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**The Dilemma of Fiscal Federalism: Grants and Fiscal
Performance around the World
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This paper uses cross-national data to examine the effects of federal fiscal and political institutions on the fiscal performance of subnational governments. Balanced budgets among subnational governments are found when either (1) the center imposes strong borrowing restrictions or (2) subnational governments have both wide-ranging taxing and borrowing autonomy. Large and persistent aggregate deficits occur when subnational governments are simultaneously dependent on general-purpose intergovernmental transfers and free to borrow—a combination found most frequently among constituent units in federations. Time-series cross-section analysis reveals that as countries increase their reliance on transfers over time, subnational and overall fiscal performance decline, especially when subnational governments have easy access to credit. These findings illuminate a key dilemma of fiscal federalism and a more precise notion of its dangers: When constitutionally constrained or politically fragmented central governments take on heavy co-financing obligations, they cannot credibly commit to ignore the fiscal problems of lower-level governments.

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I. INTRODUCTION

A rapid growth in the autonomy and responsibilities of state and local governments is one of the most noteworthy trends in governance around the world in recent decades. This trend, along with the growing autonomy of supra-national bodies like the European Union, has encouraged analysts to reexamine some basic issues facing multi-tiered systems of government. As experiences with federalism unfold, an abstract welfare economics literature emphasizing its efficiency advantages has given way to a more balanced political economy literature that draws attention to questions of institutional design. Much of this new literature points out that decentralization can be dangerous, especially in developing countries. Above all, skeptics point out the difficulties of macroeconomic management, adjustment, and reform in decentralized systems (Litvack et al. 1998, Prud'homme 1995, Tanzi 1995) especially when they feature formally federal constitutions that effectively empower states with veto authority over certain central government decisions (Treisman 1999, Wibbels 2000).

This paper addresses one of the most formidable challenges facing nascent multi-tiered systems of government-- fiscal indiscipline among subnational governments. A strikingly similar pattern has emerged in developed and developing countries alike: free-spending subnational governments have built up unsustainable deficits and called upon central governments to provide special bailout transfers or otherwise assume their liabilities. These episodes have been extremely costly in countries like Brazil, where subnational fiscal crises have undermined macroeconomic stability by snowballing into systemic financial crises. An impressive array of case studies has recently demonstrated that decentralization may be dangerous indeed if it allows subnational governments to expand their expenditures while externalizing the costs to others (Rodden, et al. 2001, Von Hagen et al. 2001, IDB 1999). However, subnational fiscal indiscipline has not posed a problem in other highly decentralized countries like the United States (Inman 2001) and Switzerland (Spahn 1997).

While single-country case studies have generated a good deal of useful information and plausible hypotheses, this paper breaks new ground by conducting cross-national quantitative analysis. Virtually all cross-national empirical studies of public sector deficits and debt have ignored subnational governments. At first glance this may not seem problematic-- during the period from 1986 to 1996 the average subnational deficit was only .42 percent of GDP for a sample of 63 countries. However, in 11 formally federal systems-- which include several of the world's largest economies-- average subnational deficits exceeded 1 percent of GDP and accounted for nearly 20 percent of total government deficits.¹ In some countries, like Argentina and Brazil, the aggregate subnational deficit routinely surpassed that of the central government and exceeded 2.5 percent of GDP. In rapidly decentralizing countries like Mexico, Spain, and South Africa, subnational deficits are increasing at an alarming rate. Moreover, recent studies have shown that increasing subnational deficits lead to higher central government expenditures and debt (Fornisari et al. 1998), along with higher rates of inflation (Treisman 2000).

This paper is a first attempt to answer a question of growing importance—what accounts for cross-country and diachronic variation in aggregate subnational fiscal outcomes? Why do some subnational governments appear to behave as fiscal conservatives, while others run up dangerous and unsustainable deficits? It weaves together an institutional argument from the threads of public economics and political science, and tests it using a large data set consisting of observations from OECD, transition, and developing countries from around the world.

While mindful of the situational factors often emphasized in case studies, this paper identifies a basic underlying institutional dilemma that can cause subnational officials to view public revenue as a common pool. When the central government is heavily involved in financing subnational governments, it incurs moral, political, and practical obligations that make it difficult to commit to “say no” to entities that overspend, generate unsustainable deficits, and demand bailouts. The second section explains this basic commitment problem, and then examines the fiscal and political incentive

¹ Source: IMF, *Government Finance Statistics Yearbook* (various years) and author's calculations.

structures that exacerbate it. First, it hypothesizes that if subnational governments have access to credit, higher levels of dependence on intergovernmental grants-- especially when these are not earmarked and highly redistributive-- will be associated with larger subnational deficits. Second, it argues that this commitment problem, and hence the relationship between transfers and deficits, should be most pronounced among state governments in federal systems—especially when the states are directly and disproportionately represented in the upper legislative chamber. The third section introduces the data and explains the econometric approach. The fourth section presents the results of regressions on cross-section averages, the penultimate section analyses time-series cross-sectional data, and the final section concludes.

II. FISCAL FEDERALISM AND COMMITMENT

THE INTERGOVERNMENTAL COMMITMENT PROBLEM

All multi-tiered governments face the possibility that subnational governments will try to over-fish the common revenue pool. The problem can be captured by a simple game in which the first move is made by a self-serving local government, which borrows to adopt an unaffordable policy that provides local benefits. Or more passively, it may decide *not* to undertake politically painful expenditure reductions (or tax increases) in response to a permanent negative revenue shock. It then finds itself in fiscal difficulties, and requests a special deficit-reduction grant or asks that the central government take over its obligations. The central government has the second move, at which point the costs to the central government of *not* providing additional funds may exceed those of providing them.² In some situations, the subnational government may have understood this all along, which is why it spent too much or refused to adjust in the first place.

While beneficial to the recipient, such bailouts are clearly costly to taxpayers as a whole and can set a dangerous precedent. Understanding this, the central government may wish to announce a firm policy *ex ante* that it will “just say no” to all bailout requests. For a number of reasons this

commitment may not be credible ex post, however, when defaults loom or schools are about to close. If the central government has access to the requisite funds, local governments may *expect* bailouts-- even in the absence of externalities or past bailout episodes-- because the central government's "no bailout" commitment is undermined by its own incentives, powers, and obligations.

FISCAL FEDERALISM

H1: Vertical Fiscal Imbalance has a negative effect on subnational fiscal performance.

Intergovernmental grants lie at the heart of the commitment problem. If subnational governments were financed only by local taxes, charges and borrowing, voters and creditors would very likely view the obligations of local governments as "sovereign" like those of central governments. As a matter of both normative theory and descriptive fact, however, intergovernmental systems always involve the vertical flow of funds between governments. Theoretical and empirical studies in public economics demonstrate that individuals appear to view grants and "own-source" local revenues through different lenses. A key proposition of the "fiscal illusion" literature is that when the link between taxes and benefits is distorted or broken, voters are less likely to sanction overspending by politicians. Intergovernmental grants create the appearance that local public expenditures are funded by non-residents.³ Grant programs often supply concentrated local benefits that are funded by a common (national) pool of resources (See Weingast et al. 1988). 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, causing them to demand more expenditures funded by grants than own-source taxation. The vast empirical literature on the so-called "flypaper effect" shows that increases in intergovernmental grants rarely lead to tax reductions, and stimulate much higher spending increases than do increased local taxes (for an overview, see Hines and Thaler 1995).

² For more elaborate treatments of this type of game, see Inman (2001).

³ This literature is too large to review here. For an overview of concepts and measurements of fiscal illusion and a literature review, see Oates (1991). For a theoretical application to intergovernmental grants in particular, see Oates (1979).

The common theme in this literature is the notion that intergovernmental grants alter perceptions and beliefs about the levels of local expenditure that can be sustained. An empirical literature has established a link between transfer-dependence and the growth of government (e.g. Winer 1980, Stein 1998, Rodden 2001a, Rattsso 2000). The central proposition of this paper is that grants also alter beliefs about the sustainability of subnational *deficits* by allowing local politicians—along with their voters and creditors—to believe that the central government will ultimately not be able to ignore their fiscal woes. When a highly transfer-dependent local government faces an unexpected adverse fiscal shock, it may not have the flexibility to raise additional revenue, forcing it either to cut services, run deficits, or rely on arrears to employees and contractors. If the situation escalates into a fiscal crisis in which the sub-national government is unable to pay workers or may default on loans, it can claim with some justification that it is not responsible for the situation.

If successful in this strategy, pressure from voters and creditors will likely be directed at the central government, which quite likely *can* resolve the crisis. It may be very difficult for the central government to resist political pressure from bondholders, banks, local parents, or public sector unions. Knowing this, transfer-dependent governments face weak incentives to be fiscally responsible. Even if such subnational governments could take simple but politically costly steps to avoid an impending fiscal crisis, it may be more rewarding to position themselves for bailouts.

