralization is just as likely to lead to capture by local interest groups and increased corruption (Barhan and Mookherjie 2000; Rodden and Rose-Ackerman, 1997). Moreover, Oates (1985) points out that if decentralization does in fact significantly enhance oversight of government, the demand side may be affected-- voters might actually demand more spending, knowing that less of it will be dissipated in rents.

The most clear and convincing arguments linking decentralization and the size of government have more to do with the constraining effects of mobility and tax competition than improved agency and information. Brennan and Buchanan (1980) made the argument that under decentralization, government's quest for rents and revenue is undermined by the need for jurisdictions to compete with one another for mobile sources of revenue.[1]

Many of the critiques of the Leviathan hypothesis take issue with the cynical assumptions of Virginia-school public choice scholarship about government rent-seeking, and some studies

[1] This argument has recently been extended to explain commitments to the preservation of markets. See, e.g. Weingast (1995).

have concluded-- on the basis of a lacking link between decentralization and spending-- that government should not be conceptualized as a monolithic Leviathan (e.g. Oates 1985). However, assumptions of government malevolence do little of the work in the theoretical link between decentralization and small government. Rather than improving agency, tax decentralization might affect the size of government through the second mechanism mentioned above—it might systematically favor certain interests. If capital is more mobile than labor, fiscal decentralization favors the interests of capital. Among capital owners, decentralization favors owners of more mobile capital.

Consider a country with several jurisdictions, consisting of individuals with high and low moving costs (labor versus capital, land-owners versus renters, farmers versus light manufacturing). Those with high moving costs rely primarily on voice, while those with low moving costs can rely on exit as well in a decentralized multi-jurisdiction setting. Through the democratic process in a centralized system, labor can tax capital, land-owners can tax renters, and farmers can tax manufacturers. Under a decentralized scenario, however, the less mobile within each jurisdiction must compete with those in other jurisdictions for mobile individuals and firms to tax. A move towards tax decentralization limits the extent to which the immobile can tax the mobile. Unless the immobile throughout the country are able to form a cartel and set uniform tax rates on the mobile, the tax burden on owners of less specific assets should fall with fiscal decentralization.

Perhaps decentralization merely entails a shift of the tax burden from capital to labor, or renters to owners. However, after an exogenous shift towards fiscal decentralization, in order to sustain the former level of local public expenditure, the immobile would be forced to pay for a higher share out of their own pockets. If they choose not to lower their tax rates on the mobile, the mobile will exit and the tax burden on the immobile will go up. Having lost the ability to externalize some of the costs of governmental output onto others, they are likely to choose lower levels of public expenditure. Foreseeing this, the immobile may instead choose to respond to

decentralization by lowering tax rates on the mobile. Especially when the relevant distinction is between capital and labor, labor may take this route in order to preserve jobs. In this case also, labor is unlikely to choose to increase the tax burden on itself in order to fully compensate for the lost revenue. If this logic is correct, other things equal, tax decentralization within countries should lead to smaller government.

Decentralization as a Boon for Leviathan

The argument outlined above resonates with theories of globalization and public spending. A familiar story holds that as countries open capital markets and compete for foreign investment, governments will be forced to reduce capital taxation and ultimately, public expenditures. Even if the median (presumably immobile) voter prefers higher expenditures in a world of perceived increasing economic insecurity (Rodrik, 1998; Garrett, 1998), and governments are primarily interested in making voters happy, the constraints of competing for mobile capital may force government expenditures below this ideal point.

There is a very important difference, however, between global tax competition and fiscal decentralization within countries-- the central government. No system of fiscal federalism is anarchic. Even in the most decentralized fiscal systems, like Canada, the United States, and Switzerland, the activities of the central government are interdependent with those of the subnational governments. In more centralized systems, like the United Kingdom or Norway, governments regulate virtually every aspect of local taxation, expenditure, and borrowing. In all systems of fiscal federalism, subnational governments are agents not only of local citizens, but also-- and in some cases much more so-- agents of the central government. In addition to direct regulation, central governments alter the incentives of subnational governments through intergovernmental grants. Although in fiscal federalism textbooks, such grants are made by benevolent central governments in order to internalize externalities, solve coordination problems,

and combat inequality, in practice intergovernmental grants have as much (or more) to do with the strategic political interests of key actors in the central government (Inman 1988, Saiegh & Tommasi 1999, Gibson et al. 1999).

Intergovernmental transfers can undermine the link between fiscal decentralization and smaller government in four ways. First, and perhaps most obvious, grants and revenue-sharing can undermine tax competition. Tax competition is the most compelling theoretical argument linking decentralization and smaller government, and quite simply, governments will not compete if they do not tax, or if fiscal equalization schemes guarantee them a flow of revenue that undermines their incentives to exert tax effort.[2] Grossman (1989) and Grossman and West (1994) see this as cartel-like collusion among subnational governments to avoid tax competition. Although it is difficult to interpret grant programs around the world as collusive agreements between rent-seeking governments, it might make more sense to see revenue-sharing and transfer schemes as attempts by less mobile groups like farmers and laborers to exert voice at the center to avoid the deleterious (for them) effects of tax competition.

Second, contra the arguments above about decentralization and improved information and agency between voters and politicians, decentralization might actually distort information and weaken oversight if funded by intergovernmental grants rather than local tax effort. If local governments are funded primarily by transfers, decentralization muddles rather than clarifies the link between taxes and benefits. The involvement of two or three levels of government in funding, legislating, and implementing the same policies might make it impossibly difficult for voters to identify and punish waste and rent-seeking. Moreover, the center-local agency relationship is fraught with adverse selection problems, since local governments may have

[2] Carreaga and Weingast (2000) refer to this as the "fiscal law of 1 over n." Revenue-sharing programs clearly undermine incentives for fiscal effort among recipient governments in Mexico (ibid.), Germany (Von Hagen and Hepp 2000), India (Bajpai & Sachs 1999), Argentina (Saiegh and Tommasi 1999), and elsewhere.

incentives to exaggerate costs and distort information when reporting to the center in order to receive larger transfers.

