

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 fiscal and political institutions on the fiscal performance of subnational governments. Long-term balanced budgets among subnational governments are found when either (1) the center imposes 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 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 intergovernmental 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 or politically constrained central governments take on heavy co-financing obligations, they often 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 empower states with veto authority over central government decisions (Treisman 1999, Wibbels 2000).

This paper addresses one of the most formidable challenges facing 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. An important goal it to move beyond some of the simple generalizations in the new literature stressing the dangers of fiscal and political decentralization and add some institutional detail.

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

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

basic commitment problem, and then examines the fiscal and political incentive structures that exacerbate it. First, it hypothesizes that if subnational governments have access to credit, higher levels of dependence on intergovernmental grants 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 fifth section examines time-series cross-sectional data, the penultimate section summarizes and discusses the results, 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 overfish the common revenue pool by shifting their costs onto others. The problem can be captured by a simple non-cooperative game in which the first move is made by nature, determining the “type” of the central government—either “resolute” or “irresolute.” The second move is made by a subnational government, which must make fiscal decisions without knowing the central government’s type. At this stage, the subnational government decides whether or not it will play a cost-shifting strategy. For instance, it must decide whether or not to undertake a costly new project that will lead to dangerous debt levels, or when faced with a permanent negative revenue shock, it must decide whether to undertake politically painful expenditure reductions or tax increases. If it funds the project or refuses to adjust, it increases the likelihood that it or one of its successors will be forced to eventually request a special debt-reduction grant or ask that the central government directly take over some of its obligations. If it chooses to scrap the project or adjust on its own, the game ends. The decision about whether to fund the project or adjust to the shock depends upon the anticipated response of the central government in the third stage of the game, when the center decides whether or not to provide the bailout. The resolute type of central

government will never prefer to provide the bailout, while for the irresolute type, the costs of *not* providing a bailout exceed those of providing one. The subnational government must assess the probability, $0 \leq p \leq 1$, that it is playing against an irresolute government. Since bailouts are beneficial to the recipient but costly to taxpayers as a whole, the central government will wish to announce firmly ex ante that it is the resolute type. 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 believe that eventual bailouts are likely ($p > 0$)—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.

The remainder of this paper attempts to identify the confluence of institutional factors that undermine the center’s commitment (subnational perception of p) and thus encourage subnational governments to over-borrow. That is, it examines factors that allow subnational governments and their voters to believe that their fiscal burdens may eventually be borne by others. The remainder of this section draws on public economics literature that points to the importance of intergovernmental transfers, and recent work by political scientists on the role of federal institutions to lay out hypotheses about the incentives and behavior of both central and subnational governments.

INTERGOVERNMENTAL TRANSFERS

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 purely 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, and p would be close to zero. 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 suggest that individuals 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.² 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).

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, Rattso 2000). A central proposition of this paper is that transfer-dependence also alters beliefs about the sustainability of subnational *deficits* by increasing p , 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 subnational 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, eventually 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

² 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).

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.³ 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.

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 creature of its own citizens. This perception depends critically on the power to tax. H1 hypothesizes that the perceived probability that the central government is irresolute—and hence subnational deficits—goes up with levels of transfer-dependence.

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 in a system with high vertical fiscal imbalance and it is common knowledge that the center is irresolute, it will 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,

³ 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 triple A ratings of the German Laender (in spite of widely divergent fiscal health) and their justification by Fitch-Ibca (Rodden 2001b).

restrictions on the use of debt, and balanced budget requirements.⁴ 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.⁵ 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” (p is low) 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. Thus subnational politicians are not tempted to play cost-shifting strategies. 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]

⁴ For a review, see Ter-Minasian and Craig (1997).

⁵ 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 subunits, 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 overrepresentation 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: Political federalism undermines subnational fiscal discipline.

H6: The effect of federalism on subnational fiscal discipline is conditional on vertical fiscal imbalance.

Even without an effect on borrowing autonomy, one might expect the unique territorial representation of federalism to increase the perceived probability that the center is irresolute. 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). Based on such considerations, recent studies by political scientists posit a direct link between federal political institutions and fiscal indiscipline (Triesman 2000, Wibbels 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 effect on the center’s ability to commit in the first place (H5). That is, the presence of federal institutions 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 might 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.