In fact, credit rating agencies are very explicit in assuming that in countries with high levels of “vertical fiscal imbalance” (transfers as a percent of total subnational revenue), the central government implicitly backs the debt of the subnational governments.⁴ In such systems, the central government’s own creditworthiness might be called into question if it fails to enforce a loan contract against a defaulting subnational government. Approached by creditors and facing the prospect of failing in its obligation to enforce property rights, the central government might see a bailout as the simplest solution.

⁴ Thus at high levels of vertical fiscal imbalance, subnational credit ratings may reflect the creditworthiness of the central government or entire public sector rather than that of the individual government. Witness the uniform tripleA ratings of the German Laender (in spite of widely divergent fiscal health) and their justification by Fitch-Ibca (Rodden 2001b).

In short, subnational politicians will not be held responsible for local fiscal outcomes by voters or creditors unless they have sufficient autonomy to raise their own revenues. The central government can only credibly promise to let a subnational government face the consequence of 'its' actions if the government is viewed by citizens and creditors as a body on its own-- a creature of its own citizens. This perception depends critically on the power to tax.

H1a: The relationship between vertical fiscal imbalance and subnational fiscal performance is strongest when grants are distributed according to discretionary criteria.

Of course the commitment problem would be attenuated or disappear if funding were completely non-discretionary-- the textbook solution is to use formulae and let revenue-sharing and transfer programs depend on local choices only when this explicitly is the intention (as when a matching grant supports activities with positive externalities). As an example, transfers to make poor jurisdictions afford a certain provision of schooling would be based on the number of children, or need, rather than paying for actual educational expenditures. Furthermore, a transfer system might resemble an insurance scheme by explicitly stipulating that emergency funding only be provided for exogenous rather than self-inflicted crises. Thus H1a posits that vertical fiscal imbalance will only be associated with fiscal indiscipline if transfers are clearly discretionary.

However, a completely non-discretionary transfer system may be an impossible goal. When vertical fiscal imbalance is high, the central government, like a dominant funding source and a large firm or a wealthy family head with a child in college, may be open to exploitation in spite of its proclamations. Even if only a very small part of the transfer system is open to yearly discretion, this may nevertheless be sufficient to provoke moral hazard. Moreover, in countries with high vertical fiscal imbalance it is exceedingly difficult, even for a judge or scholar with nothing at stake, to distinguish between exogenous and self-inflicted fiscal crises, and even the best insurance schemes involve moral hazard.

H1b & H1c: The relationship between vertical fiscal imbalance and subnational fiscal performance is strongest when subnational governments depend on general-purpose and equalization transfers.

Other aspects of a transfer system might affect the severity of the moral hazard problem. First, if most of the grants are unconditional lump-sum transfers rather than payments for the administration of specific projects and services, local leaders are allowed to spend money that was not raised locally as they (and their supporters) see fit. Not only does this blur the link between taxes and benefits, but it may further implicate the central government in local fiscal outcomes, open it up to political and moral pressure in the event of crises, and thereby undermine the credibility of its pronounced ambivalence to local service provision and fiscal outcomes.

The central government might further undermine the credibility of its “no bailout” commitment if it obligates itself to assure a minimum revenue capacity or level of public services in all of the constituent units. Central governments often take on this responsibility through formal revenue equalization programs. It may be politically difficult or even unconstitutional to allow workers to go unpaid or schools to close when the center is obligated to facilitate cross-jurisdiction equalization.

BORROWING RESTRICTIONS

H2: Central governments will place restrictions on subnational borrowing autonomy when vertical fiscal imbalance is high.

Aware of its vulnerability to manipulation, the central government’s first line of defense is to make a credible no-bailout commitment (Inman 2001). If this commitment is undermined by its co-financing obligations, it may turn to a second line of defense. Like a vulnerable parent who takes away a child’s credit card, the central government may head off the moral hazard problem by formally restricting local governments’ spending and access to credit. A wide range of strategies have been used around the world, including outright prohibitions on borrowing, limits on foreign debt, numerical

debt ceilings, restrictions on the use of debt, and balanced budget requirements.⁵ In fact, empirical evidence seems to suggest that these restrictions are a direct response to the commitment problem-- Eichengreen and von Hagen (1996) examine H2 and demonstrate that fiscal restrictions are indeed most often found in countries with high levels of vertical fiscal imbalance.

H3: Vertical fiscal imbalance will only affect subnational fiscal performance at high levels of borrowing autonomy

However, previous studies have not asked whether hierarchical borrowing restrictions are mere parchment barriers, or whether they restrict subnational fiscal behavior in practice.⁶ If they are effective, one should modify H1 and expect the interactive relationship between transfer-dependence, borrowing autonomy, and fiscal performance suggested by H3. If vertical fiscal imbalance is indeed associated with subnational fiscal indiscipline, the relationship should only hold when subnational governments have relatively unrestricted access to borrowing. That is, subnational fiscal indiscipline should be most pronounced in cases where vertical fiscal imbalance and borrowing autonomy are both high. This is represented by the upper right hand corner of Figure 1, which depicts vertical fiscal imbalance on the horizontal axis and borrowing autonomy on the vertical axis. At low levels of vertical fiscal imbalance and high levels of borrowing autonomy (the upper left hand corner), voters and creditors view subnational obligations as “sovereign,” and face incentives to keep local governments on a tight leash. Creditors punish profligacy with higher interest rates, and voters, knowing that the costs ultimately fall on them, punish politicians at the polls. When formal borrowing autonomy is low (both lower quadrants in Figure 1), deficits are kept under control by the heavy hand of the central government.

[FIGURE 1 ABOUT HERE]

⁵ For a review, see Ter-Minasian and Craig (1997).

⁶ Studies of the US states have addressed voter-imposed local restrictions, but not hierarchical restrictions imposed by central governments.

But if H3 is correct, it merely raises an additional question—why should any cases fall into the upper right-hand cell? Why would a vulnerable central government with heavy co-financing obligations ever allow subnational governments to borrow?

POLITICAL FEDERALISM AND TERRITORIAL REPRESENTATION

H4: Political federalism undermines the central government's ability to restrict subnational borrowing.

“For an economist, nearly all public sectors are more or less federal in the sense of having different levels of government that provide public services, irrespective of formal constitution” (Oates 1999: 1121). For political scientists, however, federalism is much more than mere fiscal decentralization—it implies that the autonomy of the central government is effectively limited, either by constitutional rules or informal constraints. In most federal systems, the constituent units had at least some influence in the formulation of the original constitutional contract. As a result, federal institutions often restrict the authority of the central government with explicit constitutional protections of the sub-units, which are often enforced by independent courts. Perhaps the most central feature of political federalism is the fact that in at least some policy areas, the central government is unable to change the policy status quo without the agreement of a majority, supermajority, and sometimes even unanimity of the constituent units. Often this is the case because the units are directly represented in the upper chamber of Congress or Parliament.

As a result of federal constitutional bargains, one important difference between unitary and federal democracies is the extensive deviation of the latter from the “one person-one vote” principal. While most democracies deviate from this principal to some extent through the legislative over-representation of small, usually rural districts, small states in most federations have been able to secure vastly disproportionate representation in the upper house of the legislature, and sometimes the lower house as well (Stepan 1999; Samuels and Snyder 2001). Virtually all of the distinguishing

characteristics of political federalism imply limits on the central government's ability to regulate the fiscal activities of the states or provinces. Not only is the expenditure autonomy of the provinces generally protected by the constitution, but their representation in the upper chamber often gives them veto power over any proposals that would limit their funding or autonomy.

H5: Federalism is associated with subnational fiscal indiscipline.

H6: Federalism is associated with subnational fiscal indiscipline only at high levels of vertical fiscal imbalance

Even without an effect on borrowing autonomy, one might expect the unique territorial representation of federalism to exacerbate the moral hazard problem. Policy-making in federations includes an element of bargaining among territorial units that often obviates any notion that decisions are made by a national median voter (Cremer and Palfrey 1999). The complex regional bargaining and log-rolling that often characterize the legislative process in federations might allow distressed states to trade votes on unrelated regional projects for bailouts. The asymmetry of jurisdiction size in federations might also exacerbate the commitment problem if the failure of a large state might create negative externalities for the rest of the federation—the “too big to fail phenomenon” (Wildasin, 1997). At the same time, a small over-represented jurisdiction might be “too small to fail” if it is in an especially favorable position to trade votes for bailouts that would be relatively inexpensive for the other constituent units to provide (Von Hagen, et al. 2000).

In short, political federalism might weaken both lines of defense. H4 suggests that it undermines the center's ability to restrict subnational borrowing. That is, states and provinces in federations will be higher in Figure 1 than municipalities in unitary systems. But federalism might have an independent affect on the center's ability to commit in the first place (H5). That is, federalism might be associated with poor subnational fiscal performance no matter where a country falls in Figure 1.