Third, in a related matter, grants can also effect the demand side through the well-known common resource dilemma.[3] Grant programs often supply concentrated local benefits that are funded by a common (national) pool of resources. Local voters, local politicians, and regional representatives within the central legislature all receive fiscal or political benefits from grant programs without internalizing their full cost. Compared with expenditures that must be funded locally, they are likely to demand higher levels of grant-funded expenditures, just as a restaurant patron might order a more expensive dish if the bill will be shared equally among her friends. Under a variety of political conditions, the central government may find it difficult to withstand these demands.[4]

This leads directly to a fourth argument—under some conditions, intergovernmental transfers can contribute to the softening of local budget constraints and the creation of an intergovernmental moral hazard problem. If faced with an unexpected fiscal shock, like rising interest rates or falling revenue, local governments might refuse to adjust, keeping expenditures constant by continuing on a dangerous path of borrowing, and ultimately demanding that the central government assume its debts or provide special "bailout" transfers. Such attempts to over-fish the common revenue pool through strategic over-borrowing are much more likely when

[3] The most important reference is Weingast, Shepsle and Johnsen (1981). On intergovernmental grants in particular, see Stein (1999), Rodden (2000), and Winer (1980).

[4] Above all, legislators may face electoral incentives to represent the interests of subnational governments, developing a norm of "universalism," whereby each jurisdiction votes for the projects of the others (Inman & Rubinfeld 1997). On Argentina, see Sanguinetti (1994). Moreover, weak or fragmented coalition governments may find it difficult to withstand demands for increased grants (Rattso 2000). A less political model is presented by Persson and Tabellini (1994), in which subnational governments bribe the central government to provide them with a larger share of common resources.

subnational governments are highly dependent on transfers, above all because creditors and voters are more likely to perceive an implicit bailout guarantee in such systems (Rodden 2000, Stein 1999, Eichengreen and von Hagen 1997). This problem is compounded when the transfers are distributed according to discretionary rather than rule-based criterea. Such intergovernmental gaming can lead to larger government whether or not the center ultimately comes through with the bailout.

Two Hypotheses

Depending on the precise nature of political and fiscal incentive structures, the decentralization of expenditures might lead either to a smaller or a larger public sector. The "Leviathan" hypothesis should hold if a shift towards greater subnational expenditure is accompanied by a shift towards greater local revenue autonomy. More precisely, decentralization should only lead to smaller government if it facilitates intergovernmental tax competition. On the other hand, the "common pool" hypothesis holds that if decentralization is funded by intergovernmental transfers or revenue-sharing schemes, it will be associated with a larger public sector.

II. Empirical Approach

In the first paper to use cross-national evidence to assess the Leviathan hypothesis, the measures of decentralization were quite simple—subnational revenue and expenditure shares of the total public sector (Oates 1985). While Oates found no significant relationship, more recent work by Ernesto Stein and his associates finds a significant positive relationship between decentralization (measured in a similar way) and the size of government (IADB 1997, Stein 1999). The Stein (1999) study introduces intergovernmental grants and the common resource

problem, finding that, consistent with the "common pool" hypothesis, this relationship is compounded by dependence on intergovernmental transfers. Moreover, the Stein study demonstrates the advantage of using a small data set with cross-section averages; it allows one to focus on specific aspects of the intergovernmental system-- like the procedures through which grants are formulated and distributed-- that might help shed further light on the common resource problem.

However, this empirical approach does not allow for the possibility that the relationship between decentralization and government spending might be reversed in those countries where decentralized spending is funded primarily by local taxes. In other words, it only tests a version of the common pool hypothesis and ignores the Leviathan hypothesis. As made clear by the discussion above, the Leviathan and common resource hypotheses are not mutually exclusive. Thus in the analysis that follows, I include separate measures of decentralization funded by grants and "own-source" local revenue.

Perhaps the most serious disadvantage of previous empirical approaches has been the exclusive reliance on cross-section rather than diachronic variation. A more convincing test of the relevant hypotheses would examine whether within-country changes in the nature of fiscal decentralization might speed, retard, or perhaps even reverse, the growth of the public sector. The importance of contrasting levels and changes is underscored by related work on trade, capital mobility, and government spending; Garrett (2000) finds that the effects of trade and capital mobility on government spending are opposite depending on whether one examines levels or changes.

Thus in the analysis that follows, I use a data set composed of yearly observations from the period from 1978-1997 for 62 countries—all of the countries and years for which data are

available.[5] The panel specification is important because some of the variables of interest have changed considerably in the past twenty years, and decentralization and the growth of government are clearly dynamic rather than static phenomena. The standard approach in political science for this kind of data is to use OLS with panel-corrected standard errors (Beck and Katz 1995) and include a lagged dependent variable and country dummies to account for time-series and cross-national variations that should not be attributed to the independent variables. However, the presence of a lagged dependent variable can bias the fixed-effects OLS estimator even if the error term is not correlated over time. In panels where the time series dimension is long, this bias may not be very severe. The data set used in this paper includes a reasonable number of years (17 years for most countries). However, in order to include as many countries as possible (including some in Sub-Saharan Africa and Central and Eastern Europe, for whom data were available only for shorter periods) the panels are unbalanced and include a small number of years for some countries. In order to avoid the potential bias associated with the Beck-Katz approach, I use the GMM estimator derived by Arellano and Bond (1991). This approach relies on the use of first-differences to remove the fixed effects part of the error term and instrumental variable estimation, where the instruments are the lagged explanatory variables (in differences) and the lagged dependent variable.[6] As recommended by Arellano and Bond (1991) one-step results are presented and used for inference on coefficients.

Dependent Variables

[5] In the results presented below, fewer observations are reported because of limited data coverage for some key control variables.

[6] This approach was first suggested by Anderson and Hsiao (1981) and developed further by Arellano and Bond (1991). For an overview, see Baltagi (1995), chapter 8.

In the section that follows, the dependent variable for most regressions is a measure of total public sector expenditure as a percent of GDP. This is calculated for each country-year by taking the sum of expenditures of the central, state, and local governments from the IMF *Government Finance Statistics* (hereafter GFS)[7] and dividing by GDP (from the IMF's *International Finance Statistics*).[8] I also examine a smaller set of federal countries for which I rely on country sources rather than the GFS. For these, the dependent variable includes only the states and not the local/municipal sector. In section four, I conduct separate analyses of trends in the expenditures of central and subnational governments respectively (as shares of GDP).