SUMMARY OF HYPOTHESES

[FIGURE 2 ABOUT HERE]

Figure 2 summarizes all of these possibilities, using bold lines to represent direct relationships and dashed lines for interactive relationships.⁶ H1 builds on the “common pool” interpretation of intergovernmental grants and hypothesizes a simple relationship between transfer-dependence (vertical fiscal imbalance) and subnational fiscal performance. H5 is based on recent studies asserting a simple relationship between federalism and subnational deficits. H3 and H6 are the interactive hypotheses: H3 suggests that the effects of vertical fiscal imbalance and borrowing autonomy are conditional on one another, and H6 suggests that the effects of vertical fiscal imbalance and federalism are conditional on one another. Finally, H2 and H4 acknowledge that it may be inappropriate to view borrowing autonomy as exogenous; central government attempts to control subnational fiscal decisions may be shaped by vertical fiscal imbalance and federalism.

III. DATA

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

⁶ The author wishes to thank an anonymous reviewer for suggesting this presentation.

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 sample contains all state or local government sectors for which complete data could be obtained.⁹

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 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.

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

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

⁹ The most important constraint was the availability of data on subnational fiscal performance.

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,¹⁰ 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 because some of the sources did not include sufficient time series variation.

The GFS “grants” variable may nevertheless be useful because it is available on a yearly basis. 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. This variable is used in the time series cross-section analysis.

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.¹¹ I have used a slightly modified version of the IDB formula to measure borrowing autonomy for a larger sample of subnational governments.¹² 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,

¹⁰ Watts (1996), Fukasaku & de Mello (1998), Von Hagen and Eichengreen (1996).

¹¹ IDB 1997, pages 173-176.

¹² 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.”

Austria, Brazil, Canada, Germany, India, Mexico, Spain, Switzerland, and the United States.¹³ The argument about federalism above, however, was driven by a specific aspect of federalism—the “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.¹⁴ 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.¹⁵ 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.¹⁶ 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.¹⁷ 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

¹³ 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.

¹⁴ 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).

¹⁵ 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.

¹⁶ 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.

¹⁷ Because the data are skewed, natural logs are used for both.

control for the overall level of decentralization—subnational expenditures as a share of total public sector expenditures (calculated from the GFS).

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).¹⁸ 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.¹⁹

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. Additionally, since Persson and Tabellini (1998) find important differences in fiscal behavior between presidential and parliamentary democracies, I include a variable from the World Bank’s *Database of Political Institutions (DPI)* that takes on 0 for pure presidential systems, 1 for systems with assembly-elected presidents, and 2 for pure parliamentary systems. Furthermore, it may be useful to control for partisan fragmentation in the central government. One might hypothesize that the central government is in a better position to “say no” to bailout requests if the president presides over a unified legislature in presidential systems, or if the Prime Minister in a parliamentary system need not hold together a diverse coalition. Thus I include the index of political cohesion developed by Roubini and Sachs (1989).²⁰

¹⁸ Source: WDI.

¹⁹ Ibid.

²⁰ Taken from the DPI, this variable takes on 0 for presidential systems under unified government, and 1 under divided government. For parliamentary systems, it takes on 0 for 1-party government, 1 for a 2-party coalition, 2 for a coalition with 3 or more parties, and 3 for minority government. Similar results to those presented below are obtained using a variety of other “government fragmentation” variables from the DPI, including a more complex “veto player” index.

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.²¹

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 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.²² 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.

The main goal is to estimate a model of average subnational surplus and ascertain whether vertical fiscal imbalance and federalism have direct or more complex interactive effects. Furthermore, there are good reasons to suspect that the relationship is complicated by an intervening variable—borrowing autonomy. Thus the empirical model must accommodate H2 and H4 by allowing federalism and vertical fiscal imbalance to affect borrowing autonomy. This calls for a system of equations in which

²¹ This variable is 0 for all states and provinces in federal systems and local governments in unitary systems.