Alternatively, if the logic of H1 is important, federalism should only undermine commitment when combined with high levels of vertical fiscal imbalance. H6 suggests an interactive relationship. H1 argues that at low levels of vertical fiscal imbalance, the center can credibly commit to remain uninvolved in the fiscal affairs of subnational governments, and voters and creditors hold local politicians responsible for their own fiscal management. If federalism places credible restrictions on the center, this might actually bolster its commitment when the constituent units are self-financing, but undermine it when they are dependent on the central government for funds. Returning to figure 1, H6 suggests that federalism should undermine subnational fiscal discipline only on the right-hand side.

III. DATA AND EMPIRICAL APPROACH

The rest of this paper examines these propositions, first using cross-section averages and then using time-series cross section analysis. The data set is composed of yearly observations for 43 cases drawn from a cross-section of OECD, developing, and transition countries for the period between 1986 and 1996. Each observation represents an aggregate state or local government sector.⁷ Some federal countries provide two separate data points—state and local.⁸ Given the arguments above and the important differences between states and local governments in federations, it is necessary to include both states and local governments for the same country separately, introducing appropriate controls and testing for separate effects. The cases were selected based on the availability of data.

MAIN VARIABLES

The first task is to come up with a comparable measure of subnational fiscal discipline to use as a dependent variable. Recall that the argument does not predict actual bailouts, but rather a higher tolerance for deficits and debt stemming from rational bailout *expectations*. Subnational debt data are unavailable, but the IMF's *Government Finance Statistics* (GFS) collects yearly data on subnational

⁷ For a list of cases and data sources, see Appendix 1.

budget balance. Of course short-term budget deficits may reflect inter-temporal tax- or expenditure-smoothing or counter-cyclical budgetary policy. One way to minimize the impact of economic cycles is by using averages over a sufficiently long time period. Another is to include controls for exogenous macroeconomic fluctuations. Both strategies are employed below.

To facilitate cross-national and time-series comparison, the deficit data might be divided either by expenditure, revenue, or GDP. While appropriate for time series analysis within countries, GDP is a less desirable denominator for cross-national comparison because of large cross-national differences in the size of the public sector and the degree of fiscal decentralization. For the analysis of cross-country averages, it makes sense to use deficit as a share of subnational revenue or expenditure. Since revenues are partially determined by the central government (through grants and revenue-sharing), the most appropriate cross-national measure of subnational fiscal discipline is the deficit/surplus as a share of expenditures.

To operationalize the most important independent variable, it is necessary to distinguish between intergovernmental grants and “own-source” subnational revenue. Previous studies that attempt to quantify this distinction do so by using the GFS,⁹ which codes revenues from tax-sharing arrangements (taxes that are levied and collected by the central government and automatically transferred to the states) as “own-source” revenues. While these data might be useful for tracking changes in grants over time, they badly overestimate local revenue autonomy for a number of countries in which subnational governments have very little taxing authority. For this reason, I have created a more accurate measure of vertical fiscal imbalance (grants/revenue) that codes shared revenues as grants by consulting a variety of additional sources (See Appendix 1). The correlation between this measure and that used elsewhere is only .46. The disadvantage of this measure is that it does not vary over time.

The GFS “grants” variable may nevertheless be useful. First of all, it is available on a yearly basis. Second, since it only codes a subnational revenue flow as a “grant” if it is an item in the central

⁸ The exceptions are Argentina and India, for which only state-level data were available.

government's yearly budget, this variable might be a plausible way of assessing H1a. Compared with revenue-sharing flows, which are almost always determined by constitutional or other stable formulae, this variable captures the portion of local revenue that is most likely subject to yearly central government discretion.

Two additional dummy variables addressing the nature of the transfer systems were also created in order to examine H1b and H1c. The first assigns a 1 to cases in which the majority of grant money is allocated through general-purpose rather than earmarked transfers. 18 cases are coded 1 while 25 cases receive a zero. The second variable assigns 1 to cases that feature a large general-purpose subsidy program with the explicit goal of revenue equalization, and zero to those that do not. Ten cases are coded as 1 while 33 are coded zero (See Appendix 1 for data sources).

Borrowing autonomy is measured by building on the work of Ernesto Stein and his associates at the Inter-American Development Bank, who have developed a legal-institutional index of subnational borrowing autonomy for a sample of Latin American countries.¹⁰ I have used a slightly modified version of the IADB formula to measure borrowing autonomy for a larger sample of subnational governments.¹¹ Taken together, these new data on intergovernmental transfers and borrowing autonomy represent a significant improvement over previous cross-national data sets dealing with fiscal decentralization.

Among the cases for which the fiscal data are available, the following countries are coded as federal because of the special constitutional status of the states or provinces: Argentina, Australia, Austria, Brazil, Canada, Germany, India, Mexico, Spain, Switzerland, and the United States.¹² The argument about federalism above, however, was driven by a specific aspect of federalism—the

⁹ Watts (1996), Fukasaku & de Mello (1998), Von Hagen and Eichengreen (1996).

¹⁰ IDB 1997, pages 173-176.

¹¹ The index is explained in Appendix 2. It is similar to the IADB's formula, but instead of calculating a weighted average of state and local governments in federal systems, I calculate separate values for state and local governments and include restrictions placed on municipal governments by state-provincial governments. In addition, I do not count borrowing restraints imposed by state and local governments on themselves. In accordance with the argument, this index seeks to capture the attempts of higher-level governments to restrict local borrowing. In fact, when subnational governments place restrictions upon themselves, either to please creditors or appease voters, this is a powerful indication that their obligations are viewed as "sovereign."

“incongruent” representation of the states in a strong upper legislative chamber. Recent research by David Samuels and Richard Snyder has generated a cross-national index of legislative malapportionment for both upper and lower houses.¹³ Samuels and Snyder show that malapportionment is much more pronounced in federal systems—especially in the upper chamber. In order to measure the effect of federal territorial representation, a variable has been created that takes on 0 if the subnational governments are *not* the constituencies for the upper chamber, and takes the value of the Samuels/Snyder upper chamber index otherwise. This variable is 0 for all of the cases except for ten of the federations.¹⁴ This is, in effect, similar to a “federal” dummy but it allows for variation in territorial over-representation among the federations.

CONTROL VARIABLES

It is possible that central governments in federations make less credible commitments to “say no” to states not because of legislative politics, but simply because states and provinces are larger and more difficult to ignore than municipalities or local governments. To evaluate this claim, I calculate the average number of persons per jurisdiction in each subnational sector.¹⁵ This variable ranges from around 1500 for the French municipalities to over 25 million for the Indian states. It is also plausible that political federalism and territorial representation are not important alone, but are mere byproducts of large country size. Thus I include controls for area (square kilometers), and population.¹⁶ It may be more difficult for subnational governments to balance their budgets when they are responsible for a wide range of expenditure activities rather than, for example, mere trash collection. For this reason I include a control for the overall level of decentralization—subnational expenditures as a share of total public sector expenditures (calculated from the GFS).

¹² This is in accordance with other recent attempts to code federalism. See, e.g. Watts (1996), Elezar (1995), Treisman (2000). Other systems commonly regarded as federal (e.g. Belgium and Venezuela) are not included because appropriate data were unavailable.

¹³ Their formula takes the absolute value of the difference between each district’s seat and population share, adds them, and divides by 2. See Samuels and Snyder (2001).

¹⁴ No data are available for Canada, which has an extremely weak, appointed upper chamber. Each of the other federal upper chambers has significant legislative or veto authority, especially over “federal” issues.

¹⁵ Population data are from the World Bank’s *World Development Indicators* (henceforth WDI) and jurisdiction data are taken from the World Bank’s *World Development Report 1999/2000*, Table A.1.

It is also important to control for economic and demographic conditions that may affect subnational fiscal performance. Thus I include the log of real GDP per capita (PPP, international dollars).¹⁷ Since subnational governments are often responsible for providing primary education and retirement benefits, it is useful to control for the portion of the population that is either too old or too young to work-- the so-called “dependency ratio.” Another common demographic control-- population density-- is included as well.¹⁸

Other aspects of a country’s institutions might also affect the central government’s ability to commit not to provide bailouts. Above all, it might be easier to commit if the center itself faces a hard budget constraint in the form of an independent central bank (Dillinger and Webb 1999). Bailout expectations are more rational if the central government can “resolve” a subnational fiscal crisis by printing more money. Thus I include Alex Cukierman’s (1992) legal-institutional index of central bank autonomy.

The fiscal woes of subnational governments might also be related to those of higher-level governments. For this reason I include the central government’s deficit/expenditure ratio for all governments, and include an additional variable that measures the state or province’s deficit/expenditure ratio for local governments in federal systems.¹⁹

IV. CROSS-SECTION ANALYSIS

Ideally, the propositions from section two would be tested using time-series data disaggregated to the level of individual states and localities. In order to differentiate between countercyclical fiscal management and fiscal laxity, it would also be useful to differentiate between expected and unexpected shocks. While such analysis is possible in single-case studies, data limitations would make cross-national comparison virtually impossible. The goal of this paper is to

¹⁶ Because the data are skewed, natural logs are used for both.

¹⁷ Source: WDI.

¹⁸ Ibid.