Main Independent Variables

For the purposes of this paper, subnational revenue can be broken down into roughly two types:

- Grants: Revenue that is raised by a higher-level government and transferred to lower-level governments
- Own-source subnational: Revenue that is raised and retained by lower-level governments themselves

Fiscal decentralization can be funded by an increase in either or both of these. While critically important, this distinction is often difficult to make in practice. Fortunately, the *GFS* distinguishes between "grants" and various forms of own-source subnational revenue (local taxes, user fees,

[7] In order to avoid double-counting intergovernmental transfers (in the expenditures of the center and the subnational governments), grants are subtracted out.

[8] Surprisingly, all of the existing papers on globalization and the size of the public sector only measure central government spending (e.g. Rodrik 1998, Garrett 2000, Quinn 1997). These data are virtually identical to the *central government* data reported in this paper. These studies severely underestimate the size of the public sector in the United States, Canada, Switzerland, and several other highly decentralized countries.

interest income, etc.). However, the residual category of "non-grant" revenue is not necessarily an ideal proxy for own-source local revenue, since it fails to distinguish between tax revenues that are legislated and collected locally, and those that accrue to the subnational governments automatically through revenue-sharing schemes. As a result, "own-source" revenue measured with the *GFS* may not be ideal for a cross-country analysis of public spending, since it does not fully capture the directness of the tax-benefit link or the likelihood of tax competition, both of which may be undermined by revenue-sharing programs.

Nevertheless, these data may be quite valuable for the analysis of changes over time within countries. The *GFS* classification "grants" refers to explicit intergovernmental transfers that appear in the yearly budget, but exclude recurring automatic distributions of shared taxes. Thus the grants reported by the *GFS* reflect the subnational revenue flows that are most subject to central government discretion. As the discussion above pointed out, discretionary transfers are most likely to create a common resource dilemma. Hence grants, taken as a percent of total public sector revenue, are a useful source of variation over time within countries to test the "common pool" hypothesis. The prediction is that as intergovernmental grants grow as a share of total public sector revenue, total government spending will grow more quickly. By including "own-source" local revenue in the same regression, it is possible to address the Leviathan hypothesis as well while controlling for the incentive effects of grants. The prediction is that as own-source revenue grows as a share of public sector revenue, government will grow less quickly or even contract.

Interaction Variables

One important conclusion of the discussion in section two above is that a link between fiscal decentralization and smaller government depends on wide-ranging subnational autonomy over revenue. While the "own-source local revenue" variable derived from the GFS is a good

start (and the only available cross-national time series data) it may overestimate local revenue autonomy in some cases. For this reason, I have collected additional data that might help pinpoint the cases in which subnational tax competition is most plausible.

A recent report published by the OECD is the first systematic cross-national examination of subnational tax autonomy. Although it only covers 19 OECD countries, it contains valuable information, from which I calculate a variable, "tax autonomy"-- the share of total tax revenue for which subnational governments not only collect revenue, but also set the base and rate themselves. The OECD study reveals that some local government sectors, like the Danish municipalities and counties-- although they raise a good deal of revenue-- set neither the rate nor the base themselves. Thus the value of this variable for Denmark is zero. At the other end of the spectrum, 30% of tax revenue in Canada is legislated and collected by the provinces and local governments. Tax competition, and hence the Leviathan hypothesis, is much more plausible in countries like the United States and Canada than in countries like Denmark. Thus the OECD data are used to estimate separate effects of "own-source revenue" in countries where tax competition is most plausible, and those in which it is less likely.

Second, tax competition might be most plausible in countries with formally federal constitutions. Even without the aid of a good worldwide data set, it is clear that the only subnational entities that issue broad-based taxes (setting the rate and base themselves) are states and provinces within federations. Subnational taxing authority in unitary systems is more often limited to property and consumption taxes, while subnational units in federal systems are more likely to tax mobile capital. Thus it is plausible that "own-source" decentralization has a stronger constraining effect on government spending in federal systems. Moreover, the institutional protections bestowed on regional governments by federal constitutions often constrain the federal government's ability to directly regulate subnational fiscal decisions, which in many cases affords subnational governments a wider realm of fiscal autonomy (Rodden 2000). In addition, subnational spending and taxation are simply much greater in federal systems. Table One shows

that as a share of total government revenue, decentralized revenues—whether funded by grants or own sources—are much larger in federal than in unitary systems.

Although scholars may quibble about the precise criteria that distinguish federal and unitary systems, a consensus is emerging among political scientists that political (as opposed to fiscal) federalism is characterized by a mixture of autonomy in some policy areas, constitutional protections, and special legislative representation for regional governments.[9] The cases coded as "federal" in this analysis include Argentina, Australia, Austria, Brazil, Canada, Germany, India, Malaysia, Mexico, Nigeria (early 1990s), Spain (since 1986), Switzerland, and the United States.[10] In the empirical analysis below, separate effects are estimated for federal and unitary systems.

[TABLE 1 ABOUT HERE]

Control Variables

In addition the lagged level of the dependent variable, I include a battery of control variables. The descriptive statistics are presented in Table 2. First, I include several variables that might affect the demand for public expenditures. In order to take account of government attempts to smooth tax rates over time or conduct counter-cyclical policy, I include the natural log

[9] Many of the recent studies (e.g. Triesman 2000, Wibbels 2000) draw on the definitions of Riker (1964) and Lijphart (1984), and the classifications of Elazar (1995).

[10] This coding is essentially identical to that of Elazar (1995) and Triesman (2000, 2001). Belgium and Colombia are not coded as federal in the late 1990s because the GFS data do not yet include the regional governments. No suitable subnational data were available for Venezuela, Russia, Pakistan, Papua New Guinea, and the various Pacific Island federations. Perhaps the only controversial cases coded as federal are Malaysia and Nigeria. Dropping these cases or coding them as unitary does not affect any of the results presented below.

of real GDP per capita (PPP, international dollars).[11] Demands for welfare spending might be driven by demographics, so I include the natural log of population and the "dependency ratio"—the portion of the society above or below the working age.[12]

Fourth, I control for the Rodrik (1998) and Garrett (2000) arguments about trade and capital account openness. I use trade/GDP ratios to capture the international integration of national goods and services markets. In addition, capital account openness is a dummy variable from the IMF's *annual Exchange Arrangements and Exchange Restrictions* describing whether countries impose significant restrictions on capital account transactions (coded as "0") or not ("1" = open). This is a simple way to measure international capital mobility that is available for all IMF members on an annual basis. Next, I control for the debt of the central government, since this may affect government expenditures through interest payments.