²² 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.

borrowing autonomy is endogenous. Leaving aside H3 and H6 (the interactive hypotheses) for the moment, the following structural model makes it possible to test H1, H2, H4, and H5 simultaneously:

$$\text{Surplus} = a_1 + a_2\text{VFI} + a_3\text{Borrow Autonomy} + a_4\text{Federalism} + a_i\text{Controls} + v \quad (1)$$

$$\text{Borrow Autonomy} = b_1 + b_2\text{VFI} + b_3\text{Federalism} + b_4\text{Log GDP per Capita} + b_5\text{Log Population} + b_6\text{System} + w, \quad (2)$$

where federalism, GDP per capita, vertical fiscal imbalance, population, system (the presidential/parliamentary variable) and all control variables are treated as exogenous. Using three-stage least squares, the parameters of equations 1 and 2 are estimated simultaneously.²³

[TABLE 1 ABOUT HERE]

The results are reported in the first column of Table 1. First, note that the borrowing autonomy equation performs quite well. Recall that 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 institutions constrain the central government's range of choices. Strong support is found for both propositions. Countries with higher levels of vertical fiscal imbalance indeed demonstrate lower levels of subnational borrowing autonomy, and states and provinces in federations do have significantly freer access to deficit finance than local or municipal governments. The results also suggest that central governments in wealthier, more populous, and presidential (as opposed to parliamentary) countries allow subnational governments freer access to credit markets.

In the subnational surplus equation, on the other hand, the variables of interest do not approach statistical significance in any specification—even if insignificant control variables are dropped, and even if a more simple single-equation OLS model is used. Thus no support is found for H1 or H5. Though vertical fiscal imbalance helps explain levels of borrowing autonomy, it does not have an independent effect on subnational fiscal performance. Likewise, constituent units in federations do have more

²³ A variety of other right-hand side variables have been included in equation 2, but only these approached statistical significance. To meet the order condition, population (which never achieves significance in any model of subnational fiscal balance) is not included in Equation 1. A variety of alternative three-stage specifications yielded very similar results.

borrowing autonomy, but other things equal, they do not have significantly higher deficit/expenditure ratios than local governments.

Model 2 estimates the same structural model, but instead of testing for independent effects of borrowing autonomy and vertical fiscal imbalance, it examines H3 by including a multiplicative interaction term. Adding the interaction term raises the R^2 of the surplus equation from .68 to .77, and the variables of interest are individually and jointly highly significant. The best way to interpret the interaction is with reference to Figure 3, which plots the conditional effect of vertical fiscal imbalance with a bold line and the 95 percent confidence interval with dotted lines. The horizontal axis displays the range of the borrowing autonomy index (from one to five). Figure 3 shows that when subnational governments face strict formal limitations on their ability to borrow, vertical fiscal imbalance has a small positive effect on fiscal balance. But as subnational governments gain independent access to credit, vertical fiscal imbalance has an increasingly negative impact on budget balance. Figure 4 gives a sense of the model's substantive predictions. It maps directly onto Figure 1, displaying the model's predictions when the borrowing autonomy and vertical fiscal imbalance are held at their 20th and 80th percentile values and all other variables are held at their mean values. It shows strong support for H3. Predicted long-run deficits are much higher in the upper right hand cell (around 14 percent of expenditures) where high levels of borrowing autonomy and vertical fiscal imbalance combine. The model predicts balanced budgets when subnational governments face substantial borrowing restrictions (the lower cells), and not surprisingly, it predicts slightly higher deficits on average (around 6 percent of expenditures) when governments are self-financing and have wide-ranging borrowing authority.

Moving on to H6, model 3 holds borrowing autonomy constant and examines separate effects of vertical fiscal imbalance for constituent units in federations and local governments. Consistent with H6, vertical fiscal imbalance only has a significant negative effect on subnational fiscal outcomes among states and provinces. Substantively, once again holding all control variables at their mean values, this model predicts long-term deficits of only around one percent of expenditures among *local* governments at both low (20th percentile) and high (80th percentile) values of vertical fiscal imbalance. Among

constituent units in federations, the model predicts a 3 percent deficit when vertical fiscal imbalance is at the 20th percentile value, and a 7 percent deficit when at its 80th percentile value.²⁴

Given the results of models 2 and 3, it seems possible that the best model would combine them by using a triple interaction term. Specifically, it is possible that the (VFI) x (Borrowing Autonomy) result in model 2 is driven primarily by federated units. Table 2 presents results of two such models, leaving out the (very similar) estimates for the control variables and borrowing autonomy equation to save space. Model 4 examines separate effects of the (VFI) x (Borrowing Autonomy) interaction for federated units and local governments, and finds highly significant negative coefficients for both that resemble the coefficient for the interaction term in Model 2. This suggests that the effect of vertical fiscal imbalance is contingent on borrowing autonomy (and vice-versa) among *both* federated units and local governments.