¹⁹ This variable is 0 for all states and provinces in federal systems and local governments in unitary systems.

make the most of the cross-national data described above. This is best achieved by combining two strategies. This section examines long-term, purely cross-sectional relationships using “between-effects” OLS regressions on ten-year averages.²⁰ While the disadvantages are obvious, this approach has some advantages: it allows for the use of more precise measures of vertical fiscal imbalance and territorial representation which cannot vary over time, and it allows for some broad generalizations about the kinds of systems in which subnational deficits are most persistent. Moreover, the cross-section results help provide background for the second empirical strategy—time-series cross-section analysis that (by necessity) uses a narrower definition of vertical fiscal imbalance and examines changes over time.

BORROWING AUTONOMY

With two exceptions, each of the hypotheses above attempts to explain subnational fiscal balance as a function of the interplay between intergovernmental grants, borrowing autonomy, and the nature of territorial representation. H2 and H4, however, are intermediate hypotheses about the determinates of subnational borrowing autonomy. We begin by examining these. The Eichengreen/von Hagen hypothesis (H2) assumes that the central government is a rational, unconstrained unitary decision-maker, and as such, it would choose to tightly regulate subnational borrowing when vertical fiscal imbalance is high. H4 relaxes these assumptions and proposes that federal territorial organization places important constraints on the central government’s range of choices.

[TABLE 1 ABOUT HERE]

Table One presents the results of two OLS regressions on borrowing autonomy. Both models include vertical fiscal imbalance, but each uses a different measure of federalism. The first model

²⁰ A slightly shorter time-series is available for some of the cases. The results presented below are not affected by the deletion of these cases, nor are they affected by limiting the data period to the years that are common to all cases.

measures federalism with the “upper house malapportionment index,” while the second includes a dummy variable (coded one for states and provinces in federal systems, zero for others).

Although the data coverage and the measurement of both variables are quite different from those in the Eichengreen and Von Hagen study, the results reaffirm their negative relationship between vertical fiscal imbalance and subnational borrowing autonomy. Moreover, even controlling for vertical fiscal imbalance, it is also clear that states and provinces in federations do have significantly freer access to deficit finance than their municipal counterparts in unitary systems. The coefficient for the dummy variable in Model 2 suggests that the difference is one point on the borrowing autonomy index. The alternative measure of federalism in Model 1—upper chamber malapportionment—yields a similar result. These results are not affected by the deletion of individual cases or the inclusion (or exclusion) of a range of additional control variables.²¹

SUBNATIONAL FISCAL PERFORMANCE

H1, H3, and H6 posit that vertical fiscal imbalance might be associated with higher deficits alone, or the relationship might be conditional on borrowing autonomy or federalism. The previous section has shown that borrowing autonomy (essentially a policy variable) and federalism (an institutional variable) are closely related. Likewise, federalism and territorial representation might matter alone, or the effect might be conditional on high levels of vertical fiscal imbalance (H5 and H6).

[FIGURES 2 AND 3 ABOUT HERE]

Figure 2a takes a first empirical cut by creating the same 2 by 2 table as Figure 1, but displays average subnational surplus/expenditure ratios at high and low (above and below the 50th percentile) levels of vertical fiscal imbalance and borrowing autonomy. Figure 2a lends initial support to H3-- the interactive hypothesis. Average subnational deficits (presented as negative numbers) are much higher in countries that fall into the northeastern cell, and are quite small in each of the other cells.

Figure 2b also divides the cases into groups with high and low levels of vertical fiscal imbalance on the horizontal axis, but displays the distinction between constitutionally-protected federated units and local governments on the vertical axis. The average deficit data lend support to the federal interaction hypothesis (H6) as well. The largest average subnational deficits are found in the cell representing federated units with high levels of transfer-dependence.

[TABLE 2 ABOUT HERE]

The next step is to conduct multivariate analysis. Table 2 presents the results of regressions that attempt to test H3 by examining the determinates of 10-year surplus/expenditure averages. Vertical fiscal imbalance, the borrowing autonomy index, and a multiplicative interaction term are the key variables included in model 3. The battery of control variables described above is included as well. The interaction term and its components are jointly significant at the one percent level (joint F-test). The interaction specification explains more of the variance than an alternative specification including only the two components.²² A good way to interpret the interaction is to calculate expected values of the dependent variable at hypothetical low and high values of the components of the interaction term; these are presented in the four cells of Figure 3a. It is important to confirm that the differences between the cells in Figure 3a are not due to chance alone. The “Clarify” software package (King, Tomz and Wittenberg 2000) uses Monte Carlo simulation to generate both expected values and confidence intervals around them. Figure 3a uses this technique and presents both, showing that as expected, long-run deficits are much higher in the upper right hand cell (around 12 percent of expenditures), where high levels of borrowing autonomy and vertical fiscal imbalance combine. Budgets are essentially balanced when subnational governments face substantial borrowing restrictions (the lower cells of Figure 3a), and they are slightly higher on average (around 5 percent of expenditures) when governments are self-financing and have wide-ranging borrowing authority.

²¹ Regression analysis using non-continuous indexes should always be approached with caution. For this reason, the borrowing autonomy index has been converted into a dummy variable (with the median value used as the cut-point), and the same variables have been included in logistic regressions. The results were quite similar.

²² Because of the potential problems associated with the use of an index in regression analysis, models 3 and 4 have also been estimated with simple indicator variables for each combination of low and high values of borrowing autonomy and vertical fiscal imbalance, yielding very similar results.

Model 4 attempts to address H1a. Instead of using the more inclusive measure of vertical fiscal imbalance used in model 3, it uses the GFS “grants” variable, which likely isolates the most discretionary intergovernmental transfers by excluding revenue-sharing. None of the variables of interest enters significantly on its own, and the three variables are jointly significant only at the ten percent level. The coefficient on the interaction term is much smaller than that of model 3, so there is little support for H1a. It should be noted, however, that this is not likely to be a very accurate cross-national measure of discretionality, which is quite difficult to measure even in one country. This hypothesis deserves much closer attention in careful single-country studies using time-series analysis of individual grant programs characterized by differing levels of discretionality.

[TABLE 3 ABOUT HERE]

Table 3 displays the results of regressions that examine the effects of general- versus specific-purpose grants and equalization programs. Since models 3 and 4 established that vertical fiscal imbalance is only associated with deficits at high levels of borrowing autonomy, models 5 and 6 estimate the conditional effects of vertical fiscal imbalance by grant type at high and low levels of borrowing autonomy (above and below the median). The results of model 5 show that at high levels of borrowing autonomy, vertical fiscal imbalance has a negative effect on deficits only in countries where more than 50% of transfers are general-purpose in nature. In other words, consistent with H1b, the findings of model 3 seem to be driven by cases in which general-purpose transfers dominate. Vertical fiscal imbalance has no significant effect on fiscal outcomes when specific-purpose transfers dominate, or when borrowing autonomy is low. Model 6 examines the role of equalization programs. The results are consistent with H1c-- the negative effect of vertical fiscal imbalance on fiscal performance appears to be concentrated in systems with equalization programs-- but this coefficient does not quite achieve traditional levels of statistical significance.

[TABLE 4 ABOUT HERE]

Table 4 displays the results of regressions aimed at testing the hypotheses related to federalism and territorial representation. Model 7 uses the variable based on the Samuels-Snyder index of

legislative malapportionment, while models 8 and 9 use the more simple federal dummy variable. Model 7 examines the interaction of vertical fiscal imbalance with the upper chamber malapportionment index. The interaction term is significant at the 5% level, and the three variables are jointly significant at the 1% level. The most effective way to evaluate the interaction term is with reference to Figure 3b, where once again, expected values at hypothetical high and low (20th and 80th percentile) values are presented. Deficits are significantly higher in the upper right hand cell—where federal systems with highly malapportioned upper chambers combine with high levels of transfer-dependence.

Model 8 examines the simple indicator variable that differentiates between constituent governments in federations and local governments, estimating separate effects of vertical fiscal imbalance for each group of cases. Consistent with H6, the coefficient for vertical fiscal imbalance is positive for the group of local governments (higher vertical fiscal imbalance is associated with better long-run fiscal performance) and negative for the federated units. The two coefficients are jointly significant at the 5% level, though neither coefficient is significant on its own. However, Model 10 breaks down the separate effects even further, differentiating between low and high levels of borrowing autonomy as well. The four variables are jointly significant at the 10% level, and the only coefficient that achieves statistical significance on its own is that measuring the effect of vertical fiscal imbalance in federated units with high levels of borrowing autonomy. This final result provides support for both H3 and H6—transfer-dependence is associated with long-run subnational deficits in federated units with high levels of borrowing autonomy.