In addition, I include three variables from the institutional supply side. Demands for redistribution may be harder to ignore in more democratic countries, but on the other hand, it is plausible that citizens have better control over rent-seeking politicians in democracies. To deal with these possibilities, I include Gurr's 20-point scale of democracy (taken from the *Polity 98* Data Set). In addition, there is a large literature linking divided government (in presidential systems) and fragmented governing coalitions (in parliamentary systems) to "wars of attrition" (Alesina and Drazen 1998) and budget deficits (e.g. Roubini and Sachs 1989, Alt and Lowry 1994). The implications of such political fragmentation for fiscal scale are less clear, but it seems plausible that "wars of attrition" create a status quo bias in expenditures, which warrants the inclusion of a control variable. An impressive new measure of executive and legislative fragmentation that bridges the parliamentary-presidential divide by incorporating both institutional and partisan veto players is included in the World Bank's *Database of Political Institutions.*[13] Finally, to control for the possibility of electoral spending cycles, I include a

[11] Taken from the World Bank's *World Development Indicators* (henceforth WDI).

dummy variable for election years, also taken from the *DPI*. Finally, I include a matrix of time dummies based on 5-year periods.[14]

The dynamic panel data technique employed in this paper obviates the need to control for factors like region, ethnic fractionalization (Easterly and Levine 1997), or presidential versus parliamentary regimes (Persson and Tabellini 1998) that might affect cross-national variation in public spending but do not change over time within countries. However, for the sake of comparison with earlier work relying on cross-country averages, I estimate a "between effects" model on cross-section averages that does include these additional controls.[15] Table 2 presents descriptive statistics for all variables.

[TABLE 2 ABOUT HERE]

III. Main Results

[12] Taken from WDI.

[13] The variable, called "Checks2a" is the sum of 1 for the president and 1 for each legislative chamber in presidential systems. Legislative chambers are not counted if elections are non-competitive, or if list PR is used and the president controls more than 50 percent of the body. For parliamentary systems, it is the sum of 1 for the Prime minister and 1 for each coalition party. The number is reduced by 1 if closed lists are used and the PM is in the coalition. For non-competitive elections, the number of coalition parties is reduced to zero. Finally, the index is augmented by 1 for every veto player whose left-right orientation is closer to the opposition's than to the average of the rest of the government.

[14] All of the models presented below were also estimated with a full matrix of year dummies, but these were never jointly significant, nor did they affect the substance of significance of the results.

[15] The ethnic fractionalization data, originally published in the *Atlas Narodov Mira* (1964) and taken from Taylor and Hudson (1972), unfortunately do not vary over time even though fractionalization clearly does. The executive-legislature variable is taken from the *Database of Political Institutions* (0 for presidential systems, 1 for systems with an assembly-elected president, and 2 for parliamentary systems). The regional dummies are as defined by the World Bank.

This section presents five sets of results. First, it present the results of the basic model including all of the variables discussed above, and second, a between-effects model for comparison with existing empirical work. Third, using a smaller data set, it explores whether the effect of "own-source subnational revenue" on government size is mediated by subnational tax autonomy. Fourth, it presents the results of an estimation including separate effects for federal and unitary systems. Finally, it checks the robustness of these results by examining only federal systems using different data to distinguish between own-source revenue and a more broad definition of grants that includes revenue-sharing schemes.

The Basic Model

[TABLE 3 ABOUT HERE]

The results of the basic model are displayed in Table 3. The one-step model performs quite well. A Wald test of the null that all of the coefficients except the constant are zero is soundly rejected. A Sargan test of over-identifying restrictions cannot reject the null hypothesis that the over-identifying restrictions are valid. The presence of first-order autocorrelation in the differenced residuals does *not* imply that the estimates are inconsistent, though the presence of second-order autocorrelation *would* imply this (Arellano and Bond 1991).[16] An Arellano-Bond test soundly rejects the null of no first-order autocorrelation in the differenced residuals, but it is not possible to reject the null of no second-order autocorrelation.

[16] The model is estimated using Stata 7, xtabond procedure. In all of the regressions using dynamic panel data analysis, results of the one-step homoskedastic estimator are reported since these are the most appropriate for inference on coefficients. For further inference on model specification, however, it is useful to estimate the same model with the one-step robust and two-

The first thing to note about the regression estimates is that patterns of government spending were fairly sticky over time-- the coefficient on the lagged dependent variable was around .4 and highly statistically significant. Most of the control variables attain statistical significance. The negative coefficient on the log of GDP per capita may be indicative of counter-cyclical spending.[17] Population growth has a negative effect on government's share of the economy. Surprisingly, increases in a country's dependency ratio are not associated with larger government. Although the coefficient for the trade variable is not statistically significant, the results do suggest that the public sector gets larger as countries open up their capital accounts.[18] Additionally, central government debt does have the expected positive effect on expenditures.[19] It is interesting to note that the "veto player" variable has a significant negative effect on expenditures. That is, during periods with more and/or more polarized veto players, government spending is lower as a share of GDP.

[TABLE 4 ABOUT HERE]

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step estimators. For all of the models presented in this paper, these results are similar to those presented in the tables, and are available from the author upon request.

[17] Since GDP is the denominator in the dependent variable, this result may simply indicate that when growth rates are high, government spending does not keep pace with the growth of the private economy.

[18] This may be worthy of further study, since it seems to contradict the conventional wisdom.

[19] Note that these results are obtained from 366 observations of 45 countries, while the full data set contains 565 observations from 53 countries. The main reason for the discrepancy is poor coverage of an important control variable—central government debt. Since this variable is highly significant in every estimation, I present results of models that include it, even though this sacrifices many observations. Dropping the debt variable does not change the main results discussed below.