[TABLE 2 ABOUT HERE]

This result should be approached with caution, however. In general, one should be skeptical about regression analysis using non-continuous indexes. Here especially, one might be concerned about the “false precision” of the borrowing autonomy index. As a robustness check, models 1 through 3 have been estimated using a simpler dummy version of the borrowing autonomy index (with the median value used as the cut-point), and all of the results were quite similar.²⁵ Similarly, Model 5 replaces the 1-5 borrowing autonomy index with the dummy, estimating separate effects of vertical fiscal imbalance for high and low levels of borrowing autonomy among federated units and local governments. Here the only significant coefficient is for federated units with high levels of borrowing autonomy. But it should be noted that when dividing the cases into those with borrowing autonomy above and below the sample median, 10 of the federated units are above the median, and only 1 (Austria) is below. Of 26 local governments in the sample, 9 are above and 17 are below. Thus it is very difficult to distinguish between the effects of federalism and borrowing autonomy. Furthermore, one should avoid concluding based on 9

²⁴ A very similar result (available upon request) is obtained using the continuous “territorial representation” measure of federalism based on the Samuels-Snyder index of upper chamber malapportionment.

²⁵ Additionally, none of the main results are affected by including or excluding control variables, including a matrix of region dummies, or dropping individual cases. Similar results have also been obtained using equation-by-equation OLS.

cases that vertical fiscal imbalance is *not* associated with subnational fiscal outcomes in unitary systems with high levels of borrowing autonomy.

To summarize the results, vertical fiscal imbalance and federalism affect long-term fiscal balance, but in a complicated and contingent way.²⁶ First of all, there is no support for H1—vertical fiscal imbalance does not have a direct independent effect on subnational fiscal outcomes; but there is support for H2—at higher levels of vertical fiscal imbalance, central governments attempt to cut off subnational access to credit markets. Perhaps the most important result is in support of H3—when relatively free to borrow, more transfer-dependent subnational sectors are likely to run larger long-term deficits.

As for federalism, no support is found for H5. Other things equal, federated units do not run significantly larger deficits than local governments. But federalism nevertheless matters a great deal. Above all, federated units have much greater access to credit than local governments (H4), and the largest subnational deficits in the sample are found among federations with high levels of transfer-dependence (H6). The coincidence of wide-ranging borrowing autonomy, high vertical fiscal imbalance, and large deficits is found primarily among constituent units in federal systems. The contingent relationship between borrowing autonomy and vertical fiscal imbalance appears to hold up among both federated units and local governments, but the relationship among local governments is less robust, perhaps because of the relatively small number of cases of high borrowing autonomy among local governments.

V. TIME-SERIES CROSS-SECTION ANALYSIS

²⁶ The performance of the control variables can be summarized as follows. “Persons per jurisdiction” has the hypothesized negative sign in each model, but statistical significance is quite sensitive to the precise specification. Land area is unrelated to subnational fiscal performance. As expected, the models show that expenditure decentralization is associated with larger deficits, but statistical significance is sensitive. There is no evidence that wealth affects subnational fiscal performance, and the coefficient for the “dependency” ratio, though negative as expected, does not achieve significance in many specifications. Coefficients for population density, central bank autonomy, executive-legislative relations, and central government political cohesion have are not significantly different from zero. Surprisingly, the central government’s long-term fiscal performance is not positively correlated with subnational fiscal performance. However, the fiscal performance of local governments in federal systems is intertwined with that of the states and provinces.

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 focuses on time series rather than cross-section variation and asks whether and under what conditions the growth of grants over time might also affect deficits. That is, it examines diachronic versions of H1, H3, H5, and H6. 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. H5 posits that subnational deficits will grow more rapidly in federations.

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 funded by increased intergovernmental transfers rather than new own-source local taxes and fees. Given the present concern in the literature about the supposed macroeconomic dangers of decentralization, this section provides an exploration of the fiscal and political conditions under which decentralization might lead to upward pressure on 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-country 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 bias. In order to avoid the potential bias associated with this approach, the results

presented below are from estimations that use the GMM estimator derived by Arellano and Bond (1991).²⁷ 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 lagged twice.²⁸ As recommended by Arellano and Bond, (1991) one-step robust results are presented and used for inference on coefficients.