Before summarizing these findings, it is useful to briefly discuss the performance of the control variables. “Persons per jurisdiction” has the hypothesized negative sign in each of the models presented above, but it only achieves significance in model 4. Area and population appear to be very poor predictors of subnational fiscal performance. As expected, most of the models show that expenditure decentralization is associated with larger deficits. Interestingly, there is no evidence that wealth is a determinate of subnational fiscal performance. The sign for GDP per capita changes from

one model to another. The coefficients for the “dependency” ratio and population density, though generally negative as expected, do not achieve significance. The index of central bank autonomy has the expected positive coefficient, but in none of the estimations is it significant. Surprisingly, the central government’s long-term fiscal performance does not help explain that of subnational governments. However, the final variable does show that the fiscal performance of local governments in federal systems is intertwined with that of the states and provinces.

The main findings can be summarized as follows. There is no support for H1 and H5, but strong support for H3 and H6. There is no direct relationship between vertical fiscal imbalance and long-run subnational fiscal performance. Transfer-dependence is only associated with larger deficits when subnational governments have significant formal borrowing autonomy. The ability of the central government to restrict borrowing, however, is undermined in federal systems where subnational governments are directly and asymmetrically represented at the center. The coincidence of wide-ranging borrowing autonomy, high vertical fiscal imbalance, and large deficits is found primarily among constituent units in federal systems. Neither borrowing authority nor federalism, however, is a recipe for large subnational deficits-- both are consistent with long-run balanced budgets when vertical fiscal imbalance is low.

V. TIME-SERIES CROSS-SECTION ANALYSIS

While cross-section averages are admittedly blunt, these results establish the key determinates of long-run subnational deficits. A natural further step is to examine the effects of intergovernmental transfers on the evolution of fiscal performance over time within countries. Previous studies have shown that increasing dependence on intergovernmental grants is associated with higher overall government *expenditures*. Building on the cross-section results presented above, this section asks whether and under what conditions the growth of grants over time might also affect deficits. That is, it examines modified versions of H1, H3, and H6 using time-series data. H1’ posits that the growth of

transfer-dependence, by increasing fiscal separation and encouraging bailout expectations, leads to growth in subnational deficits. H3' and H6' posit, respectively, that this relationship will be conditional on the presence of borrowing autonomy and political federalism.

Dynamic analysis is particularly useful from a policy perspective; countries are decentralizing expenditure authority in many countries around the world, and in most cases, these new subnational expenditures are being funded by increased intergovernmental transfers rather than new own-source local taxes and fees. Given the present concern in the literature about the supposed dangers of decentralization, this section provides a useful exploration of the fiscal and political conditions under which decentralization might lead to upward pressure on subnational and total public sector deficits.

In order to make use of time-series data, it is necessary to rely on the GFS distinction between “own-source” and “grant” revenue. This may not be a disadvantage, however, since the GFS conception of “grants” zeros in on the more discretionary grants that show up in yearly budgets, and any problems of cross-national comparability will be obviated by an empirical approach that focuses exclusively on time-series variation.

The goal of the empirical set-up is to eliminate cross-section variation and focus exclusively on changes. Given the relatively short (10 years for most countries) period under analysis, the customary approach to this kind of time-series cross-section data used in political science—OLS with panel corrected standard errors, including fixed effects and a lagged dependent variable (Beck and Katz, 1995)—may lead to biased coefficients. In order to avoid the potential bias associated with this 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 dependent variable in level lagged twice.²³ As recommended by Arellano and Bond, (1991) one-step robust results are presented and used for inference on coefficients.

SUBNATIONAL DEFICITS

The most straightforward model-- displayed in Table 5 (model 12)-- explores changes in the same dependent variable used above: the subnational deficit/expenditure ratio. The key dependent variable is the change in grants as a share of subnational revenues. The model also includes two lags of the dependent variable, and changes in all of the control variables that vary over time.²⁴

[TABLE 5 ABOUT HERE]

While model 10 includes only grants/revenue, model 11 breaks this variable down and estimates separate effects for systems with high and low levels of borrowing autonomy, and within these categories, separate effects for local/municipal governments and constituent units in federations. In model 10, although the coefficient for grants/revenue is negative as predicted by H1', it is not significantly different from zero.²⁵ Model 11 reveals no significant relationship between changes in transfer-dependence and changes in subnational deficits among *local* governments (regardless of borrowing autonomy levels). However, it reveals a strong, highly significant negative relationship in states or provinces with high levels of borrowing autonomy.²⁶ In such systems, a ten percent increase in vertical fiscal imbalance is associated with a four percent decline in fiscal balance as a share of expenditures. Here again, it appears that the effect of grants on subnational fiscal balance is strongest among federated units with relatively unfettered access to borrowing.

While the models presented in Table 5 are useful for comparison with the cross-section analysis above, it may also be useful to examine subnational fiscal balance relative to GDP rather than

²³ 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. Note that for all of the regressions presented below, the Beck and Katz OLS, PCSE technique described above does yield very similar results.

²⁴ The only such variable from above that cannot be included is "expenditure decentralization," since it might create an endogeneity problem in the time-series analysis.

²⁵ 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). 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. The same is true for all of the models presented in this section.

²⁶ Recall the high correlation between federalism and borrowing autonomy. The positive coefficient for federated units with low levels of borrowing autonomy is driven exclusively by Austria. Thus all coefficients for the "federated units-low borrowing autonomy" combination should be regarded with caution. Each of the other combinations, however, includes at least 10 cases.

subnational expenditures. Direct cross-national comparability is no longer a concern in the dynamic panel data set-up, and this variable provides a better sense of the importance of subnational deficits relative to the entire economy. Moreover, if grants and “own-source” revenues are also divided by GDP and entered separately as independent variables, one can directly compare the effects on deficits of two different kinds of fiscal (de)centralization—one driven by changes in grants and the other by “own-source” revenue.

Such a model was estimated using the same estimation technique and control variables, and the results are reported in Table 6. Model 12 reports the results of the basic model, and model 13 displays separate effects for high and low borrowing autonomy and federalism. Model 12 is quite striking. The coefficient for “grants/GDP” is negative, while the coefficient for “own-source revenue/GDP” is positive; both are highly statistically significant. Other things (including local “own-source” receipts) equal, a 10 percent increase in grants is associated with a 1.7 percent *decline* in fiscal balance. It is quite striking to find that an increase in a source of subnational revenue actually is associated with declining fiscal balance. On the other hand, as subnational governments increase *other* sources of revenue, fiscal balance improves. As in Model 11, Model 13 shows that as expected, these results are driven by subnational units that are relatively free to borrow. This relationship appears to hold up both among federated units and local governments.

[TABLE 6 ABOUT HERE]

TOTAL PUBLIC SECTOR DEFICITS

When subnational governments are free to borrow, increasing reliance on intergovernmental grants is associated with declining subnational fiscal balance. But there are reasons to suspect that subnational fiscal indiscipline affects not only the state or local government sector in question, but the entire public sector. In fact, one possible objection to the use of aggregate subnational fiscal balance as the only dependent variable is the possibility that soft local budget constraints and bailouts might

affect the finances of the central government in addition to, or perhaps even instead of the local governments.

For this reason it is useful to reexamine models 10 through 13 using *total* (combined central, state, and local) fiscal balance as the dependent variable. Of course this requires some changes to the data set and model specification since states and local governments within federations can no longer be individual data points. The borrowing autonomy variable for each country must now be based on a weighted average of state and local governments. “Grants” and “own-source” revenues now refer to totals for all subnational governments. In addition, the last two variables—changes in fiscal balance for higher-level governments—must be left out.

Table 7 presents two models that examine the effects of changes in grants (as a share of total public sector revenue) on changes in total deficits (as a share of total expenditures). Model 14 is the simple model, and model 15 presents separate effects. The results are once again quite striking. As the public sector becomes more dependent on intergovernmental transfers, overall deficits climb. Once again, this result is driven by systems in which subnational governments are free to borrow. Table 8 presents the model that uses GDP as the denominator for the key variables and directly compares the effects of changes in “own-source” and “grant” revenues. Though not nearly as striking, the results are consistent with similar regressions using expenditures as the denominator (Table 6). The negative coefficient for “grants/GDP” is only significant at the 10 percent level, and the significance disappears rather easily with alternative specifications. Here, as in model 15, the negative coefficient seems to be driven by the unitary systems with high levels of borrowing autonomy. Perhaps not too much should be made of the unitary-federal distinction because of the rather blunt aggregation that has taken place, but it does appear that increased transfer-dependence has a negative effect on *overall* fiscal balance in unitary systems, even though no evidence was found in models 10 through 13 for a relationship between transfers and *local* deficits. A reasonable supposition, then, is that increasing reliance on intergovernmental transfers in unitary systems puts an increasing fiscal burden on the central government.

All of the panel data results presented thus far are quite robust. Similar results can be obtained using a variety of estimation techniques and functional forms. Year dummies have also been included, but none attained statistical significance and the results were unaffected. The overall thrust of the results presented in this section can be easily summarized—as countries increase the use of intergovernmental transfers to fund public expenditures, subnational and total fiscal performance decline, especially when the central government lacks the will or the strength to regulate subnational borrowing.