For the purpose of comparison with other studies, Table 4 presents results of a between-effects OLS model of cross-section averages. In this simple model driven purely by long-term cross-sectional variation, trade indeed has a significant positive effect on government expenditure as in Rodrik (1998), and capital accounts openness does not. And as shown by Easterly and Levine (1997), governments in ethnically fractious countries spend a relatively smaller portion of GDP than those in more homogeneous countries. This model also provides weak evidence that, on average, democracies spend more than non-democracies. No evidence is found here in favor of the Persson/Tabbelini argument that presidential regimes spend less than pariliamentary regimes.

Moving on to the main findings, the most striking result in Table 3 is the large, significant, positive coefficient for grants as a percent of total government revenue. This result provides strong support for the common pool hypothesis—the heavier the reliance on intergovernmental grants to fund government expenditure, the higher the overall expenditure level. A one percent shift towards grants as a share of total public revenue is associated with a .24% increase in the size of government as a share of GDP.

The model appears to provide strong initial support for the Leviathan hypothesis as well. The heavier the reliance on own-source local revenue to fund government expenditure, the lower the overall expenditure level. In other words, as countries shift from centralized to subnational taxation, the size of the public sector decreases. Substantively, a one percent increase in subnational own-source revenue (as a share of total revenue) is associated with a .29% decrease in the overall size of government.

These results are quite resilient when control variables are added or excluded, and they are unaffected by the case-wise deletion of countries. The results are also quite similar when a full set of year dummies is included, but the year dummies do not approach statistical

significance. Virtually identical results are also obtained using the Beck-Katz OLS approach with panel-corrected standard errors, a lagged dependent variable, and country fixed effects.[20]

Note that in a comparison of Tables 3 and 4, results driven by time-series variation and those driven by cross-sectional variation are dramatically different. Table 4 presents two cross-section OLS models: model 2 mirrors model 1 and differentiates between grants and own-source revenue, and model 3 directly replicates the original Oates (1985) study (including some additional control variables and broadening the sample) along with that of Stein (1999). The findings presented in Table 4 are in accord with these previous studies that conclude from *cross-section* data that decentralization is associated with larger government. This merely underscores the importance of using panel data and exploring changes rather than levels. Over time within countries, decentralization funded by grants indeed leads to larger government. On the other hand, it appears that decentralization within countries, when funded by own-source subnational revenue, if anything leads to smaller government.

Interactions

Given the caveats above about the problems with the classification of "own-source" revenue, however, the latter finding should be approached with caution. It could be the case that a shift towards greater "own-source" revenue merely reflects an increase in the subnational allocation in revenue-sharing schemes. This would not reflect the kind of tax decentralization required for the Leviathan hypothesis. Thus it is useful to break the data down into subsets to examine which cases might be driving the negative coefficient on the "own-source subnational revenue" variable.

[20] The same is true for all of the additional results presented below. All of these results are available from the author upon request.

First, I consider the "subnational tax autonomy" variable I have created from the recent OECD study. If the findings above reflect anything like the tax competition hypothesis, the negative relationship between "own-source" subnational revenue and government size should be driven primarily by cases in which subnational governments have wide-ranging tax autonomy. To examine this, I divide the countries for which data were available (most of the OECD countries) into two groups—those falling above and below the 50th percentile value of "subnational tax autonomy"—and estimate separate effects for each group in the same model.[21] Given the limited coverage of the data, this allows for only 18 countries and 146 total observations.

[TABLE 5 ABOUT HERE]

In spite of the small number of observations, the results, reported in Table 5 (model 4), confirm these expectations.[22] While increased grants remain positively correlated with government spending in both types of systems, increased own-source revenue has a negative effect on spending in systems with substantial tax autonomy, and a positive effect in systems without such autonomy. In countries like Denmark, where subnational governments do not set the local tax base and rate themselves, an increase in the "own-source" variable calculated from the GFS does not truly capture an increase in local taxation as a percent of the total public sector,

[21] The median country is Norway, with .0044 of total tax revenue collected and legislated by the subnational governments. As explained above, several cases receive a "zero," and because the United States, Canada, and Switzerland are much more decentralized than the rest of the cases, the mean is much higher than the median. Although similar results can be obtained by using a multiplicative interaction term, it is most straightforward simply to present separate effects for high and low values.

[22] The results of tests for over-identifying restrictions and autocorrelation in the differenced residuals for models 4 and 5 are similar to those discussed above for Model 1.

and hence should not be expected to add new constraints on the taxation of mobile capital. In such countries, "grants" and "own-source" revenue are rather similar, and both have a roughly similar positive effect on total expenditures. At the other end of the spectrum, in countries like Switzerland and the United States, the "own-source" variable does indeed primarily reflect local taxation. In these countries, a one percent increase in the subnational governments' own-source share of total revenue is associated with a striking .45% *decrease* in the size of government.

Additionally, section three made the related suggestion that the tax competition hypothesis might be more plausible in federal than unitary countries. Table Four (model 5) displays the results of a model that estimates separate effects for federal and unitary systems, returning to the larger sample. Indeed, the negative relationship between "own-source" local revenue and total expenditure appears to be driven by the federal systems in the sample. While no significant relationship was found in unitary systems, in federal systems a one percent shift towards "own-source" subnational revenue is associated with roughly a half-percent decrease in the size of government. Likewise, the relationship between increased dependence on intergovernmental transfers and higher spending appears to be more pronounced in *unitary* systems.[23]

Robustness Check: A Smaller Sample of Federations

The findings thus far are encouraging to the Leviathan hypothesis, especially in formal federations. The federations in the sample also present an opportunity to improve confidence in the results. Since federal countries generally publish detailed yearly reports on transfer programs, they provide an opportunity to move beyond the problem with the classification of revenue-

[23] One should not conclude from the lack of a significant "grants" coefficient for federations in model 5 that the "common pool" hypothesis can be rejected in federations. This variable is positive and significant if some very slight modifications are made to the coding of federalism.