The most straightforward model—displayed in Table 3 (model 6)—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. An important control variable is subnational revenue as a share of total (combined state, central, and local) revenue. This set-up allows one to compare the impact of growing revenue decentralization, and that of having more of the revenue tilted towards grants. The model also includes two lags of the dependent variable, changes in all of the other control variables that vary over time, levels for those that do not, and a set of dummies for each subnational sector.²⁹

[TABLE 3 ABOUT HERE]

In order to examine H1, model 6 includes only grants/revenue, while model 7 examines H3 and H6 by breaking this variable down and estimating separate effects for systems with high and low levels of borrowing autonomy (above and below the median value), and within these categories, separate effects for local/municipal governments and constituent units in federations. H5 is examined in each model by including the dummy variable that distinguishes between federated units and local governments. In each model, it is not surprising that the coefficient for “subnational revenue/total revenue” is positive and significant; as a subnational government receives a larger share of total government revenue, its fiscal position improves. In model 6, although the coefficient for grants/subnational revenue is negative as

²⁷ The Arellano-Bond technique may also lead to bias when the number of cross-section units is low. Since the models reported below include between 30 and 40 units, the models have been estimated using a variety of alternative estimation techniques, achieving similar results except when noted.

²⁸ 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.

²⁹ 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

predicted by H1, it is not significantly different from zero. However, Model 7 demonstrates very clearly that the coefficient is negative and highly significant, as predicted by H3, among cases with high levels of borrowing autonomy, regardless of status as federated units or local governments. Recall from above that there are 10 state-provincial sectors and 9 local sectors with “high” levels of borrowing autonomy, and the coefficients suggest that a one percent increase (decrease) in transfer-dependence is associated with .32 percent and .54 percent declines (improvements) in fiscal balance (as a share of revenue) respectively. The significant positive coefficient for federated units with low levels of borrowing autonomy is driven exclusively by Austria. For the remaining cases—the 17 local government sectors with low levels of borrowing autonomy—the coefficient is positive but not significant.

The results presented in Table 3 lend support neither to H5 nor H6. There is no evidence that deficits grow more quickly among federated units—in no estimation does the “federal” dummy approach statistical significance. Furthermore, among subnational sectors with substantial borrowing autonomy, growing transfer-dependence does not have a larger effect on fiscal outcomes among federated units than among local governments. In fact, the negative coefficient is larger for local governments.

All of these results are quite robust. Similar results are obtained with and without fixed effects and year dummies, and the results are not affected by the deletion of cases. Very similar results are obtained with a variety of other estimation techniques (including OLS with panel corrected standard errors, lags of the dependent variable, and fixed effects). It is also useful to examine subnational fiscal balance relative to GDP rather than subnational expenditures, since direct cross-national comparability is no longer a concern in the dynamic panel data set-up, and this variable provides a sense of the importance of subnational deficits relative to the entire economy. This approach yields very similar results (available upon request) to those presented in Table 3.

VI. MAIN RESULTS: SUMMARY, EXTENSION AND DISCUSSION

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.

The results of the panel data analysis lend further support to the analysis of long-term averages with respect to transfer-dependence, and they help resolve some of the uncertainty about the role of federalism. Table 4 summarizes the results of both sections. First of all, models that consider long-term averages across countries and changes over time within countries lend no support to the simple proposition that higher levels of transfer-dependence are associated with larger or faster-growing subnational deficits (H1). Rather, both types of models suggest that subnational governments can assuage the intergovernmental moral hazard problem by cutting off the access of subnational governments to credit markets. The cross-section models show that indeed, at higher levels of vertical fiscal imbalance, central governments attempt to restrict subnational borrowing (H2). The cross-section models predict relatively small deficits among subnational governments that either (a) face relatively strict formal borrowing limitations, or (b) are relatively fiscally independent, while the largest long-term deficits are found among subnational governments that are simultaneously transfer-dependent and free to borrow (H3). Similarly, growing transfer-dependence over time is associated with larger subnational deficits only among the subnational sectors that are free to borrow.

[TABLE 4 ABOUT HERE]

The role of federalism is somewhat more complicated. Federated units display neither larger nor faster-growing deficits than local governments (H5). However, they do have significantly higher levels of borrowing autonomy (H4)—so much so that it is difficult to differentiate between the effect of borrowing autonomy and federalism. Though the degrees of freedom are low, the cross-section analysis does suggest that the conditional relationship between borrowing autonomy and transfer-dependence holds up among both federated units and local governments. Moreover, the panel data results show very clearly that when free to borrow, growing transfer-dependence has a negative effect on subnational fiscal performance both among federated units and local governments.