VI. IMPLICATIONS AND CONCLUSIONS

This paper has shown that in the long run, aggregate subnational deficits are highest among lower-level governments that are most dependent on intergovernmental transfers and most free of hierarchical borrowing restrictions. Though this combination is found most commonly (but not exclusively) among states and provincial governments in federations, unlike previous studies, this paper finds that federalism alone has very little explanatory power. Thus an important improvement has been made upon the rather frustrating and simple binary distinction between federal and unitary systems that has characterized recent literature. Intergovernmental fiscal systems, hierarchical rules, and representation schemes are important building blocks in a more nuanced approach to the “varieties of federalism.” This paper also addresses the recent preoccupation with the “dangers” of decentralization and federalism, showing that in countries where subnational governments are free to borrow, as governments rely increasingly on intergovernmental transfers over time, deficits increase at all levels of government.

The most important policy implications and questions for future research have to do with intergovernmental transfers. This paper probably approaches the limits of what can be done with cross-national data. Perhaps using the typology in Figure 1 as a guide, more refined work can use disaggregated state- and local-level data to examine the incentive effects of different kinds of

intergovernmental transfers within countries.²⁷ To be sure, the paper’s key contribution is empirical rather than theoretical. The causal mechanisms driving the key hypotheses are consistent with the results, but the precise role of intergovernmental transfers in shaping the perceptions and incentives of voters and politicians remains a notoriously open question in public economics (Oates 1991)—one that is not likely to be resolved with cross-country data.

Nevertheless, from a policy perspective, the empirical results presented above are hard to ignore. The combination of wide-ranging subnational borrowing autonomy and increasing transfer-dependence appears to be a dangerous one. It may also be increasingly common, especially as countries decentralize expenditures by ramping up intergovernmental transfers rather than building up the local tax base. In most cases, increases in transfers do not keep pace with increases in mandated subnational responsibilities. Unfortunately this has been the route to fiscal decentralization in much of the developing world. This danger appears to be particularly severe in large formal federations, where the center faces practical and constitutional challenges when trying to limit the spending and borrowing activities of the constituent units.

The results point out not only the path to persistent subnational deficits, but also a couple of distinct paths to long-term fiscal discipline. In the lower half of figure 1, which I have called “subordination,” central governments attempt to cut off local access to credit. An important finding is that these prohibitions seem to work—long-term subnational deficits are negligible in such systems, and short-term fluctuations in grants have no effect on deficits. However, I have also found that this method of fiscal discipline is rarely in place among constituent units in large federations. It is found primarily among local governments in small, homogeneous unitary systems, though interestingly, some troubled large federations like Brazil and India have recently been considering sweeping new legislation aimed at enhancing central control over subnational borrowing.

²⁷ Several recent papers use state-level data to show that strategic behavior and long-run deficits are most pronounced in states that are most dependent on transfers—especially when these imply a central government responsibility for minimum service provision. On Argentina see Jones, et al. (2000); on Germany see Rodden (1998); on the United States see Rogers and Rogers (2000).

Another path to fiscal discipline is found in the upper left-hand cell of Figure 1. Here, the central government limits its co-financing obligations, allows local governments to borrow, and leaves the enforcement of hard budget constraints up to self-interested voters and creditors. Indeed there is considerable evidence that this variety of fiscal discipline works well among governments occupying the upper left-hand corner like the U.S. states and Swiss Cantons.²⁸ One is tempted to conclude that the most clear goal for reform is to move toward this cell, increasing the tax base and revenue-raising capacity of subnational governments and reducing borrowing restrictions, sending a clear signal to voters and creditors that local obligations are sovereign. Indeed the goal of increased local self-sufficiency seems attractive from many perspectives. But this can be extremely difficult, both as a normative and practical matter, especially in poor countries with weak or corrupt local government institutions and high levels of inequality. It also seems likely that effective local discipline enforced by creditors and voters develops only slowly over time in countries with strong legacies of centralized control.

Herein lays the dilemma of fiscal federalism and a more precise understanding of its “dangers”; for a variety of political and perhaps even moral reasons, the center often gets heavily involved in the affairs of the subnational governments—so involved that it cannot credibly commit to ignore their problems. At the same time, the center can be politically too weak, fragmented, or even beholden to certain states to censure them or change the basic fiscal and political institutions that create bad incentives. This is most often the case in federations with strong, disproportionate territorial representation. Thus there may be particular cause for concern about fiscal decentralization in places like Mexico, South Africa, and Spain, where the veto authority of subnational governments is strong and growing and sizeable subnational expenditures are funded by rapidly growing transfer programs rather than local taxation. But by no means is the phenomenon limited to formal federations (see, e.g. Von Hagen et al. 2000).

²⁸ See, e.g. Lowry, Alt, and Ferree (1999), Besley and Case (1995), Bayoumi, Goldstein, and Woglom (1995), Feld and Kirchgaessner (1999).

Although institutions clearly affect outcomes, an understanding of these effects does not translate easily into prescriptions for reform. It is necessary to make the key independent variables in this study endogenous in order to understand more clearly the political economy of institutional evolution and reform. An important goal for future studies of federalism is a richer understanding of the way in which fiscal and political institutions co-evolve, and the conditions under which reform is possible.

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**FIGURE 1:
HYPOTHESIZED RELATIONSHIP BETWEEN
VERTICAL IMBALANCE,
BORROWING AUTONOMY, AND FISCAL RESTRAINT**

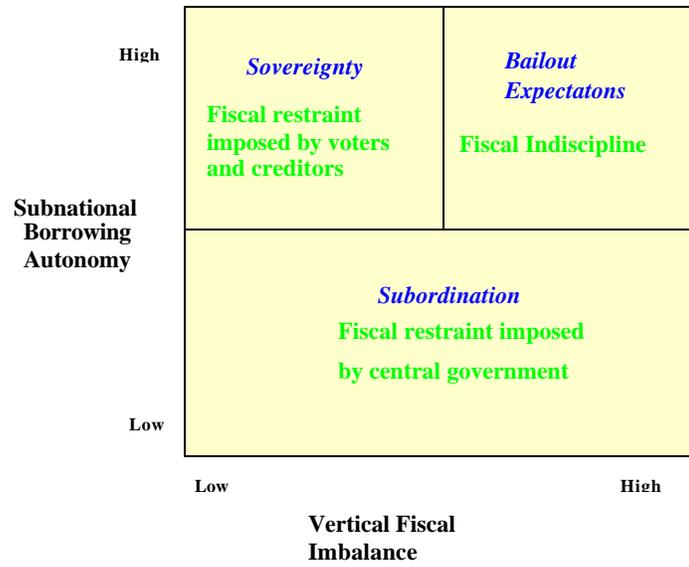


Figure 2: Average Subnational Deficit/Expenditure

Figure 2a: Vertical Fiscal Imbalance and Borrowing Autonomy

Borrowing Autonomy	High	-0.034	-0.142
	Low	-0.025	-0.018
		Low	High

Vertical Fiscal Imbalance

Figure 2b: Vertical Fiscal Imbalance and Federalism

States/provinces in federal systems	High	-0.041	-0.115
	Low	-0.027	-0.022
Local Governments		Low	High

Vertical Fiscal Imbalance

Low and high: above and below median

Figure 3: Average Subnational Deficit/Expenditure, Expected Values Based on Models 3 and 7

Figure 3a: Vertical Fiscal Imbalance and Borrowing Autonomy (expected values calculated from Model 3)

Borrowing Autonomy	High	-0.046 (-.07, -.02)	-0.122 (-.17, -.08)
	Low	.002 (-.04, .04)	.015 (-.02, .05)
		Low	High

Vertical Fiscal Imbalance

Figure 3b: Vertical Fiscal Imbalance and Upper Chamber Malapportionment (expected values calculated from Model 7)

Upper Chamber Malapp.	High	-0.036 (-.07, 0)	-0.094 (-.13, -.05)
	Low	-0.17 (-.04, .004)	-0.006 (-.04, .03)
		Low	High

Vertical Fiscal Imbalance

Expected values of dependent variable in models 3 and 7 at hypothetical low and high (20th and 80th percentile) values of the components of the interaction terms (other variables held at their means). 95 percent confidence intervals are in parentheses. Expected values and confidence intervals have been calculated from simulated parameters using *Clarify* Software (King, Tomz and Wittenberg 1999).