sharing programs in the GFS data. For the federal countries in the data set, the GFS "grants" data are checked against country sources and direct country data are substituted when revenue-sharing programs create discrepancies (See data appendix).[24] The requisite country sources were unavailable for Nigeria and Malaysia, so the smaller sample of federations includes 10 countries. Table 1 displays descriptive statistics from the larger data set (broken down into federal and unitary systems) and the smaller data set that only includes federations. Note that the smaller federal data set does not include data for local or municipal governments. Rather, it focuses exclusively on the states or provinces, for which reliable yearly data on intergovernmental transfers and own-source revenue were available. This produces a data set with a less expansive (and more accurate) definition of local revenue autonomy for the states than that based on the GFS. The same basic model is then estimated using this new variable for the smaller sample of federal cases. Since the local governments are not included in the calculation of the main independent variables, I do not include them in the calculation of the dependent variable. Thus the dependent variable here is combined central-state expenditure as a share of GDP.[25]

The results are reported in Table 6.[26] In this estimation, the coefficient for the "grants" variable is not significantly different from zero. This is not surprising, since in this data set "grants" include a larger component of predictable, non-discretionary revenue-sharing transfers. The exclusion of local governments also appears to be important. The "grants" variable is

[24] For cases without certain kinds of revenue-sharing programs, the GFS data and government data are virtually identical. For countries like Mexico and Germany, however, they are radically different. For the sample of federations, the simple correlation between a measure of grants/provincial revenue and the measure based on country sources (coding revenue shares as grants) is .46.

[25] The results are similar if the local governments are included in the calculation of the dependent variable.

[26] Again, tests for over-identifying restrictions and autocorrelation yield acceptable results.

significant and positive for the same sample if the more discretionary GFS measure is used and local governments are included.

However, the negative coefficient for "own-source" state revenue is highly significant, and roughly similar in magnitude to the "own-source" coefficient for federations in model 5 (Table 4). Once again, using a different and hopefully more accurate proxy for local revenue autonomy for a smaller group of federations, it appears that decentralization, when funded by increased local taxation, puts downward pressure on the growth of the public sector.

[TABLE 6 ABOUT HERE]

IV. Grants and the Growth of Government: Disaggregated Analysis

The previous section showed that in a large sample, increased intergovernmental grants are associated with larger government, and at least in federal systems with high levels of tax autonomy, increased reliance on subnational taxes appears to slow the growth of government. Thus far it is unclear, however, whether these shifts affect expenditures at the subnational level, the central level, or both. This section returns to the large GFS sample and examines central and subnational expenditures separately. In these models, rather than examining grants and "own-source" local revenues as portions of total revenues as before, they are entered as shares of GDP in order to facilitate direct comparisons of the stimulative effects of increases in grants and own-source local revenues on expenditures at each level.

This allows for some insight into the "flypaper effect" using cross-national data. Although economists disagree about the explanation, a number of empirical studies—most of them using data from state and local governments in the United States—have found that the stimulative effect of intergovernmental grants is much more than the marginal propensity of local

governments to spend out of income.[27] For U.S. states this propensity is around 5-10 cents on the dollar, yet for unrestricted block grants, virtually an entire dollar of extra "income" provided through new grants is spent. The result was dubbed the "flypaper effect," since the money distributed through intergovernmental transfers "sticks where it hits."

The first column of Table 7 (model 7) displays the results of a model that directly compares the stimulative effect of increased subnational own-source revenues and increased grants (both as shares of GDP) on subnational expenditure shares of GDP. Of course both coefficients should be positive and significant, and they are. It is more interesting to note that increased grants have a much larger stimulative effect on local spending than do increased "own-source" revenues. (A Wald test confirms the significance of the difference in coefficients). In fact, the coefficient for grants is greater than one. A one percent increase in grants over the previous year is associated with a 1.07 percent increase in expenditures. Even though we have no information about whether the grants under analysis are primarily general- or specific-purpose, matching or non-matching, money from intergovernmental grants indeed seems to "stick where it hits" in intergovernmental systems around the world.

The next column (model 8) reveals that increased grants are associated with large expenditure increases at the central level as well. Note that the grants themselves have not been removed from the dependent variable, so it would not be surprising if the coefficient were unity (a 1 percent increase in grants would be associated with a corresponding 1 percent increase in central expenditures). However, the coefficient is 1.67, which suggests that a one percent (of GDP) increase in budgetary intergovernmental grants is associated with a 1.67% (of GDP) increase in total central government expenditures. Increases in grants are not offset by reductions in direct central government spending. On the contrary, central governments appear to increase

[27] For a literature review, see Hines and Thaler (1995).

(decrease) both kinds of expenditure at the same time. Changes in *own-source* subnational revenue, on the other hand, have no significant effect on central government expenditures.

[TABLE 7 ABOUT HERE]

Increases in grants are associated with expenditure increases at *both* central and subnational levels. The results of model 9 (Table 7) show that for the public sector as a whole, increases in grants stimulate more than twice as much additional spending as increases in own-source subnational revenues. Taken together, these results show that the growth of intergovernmental transfers has been an important factor in the growth of the public sector over the last 20 years. Some case studies (Winer 1980, Grossman and West 1994, Rattso 2000) have demonstrated this relationship within countries. But section three also showed that no such relationship can be found across countries using cross-section averages. In other words, more transfer-dependent public sectors are not necessarily larger. However, the questions motivating this analysis have to do with changes rather than levels, and these results show that public spending has grown fastest in countries that have increased their reliance on intergovernmental transfers the most.

V. Conclusion

Two arguments about decentralization within countries have been presented and tested in this paper. First, the "common pool" argument suggests that when decentralization is funded by grants, the tax-benefit link is broken, which increases fiscal illusion and undermines accountability, giving politicians incentives to "overfish" the common pool of public revenue. Analysis of a large panel of countries over time shows that as intergovernmental grants make up a larger portion of public finance, the public sector grows more rapidly. The growth of

intergovernmental transfers appears to be an important untold part of the story of the growth of government. The fastest-growing public sectors over the past 20 years have been those in which grants—as a portion of total revenue—have grown the fastest. Importantly, rising intergovernmental grants lead to higher spending both at the central and subnational levels. More specific future studies might build on these findings by examining the incentive effects of different kinds of intergovernmental transfers. More broadly, the political determinates of reliance on intergovernmental transfers deserve more careful theoretical and comparative empirical analysis, as does the "flypaper" effect itself.