Table 1: The Determinates of Subnational Borrowing Autonomy

Dependent Variable: Borrowing Aut. Index	Model 1	Model 2
<i>Independent Variables:</i>		
Vertical Fiscal Imbalance	-1.13 (0.53) **	-1.31 (0.56) **
Federal Upper Chamber Malapportionment	3.32 (0.91) ***	
Federalism Dummy		0.98 (0.32) ***
Persons per Jurisdiction	-0.03 (0.03)	-0.06 (0.04) *
Log Area	-0.10 (0.14)	-0.07 (0.14)
Log Population	0.27 (0.16)	0.29 (0.16) *
Decentralization	1.14 (1.32)	2.07 (1.26)
Log GDP per Capita	0.00001 (0.00002)	-0.00002 (0.00002)
Dependency Ratio	0.59 (1.25)	0.86 (1.29)
Population Density	-0.001 (0.002)	-0.00094 (0.002)
Constant	-1.15 (2.19)	-2.09 (2.21)
R2	0.56	0.54
Groups	42	43

OLS, Standard Errors in parentheses., ***p<.01, **p<.05, *p<.10

Table 2: Determinates of Average Subnational Fiscal Balance (1986-1996): The Interaction of Grants and Borrowing Autonomy

Dependent Variable:	Model 3	Model 4
Subnational Surplus/Expenditure		
<i>Independent Variables:</i>		
VFI x Borr. Autonomy	-0.136 (0.061) **	
Vertical Fiscal Imbalance	0.232 (0.147)	
Borrowing Autonomy	0.011 (0.030)	-0.012 (0.019)
Discretionary Grants/Rev.		0.137 (0.113)
Disc. Grants/Rev * Borr. Aut.		-0.055 (0.051)
Federal Dummy	0.001 (0.028)	-0.019 (0.021)
Persons per Jurisdiction	-0.005 (0.003)	-0.075 (0.028) **
Log Area	0.001 (0.010)	0.002 (0.009)
Log Population	0.011 (0.013)	0.010 (0.012)
Subnational Expenditure/Total	-0.161 (0.096) *	-0.009 (0.091)
Log GDP per Capita	0.019 (0.018)	-0.003 (0.016)
Dependency Ratio	-0.043 (0.130)	0.016 (0.119)
Population Density	-0.016 (0.016)	-0.001 (0.001)
Central Bank Independence	-0.007 (0.061)	0.068 (0.053)
Central Govt. Surpl./Expenditure	-0.112 (0.125)	-0.038 (0.122)
State-Prov. Surpl./Exp	0.776 (0.237) ***	0.544 (0.205) **
Constant	-0.337 (0.293)	-0.192 (0.250)
R ²	0.74	0.72
Groups	37	36

OLS, Standard Errors in parentheses., ***p<.01, **p<.05, *p<.10

Table 3: Determinates of Average Subnational Fiscal Balance (1986-1996): Effects of Grant Type

<i>Dependent Variable:</i>	Model 5	Model 6
Subnational Surplus/Expenditure		
<i>Independent Variables:</i>		
Vertical Fiscal Imbalance		
<i>High Borrowing Autonomy</i>		
Majority of grants:		
General Purpose	-0.143 (0.07) **	
Specific Purpose	0.012 (0.08)	
<i>Low Borrowing Autonomy</i>		
Majority of grants:		
General Purpose	-0.001 (0.07)	
Specific Purpose	0.028 (0.05)	
<i>High Borrowing Autonomy</i>		
Equalization Program?		
Yes		-0.105 (0.07)
No		0.025 (0.10)
<i>Low Borrowing Autonomy</i>		
Equalization Program?		
Yes		0.004 (0.08)
No		0.005 (0.06)
Federal Dummy	-0.008 (0.03)	-0.028 (0.03)
Persons per Jurisdiction	-0.002 (0.00)	-0.004 (0.004)
Log Area	0.002 (0.01)	0.005 (0.01)
Log Population	0.003 (0.02)	-0.003 (0.02)
Subnational Expenditure/Total	-0.245 (0.11) **	-0.257 (0.11) **
Log GDP per Capita	-0.002 (0.02)	0.008 (0.02)
Dependency Ratio	-0.062 (0.15)	-0.103 (0.15)
Population Density	-0.005 (0.02)	0.002 (0.02)
Central Bank Independence	0.024 (0.07)	0.010 (0.07)
Central Govt. Surpl./Expenditure	0.036 (0.15)	-0.036 (0.15)
State-Prov. Surp./Exp	0.562 (0.31) *	0.732 (0.29) **
Constant	0.008 (0.35)	0.016 (0.36)
R ²	0.67	0.65
Groups	37	37

OLS, Standard Errors in parentheses., ***p<.01, **p<.05, *p<.10

Table 4: Determinates of Average Subnational Fiscal Balance(1986-1996): Effects of Federalism and Territorial Representaion

<i>Dependent Variable:</i>	Model 7	Model 8	Model 9
Subnational Surplus/Expenditure			
<i>Independent Variables:</i>			
VFI * Federal Upper Chamber Malapportionment	-0.805 (0.34) **		
Federal Upper Chamber Malapportionment	0.143 (0.17)		
Vertical Fiscal Imbalance	0.034 (0.05)		
Vertical Fiscal Imbalance:			
Constituent units in Federations		-0.092 (0.05)	
Local Governments		0.025 (0.06)	
<i>High Borrowing Autonomy</i>			
Const. Units in Federations			-0.148 (0.06) **
Local Governments			-0.046 (0.09)
<i>Low Borrowing Autonomy</i>			
Const. Units in Federations			-0.025 (0.08)
Local Governments			0.013 (0.06)
Persons per Jurisdiction	-0.004 (0.003)	-0.001 (0.004)	-0.001 (0.004)
Log Area	0.007 (0.01)	0.002 (0.01)	0.002 (0.01)
Log Population	-0.0005 (0.01)	-0.003 (0.02)	0.002 (0.02)
Subnational Expenditure/Total	-0.186 (0.11)	-0.301 (0.11) **	-0.261 (0.11) **
Log GDP per Capita	-0.001 (0.02)	0.002 (0.02)	0.011 (0.02)
Dependency Ratio	-0.061 (0.14)	-0.118 (0.15)	-0.057 (0.16)
Population Density	-0.0004 (0.0002)	-0.0001 (0.0002)	-0.0001 (0.0002)
Central Bank Independence	0.049 (0.06)	0.059 (0.07)	0.031 (0.07)
Central Govt. Surpl./Expenditure	0.057 (0.14)	-0.005 (0.15)	0.009 (0.17)
State-Prov. Surpl./Exp	0.676 (0.26) **	0.715 (0.29) **	0.761 (0.30) **
Constant	-0.034 (0.31)	0.107 (0.34)	-0.095 (0.36)
R ²	0.67	0.56	0.6
Groups	36	37	37

OLS, Standard Errors in parentheses., ***p<.01, **p<.05, *p<.10

Table 5: Determinates of Changes in Subnational Surplus/Expenditure, Dyanmic Panel Data Analysis

<i>Dependent Variable:</i>	Model 10	Model 11
Δ Subnational Surplus/Expenditure		
<i>Independent Variables:</i>		
Subnational Surplus/Expenditure _{t-1}	0.120 (0.108)	0.056 (0.135)
Subnational Surplus/Expenditure _{t-2}	-0.157 ** (0.075)	-0.202 ** (0.084)
D Grants/ Subnational Revenue	-0.139 (0.097)	
<i>High Borrowing Autonomy</i>		
Constituent Units in Federations		-0.409 *** (0.096)
Local Governments		0.017 (0.415)
<i>Low Borrowing Autonomy</i>		
Constituent Units in Federations		0.276 *** (0.064)
Local Governments		-0.031 (0.033)
Δ Population (log)	0.026 (0.019)	0.011 (0.017)
Δ GDP per capita (log)	0.014 (0.038)	0.054 (0.046)
Δ Dependency Ratio	-0.016 (0.042)	-0.077 (0.078)
Δ Population Density	-0.001 (0.002)	0.0004 (0.001)
Δ Central Govt. Surplus/Expend.	-0.041 (0.043)	-0.033 (0.043)
Δ State-Prov. Surplus/Expend. (fed)	0.235 (0.174)	0.309 ** (0.152)
Constant	0.004 ** (0.002)	0.002 (0.002)
Observations	272	272
Number of Groups	39	39

Robust standard errors in parentheses

* significant at 10%; ** significant at 5%; *** significant at 1%

Calculated using Stata 7.0, "xtabond" procedure, one step results

Table 6: Determinates of Changes in Subnational Surplus/GDP, Dyanmic Panel Data Analysis

<i>Dependent Variable:</i>	Model 12	Model 13
Δ Subnational Surplus/GDP		
<i>Independent Variables:</i>		
Subnational Surplus/GDP _{t-1}	0.250 *** (0.080)	0.252 *** (0.078)
Subnational Surplus/GDP _{t-2}	-0.207 *** (0.075)	-0.145 ** (0.066)
D Grants/GDP	-0.175 ** (0.078)	
<i>High Borrowing Autonomy</i>		
Constituent Units in Federations		-0.243 * (0.133)
Local Governments		-0.247 (0.153)
<i>Low Borrowing Autonomy</i>		
Constituent Units in Federations		0.674 (0.840)
Local Governments		-0.051 (0.068)
D "Own-Source" Revenue/GDP	0.252 *** (0.047)	
<i>High Borrowing Autonomy</i>		
Constituent Units in Federations		0.258 * (0.143)
Local Governments		0.437 *** (0.066)
<i>Low Borrowing Autonomy</i>		
Constituent Units in Federations		0.528 (0.869)
Local Governments		0.029 (0.034)
Δ Population (log)	0.003 (0.004)	0.006 * (0.003)
Δ GDP per capita (log)	-0.001 (0.002)	0.0002 (0.002)
Δ Dependency Ratio	0.001 (0.008)	-0.010 (0.014)
Δ Population Density	0.000 (0.000)	0.000 (0.000)
Δ Central Govt. Surplus/GDP	0.011 (0.011)	-0.003 (0.012)
Δ State-Prov. Surplus/GDP	0.058 (0.189)	0.123 (0.129)
Constant	-0.0002 (0.000)	-0.0002 (0.000)
Observations	268	268
Number of Groups	39	39