Second, this paper updates the Leviathan hypothesis and provides a more appropriate test than previous cross-national studies. A modified version of the Brennan/Buchanan argument drops rent-seeking assumptions about public officials and posits that as countries devolve tax authority to subnational governments, owners of relatively immobile assets will lose their ability to tax more mobile asset owners. Assuming that the immobile will not be willing to completely offset the lost revenue out of their own pockets, government spending should fall. Such an argument cannot be tested with cross-country averages, but only by exploring dynamics within countries over time. Moreover, decentralization should only be linked with smaller government when subnational governments gain new authority to tax mobile capital. Analysis of the available cross-national data lends support to this hypothesis. Controlling for the effects of changes in intergovernmental grants, the growth of government declines as countries devolve more taxing authority to subnational governments, especially in federal systems. When the data set is limited to a smaller set of OECD countries for which better "tax autonomy" data are available, it becomes clear that, as expected, the negative relationship between revenue decentralization and smaller government is driven by the countries with the most substantial subnational tax autonomy. Future comparative work might build on these findings by examining further the incentive effects of different forms of local taxation and user fees, and studying the political and historical determinates of subnational revenue autonomy.

This paper helps explain why the empirical debate about the "the search for Leviathan" has not been resolved. Evidence of a relationship between decentralization and lower spending has been found in time-series studies of the United States and Canada, but not in cross-national studies. This paper suggests that such evidence is most likely to be found by examining (de)centralization over time, and by examining countries—the United States, Canada, and Switzerland are perhaps the prime examples—in which subnational governments have significant autonomous authority to tax mobile capital. In short, whether or not one "finds" Leviathan depends on where—and how—one searches.

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Table 1: Descriptive Statistics, Comparison of Fiscal Variables for Federal and Unitary Systems

		Mean	Std. Dev.	Min	Max
Full Data Set (GFS)					
Grants/Total Govt. Rev.	*Federal*	0.157	0.107	0.002	0.622
	Unitary	0.084	0.082	0.0001	0.419
Own-Source State-Local Revenue/Total Govt. Revenue	*Federal*	0.303	0.118	0.049	0.546
	Unitary	0.111	0.089	0.006	0.370
Federations (Country Sources)					
Grants/(State+Central Rev.)		0.128	0.066	0.002	0.254
Own-Source State-Local Revenue/(State+Central Rev.)		0.130	0.096	0.001	0.381

Table 2: Descriptive Statistics

	Mean	Std. Dev.	Min	Max
Dependent Variable				
Total Expenditure as % of GDP	0.388	0.152	0.053	1.024
Independent Variables				
Grants as % of Total Govt. Revenue	0.102	0.094	0.0001	0.622
"Own-Source" State-Local Revenue as % of Total Govt. Revenue	0.161	0.129	0.006	0.546
Interaction Variables				
Tax Autonomy	0.041	0.080	0	0.299
Federalism	0.257	0.437	0	1
Control Variables				
GDP Per Capita (log)	8.935	0.916	6.205	10.305
Population (log)	16.424	1.608	12.363	20.685
Dependency Ratio	0.645	0.166	0.438	1.150
Trade as % of GDP	0.672	0.388	8.959	2.086
Capital Account Openness	0.352	0.478	0	1
Central Government Debt/GDP	0.439	0.450	0.443	4.473
Democracy	5.155	6.427	-10	10
Veto Players	2.768	1.678	0	15
Election Year	0.071	0.257	0	1

Table 3: Determinates of Fiscal Scale, Basic Model

	Model 1	
Dependent Variable		
Δ Total Expenditure as % of GDP		
Independent Variables		
Δ Grants as % of Total Govt. Revenue	0.239	***
	(0.089)	
Δ "Own-Source" State-Local Revenue as % of Total Govt. Revenue	-0.287	***
	(0.092)	
Control Variables		
Δ GDP Per Capita (log)	-0.068	***
	(0.021)	
Δ Population (log)	-0.200	***
	(0.071)	
Δ Dependency Ratio	-0.163	*
	(0.094)	
Δ Trade as % of GDP	0.040	
	(0.030)	
Capital Account Openness	0.018	**
	(0.009)	
Δ Central Government Debt/GDP	0.090	***
	(0.010)	
Δ Democracy	-0.0008	
	(0.001)	
Δ Veto Players	-0.004	**
	(0.002)	
Election Year	0.004	
	(0.006)	
Lagged Total Exp./GDP	0.369	***
	(0.047)	
Constant	0.002	
	(0.001)	
Observations	366	
Number of countries	45	
Wald chi2(14)	867.22	***

Standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%
Arellano-Bond dynamic panel data estimates
Coefficients for year dummies not shown

Table 4: Determinates of Fiscal Scale, Between-Country Effects (Cross-Section Averages)

	Model 2		Model 3	
Dependent Variable				
Total Expenditure as % of GDP				
Independent Variables				
Grants as % of Total Govt. Revenue	-0.059			
	(0.194)			
"Own-Source" State-Local Revenue as % of Total Govt. Revenue	0.390	***		
	(0.134)			
Total State-Local Revenue as % of Total Govt. Revenue			0.244	***
			(0.116)	
Control Variables				
GDP Per Capita (log)	0.023		0.026	
	(0.032)		(0.030)	
Population (log)	0.021	*	0.013	
	(0.011)		(0.011)	
Dependency Ratio	0.060		0.057	
	(0.130)		(0.128)	
Trade as % of GDP	0.148	**	0.121	*
	(0.059)		(0.060)	
Capital Account Openness	0.023		0.031	
	(0.034)		(0.034)	
Central Government Debt/GDP	0.139	***	0.127	***
	(0.034)		(0.034)	
Democracy	0.006	*	0.004	
	(0.003)		(0.003)	
Veto Players	0.001		0.001	
	(0.011)		(0.011)	
Ethnic Fractionalization	-0.002	***	-0.002	***
	(0.001)		(0.001)	
Presidentialism	0.002		-0.002	
	(0.022)		(0.022)	
Constant	-0.388		-0.269	
	(0.397)		(0.389)	
Observations	385		395	
Number of countries	43		45	
R-squared	0.89		0.87	

Standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%
OLS regressions on cross-section averages, entire period
Coefficients for region dummies not shown

Table 5: Determinates of Fiscal Scale, Interactions

	Model 4	Model 5
Dependent Variable		
Δ Total Expenditure as % of GDP		
Independent Variables		
Δ Grants as % of Total Govt. Revenue		
High Tax Autonomy	0.504 **	
	(0.205)	
Low Tax Autonomy	0.676 ***	
	(0.171)	
Federal		0.124
		(0.219)
Unitary		0.285 **
		(0.132)
Δ "Own-Source" State-Local Revenue as % of Total Govt. Revenue		
High Tax Autonomy	-0.451 ***	
	(0.172)	
Low Tax Autonomy	0.598 ***	
	(0.178)	
Federal		-0.524 **
		(0.225)
Unitary		-0.234
		(0.166)
Control Variables		
Δ GDP Per Capita (log)	-0.147 ***	-0.077 **
	(0.035)	(0.034)
Δ Population (log)	0.228 *	-0.216
	(0.118)	(0.141)
Δ Dependency Ratio	0.317 ***	-0.201
	(0.117)	(0.190)
Δ Trade as % of GDP	-0.018	0.043
	(0.039)	(0.056)
Capital Account Openness	0.039 ***	0.017
	(0.008)	(0.017)
Δ Central Government Debt/GDP	-0.003	0.092 ***
	(0.023)	(0.008)
Δ Democracy	-0.009 *	-0.001
	(0.005)	(0.001)
Δ Veto Players	-0.007 **	-0.004 **
	(0.003)	(0.002)
Election Year	0.006	0.004
	(0.007)	(0.006)
Lagged Total Exp./GDP	0.505 ***	0.368 ***
	(0.059)	(0.101)
Constant	-0.002	0.001
	(0.001)	(0.002)
Observations	146	366
Number of countries	18	45
Wald chi2(16)	658.65 ***	1466.7 ***

Standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%
Arellano-Bond dynamic panel data estimates
Coefficients for year dummies not shown

Table 6: Determinates of Fiscal Scale, Basic Model, Smaller Sample of Federations

	Model 6	
Dependent Variable		
Δ Central+State Expend. as % of GDP		
Independent Variables		
Δ Grants as % of Central+State Govt. Revenue	-0.072	
	(0.095)	
Δ "Own-Source" State Revenue as % of Central+State Govt. Revenue	-0.465	***
	(0.140)	
Control Variables		
Δ GDP Per Capita (log)	0.070	**
	(0.031)	
Δ Population (log)	-0.206	**
	(0.089)	
Δ Dependency Ratio	-0.105	**
	(0.042)	
Δ Trade as % of GDP	-0.002	***
	(0.001)	
Capital Account Openness	0.027	***
	(0.008)	
Δ Central Government Debt/GDP	0.093	**
	(0.038)	
Δ Democracy	-0.004	
	(0.004)	
Δ Veto Players	-0.002	
	(0.002)	
Election Year	0.006	
	(0.007)	
Lagged Central+State Exp./GDP	0.500	***
	(0.055)	
Constant	0.004	**
	(0.002)	
Observations	96	
Number of countries	10	
Wald chi2(14)	494.45	***

Standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%
Arellano-Bond dynamic panel data estimates
Coefficients for year dummies not shown

Table 7: Determinates of Fiscal Scale, Disaggregated Analysis

	Model 7	Model 8	Model 9
Dependent Variable:	*Δ Subnational Expend. as % of GDP*	*Δ Central Expend. as % of GDP*	*Δ Total Expend. as % of GDP*
Independent Variables			
Δ Grants as % of GDP	1.074 ***	1.670 ***	1.793 ***
	(0.052)	(0.231)	(0.237)
Δ "Own-Source" State-Local Revenue as % of GDP	0.735 ***	-0.117	0.629 ***
	(0.048)	(0.211)	(0.219)
Control Variables			
Δ GDP Per Capita (log)	0.002	-0.044 **	-0.045 **
	(0.004)	(0.020)	(0.020)
Δ Population (log)	0.005	-0.063	-0.056
	(0.014)	(0.065)	(0.068)
Δ Dependency Ratio	-0.007	-0.020	-0.077
	(0.018)	(0.087)	(0.090)
Δ Trade as % of GDP	-0.006	0.069 ***	0.060 **
	(0.005)	(0.024)	(0.025)
Capital Account Openness	-0.002	0.014 *	0.014 *
	(0.002)	(0.008)	(0.008)
Δ Central Government Debt/GDP	0.004 **	0.091 ***	0.099 ***
	(0.002)	(0.008)	(0.008)
Δ Democracy	-0.0001	-0.0003	-0.0004
	(0.0002)	(0.001)	(0.001)
Δ Veto Players	-0.001 *	-0.003 *	-0.003 **
	(0.0003)	(0.002)	(0.002)
Election Year	-0.001	0.004	0.003
	(0.001)	(0.006)	(0.006)
Lagged Dependent Variable	0.121 ***	0.352 ***	0.313 ***
	(0.033)	(0.047)	(0.046)
Constant	-0.0002	-0.0004	-0.001
	(0.0002)	(0.001)	(0.001)
Observations	366	366	366
Number of countries	45	45	45
Wald chi2(14)	1686.97 ***	1038.36 ***	1038.06 ***

Standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%
Arellano-Bond dynamic panel data estimates
Coefficients for year dummies not shown

Data Appendix

For the smaller federal sample, data for "own-source" state-provincial revenue are taken from the IMF *Government Finance Statistics* (checked against various country sources) with the following exceptions:

Argentina:	Unpublished Ministry of Finance data.
Brazil:	Unpublished government data, provided by the World Bank.
Germany:	German Federal Statistics Agency, http://www.statistik-bund.de, and unpublished data provided by the Finance Ministry of the state of Baden-Wuerttemberg
Mexico:	Combination of *GFS* and Instituto Nacional de Estadística, Geografía e Informática. Various years. "Finanzas Públicas Estatales y Municipales de México."