Robust standard errors in parentheses

* significant at 10%; ** significant at 5%; *** significant at 1%

Calculated using Stata 7.0, "xtabond" procedure, one step results

Table 7: Determinates of Changes in Total Surplus/Expenditure, Dyanmic Panel Data Analysis

<i>Dependent Variable:</i>	Model 14	Model 15
Δ Total Surplus/Expenditure		
<i>Independent Variables:</i>		
Total Surplus/Expenditure _{t-1}	0.348 * (0.198)	0.365 ** (0.175)
Total Surplus/Expenditure _{t-2}	-0.138 (0.119)	-0.116 (0.105)
D Grants/Total Revenue	-0.780 ** (0.352)	
<i>High Borrowing Autonomy</i>		
Federations		-0.954 *** (0.355)
Unitary Systems		-2.363 *** (0.701)
<i>Low Borrowing Autonomy</i>		
Federations		1.264 (0.869)
Unitary Systems		-0.450 (0.323)
Δ Population (log)	0.057 (0.331)	0.122 (0.315)
Δ GDP per capita (log)	0.058 0.104	0.013 (0.102)
Δ Dependency Ratio	-1.884 *** (0.407)	-1.658 *** (0.343)
Δ Population Density	0.000001 (0.00002)	0.000006 (0.00002)
Constant	-0.002 (0.004)	-0.003 (0.004)
Observations	206	206
Number of Groups	30	30

Robust standard errors in parentheses

* significant at 10%; ** significant at 5%; *** significant at 1%

Calculated using Stata 7.0, "xtabond" procedure, one step results

**Table 8: Determinates of Changes in Total Surplus/GDP,
Dyanmic Panel Data Analysis**

<i>Dependent Variable:</i>	Model 16	Model 17
Δ Total Surplus/GDP		
<i>Independent Variables:</i>		
Total Surplus/GDP _{t-1}	0.625 *** (0.101) ***	0.563 *** (0.098) ***
Total Surplus/GDP _{t-2}	-0.323 (0.075)	-0.286 (0.083)
D Grants/GDP	-0.552 * (0.314)	
<i>High Borrowing Autonomy</i>		
Federations		-0.905 (0.955)
Unitary Systems		-2.265 *** (0.903)
<i>Low Borrowing Autonomy</i>		
Federations		3.624 (2.924)
Unitary Systems		-0.759 * (0.456)
D "Own-Source" Revenue/GDP	0.052 (0.079)	
<i>High Borrowing Autonomy</i>		
Federations		0.743 (0.807)
Unitary Systems		0.458 *** (0.133)
<i>Low Borrowing Autonomy</i>		
Federations		1.885 (2.024)
Unitary Systems		-0.137 (0.106)
Δ Population (log)	0.080 (0.089)	0.124 (0.090)
Δ GDP per capita (log)	0.033 (0.048)	0.032 (0.050)
Δ Dependency Ratio	-0.370 *** (0.102)	-0.403 *** (0.131)
Δ Population Density	-0.000001 (0.000005)	-0.000002 (0.000004)
Constant	-0.001 (0.002)	-0.002 (0.002)
Observations	206	206
Number of Groups	30	30

Robust standard errors in parentheses

* significant at 10%; ** significant at 5%; *** significant at 1%

Calculated using Stata 7.0, "xtabond" procedure, one step results

Appendix 1: Years and Sources

Case	Years	VFI	Grant Information	Borrowing Autonomy
Argentina state	1986-1996	IDB	IMF, IDB	IMF, IDB
Australia local	1986-1996	IMF	IMF	IMF
Australia state	1986-1996	IMF	IMF	IMF
Austria local	1986-1995	Bird 1986	Bird 1986	IMF, Bird 1986
Austria state	1986-1996	Bird 1986	Bird 1986	IMF, Bird 1986
Bolivia	1987-1995	IDB	IMF, IDB	IMF, IDB
Botswana	1990-1994	Segodi 1995	Segodi 1995	Segodi 1995
Brazil local	1986-1993	Shah 1994	IMF, IDB, Shah 1994	IMF, IDB, Shah 1994
Brazil state	1986-1994	Shah 1994	IMF, IDB, Shah 1994	IMF, IDB, Shah 1994
Bulgaria	1988-1996	IMF	IMF	IMF
Canada local	1986-1994	IMF	IMF, Courchene 1994	IMF, Kitchen & McMillan 1986
Canada state	1986-1995	IMF	IMF, Courchene 1994	IMF
Chile	1986-1988	IDB	IDB	IDB
Colombia	1985-1986	IDB	IMF, IDB	IDB
Denmark	1986-1993	GFS	Harloff 1988, Bury & Skovsgaard 1988	IMF
Finland	1986-1995	GFS	Harloff 1988; Nurminen 1989	IMF
France	1986-1996	GFS	Guilbert & Guengant 1989	IMF
Germany local	1986-1994	IMF	IMF	IMF
German state	1986-1995	IMF	IMF	IMF
Guatemala	1990-1994	GFS	IDB	IDB
India	1986-1994	IMF	IMF	IMF
Ireland	1986-1994	GFS	Harloff 1988	IMF
Israel	1986-1994	Hecht 1988	Hecht 1988	Hecht 1988
Italy	1986-1989, 95-6	GFS	IMF	IMF
Mexico local	1986-1994	IMF	IMF	IMF
Mexico state	1986-1994	IMF	IMF, IDB	IMF, IDB
Netherlands	1987-1996	GFS	Blaas & Dostal 1989, Harloff 1988	IMF
Norway	1986-1995	GFS	Harloff 1988	IMF
Paraguay	1986-1993	IDB	IDB	IMF, IDB
Peru	1990-1996	IDB	IDB	IMF, IDB
Philippines	1986-1992	GFS	Padilla 1993	Padilla 1993
Poland	1994-1996	Cielecka&Gibson 1995	Cielecka & Gibson 1995	Cielecka & Gibson 1995
Portugal	1987-1995	GFS	Harloff 1988	IMF
Spain local	1986-1994	Newton 1997	Newton 1997	IMF, Newton 1997
Spain state	1986-1995	Newton 1997	Newton 1997	IMF, Newton 1997
Sweden	1986-1996	GFS	Harloff 1988	IMF
Switzerland local	1990-1995	IMF	IMF	IMF
Switzerland state	1990-1996	IMF	IMF	IMF
UK	1986-1995	GFS	IMF	IMF
US local	1988-1995	IMF	IMF	IMF
US state	1988-1996	IMF	IMF	IMF
Zimbabwe	1986-1991	Helmsing 1991	Helmsing 1991	Helmsing 1991

GFS: Government Finance Statistics Yearbook

IMF: Teresa Ter-Minassian, ed., *Fiscal Federalism in Theory and Practice*, 1997, International Monetary Fund.

IDB: Inter-American Development Bank, *Latin America after a Decade of Reforms*, 1997 Report.

Note: When the GFS is listed as a source for VFI, it has been checked against the sources listed in the other two columns.

Appendix 2: Construction of Borrowing Autonomy Index

This index is constructed based on the method developed by the Inter-American Development Bank (see IADB 1997: 188). It is built according to the following criteria:

(1) Ability to Borrow:

If the subnational government cannot borrow, 2 points.

(2) Authorization:

This number ranges from zero to one. If all borrowing by the subnational government requires central government approval (or state government approval for local governments in federal systems), 1 point. If no subnational borrowing requires approval, zero points. If the authorization constraint only applies to certain kinds of debt, or if the approval requirement is not always enforced, a score between one and zero is given according to the level of constraint.

(3) Borrowing Constraints:

If there are numerical constraints on borrowing, such as maximum debt service/revenue ratios, up to .5 points, according to the coverage of the constraints.

(4) Limits on the Use of Debt:

If debt may not be used for current expenditures, .5 points.

The value of the first part of the index (criteria 1 through 4) is equal to 2 minus the sum of the points from criteria (1) through (4). For example, if subnational governments in a country cannot borrow, the total for this part will be $2-2=0$.

Additional criteria are:

(5) Subnational Government Banks:

If subnational governments own banks, 1 point. If these banks have substantial importance, an additional .5 points. If subnational governments have special relationships with banks, but do not actually own them (as in the German *Länder*), .5 points.

(6) Public Enterprises:

If subnational governments own important public enterprises, and these have liberal borrowing practices, .5 points.

To obtain the final index for each country, the scores from criteria (5) and (6) are added to the first part of the index. One is added so that the final index varies between 1 and 5.