But H6 suggests that the negative effect of transfer-dependence will be more pronounced among federated units. Here the results of the cross-section and dynamic panel analyses are discordant, though it must be borne in mind that they make use of different measures of vertical fiscal imbalance. Moreover, to disentangle the long-term effect of borrowing autonomy from that of federalism would require excessive

reliance on small variations in a fallible non-continuous index. Yet it is worth noting that the largest long-term deficits are clearly found among federated units with relatively high levels of vertical fiscal imbalance, even though panel analysis rejects the proposition that marginal increases in transfer-dependence have a more pronounced effect among federated units.

TOTAL PUBLIC SECTOR DEFICITS

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 subnational fiscal balance as the 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 the key results 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 specifications since states and local governments within federations can no longer be individual data points. Vertical fiscal imbalance and borrowing autonomy in federations must now be based on a weighted (by expenditure share) average of state and local governments. “Grants/Revenue” now refer to totals for all subnational governments. In addition, the control variables measuring changes in fiscal balance for higher-level governments must be left out.

Table 5 presents the results of a model that simply re-estimates Model 2 from above using average aggregate deficit/expenditure as the dependent variable. Estimates for the borrowing autonomy equation and control variables (not shown) are quite similar; in fact some of the control variables gain significance. Though the coefficient on the interaction variable is slightly smaller than in the subnational deficit model, the result is quite similar, and survives all of the robustness checks outlined above.³⁰ Moreover, a similar result is obtained when the aggregate deficit is indexed by GDP rather than expenditures. When subnational governments are free to borrow, higher reliance on intergovernmental transfers is associated with larger aggregate deficits not just for the subnational sector, but for the entire public sector.

[TABLE 5 ABOUT HERE]

Table 6 presents two models that extend the panel data analysis to total deficits, examining the effects of changes in grants (as a share of total subnational revenue) on changes in total deficits (as a share of total expenditures). Model 9 is the simple model, and model 10 includes separate effects.

[TABLE 6 ABOUT HERE]

First of all, note that the coefficient for subnational revenue/total revenue is negative and significant in both models, suggesting that other things equal, revenue decentralization is associated with declining overall fiscal performance. Substantively, a one percent increase in the subnational share of total revenues is associated with roughly one half percent decline in surplus as a share of expenditures.

While this lends some empirical support to the fear that fiscal decentralization can harm budget balance, once again, more precise institutional details are important. As in Table 3, the coefficient for the grants/revenue variable has a negative coefficient in the simple model, but it does not quite reach statistical significance. Model 9 shows that as in the subnational deficit models, the negative coefficient seems to be driven by the cases with substantial borrowing autonomy, the coefficients for which are large, negative, and significant. Thus growing transfer-dependence is associated with growing total deficits, and once again, contrary to the logic of H6, increasing transfer-dependence actually has a larger negative effect on fiscal performance in unitary systems.

ENDOGENEITY AND OMITTED VARIABLES

One potential weakness of this study is that although it explicitly considers endogenous borrowing autonomy, it maintains the assumption that vertical fiscal imbalance is exogenous. One might suspect that dependence on intergovernmental transfers is caused by some of the other variables considered here, like federalism, country size, persons per jurisdiction, or wealth. However, federated units and local governments on average demonstrate virtually identical levels of vertical fiscal imbalance (around .47), and none of the other variables is correlated with vertical fiscal imbalance above .25. Similarly, none of the other variables successfully explains fluctuations in transfer-dependence over time.

³⁰ As before, this model performs much better than a non-interactive model.

Explaining transfer-dependence across countries and over time is an important goal for future analysis. Such analysis should look carefully at levels of income inequality across units that might create demands for regional redistribution, and constitutional provisions like Germany's that essentially mandate vertical fiscal imbalance by obligating the central government to ensure similar government services across units.

Future studies might also do more to break vertical fiscal imbalance down into its components and distinguish between the incentive effects of different types of intergovernmental grants. For example, discretionary grants are more likely to encourage bailout expectations than are formulaic transfers, and fungible general-purpose transfers are more likely to do so than are tightly earmarked grants. This paper probably approaches the limits of what can be done with a large cross-national data set. 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.³¹ 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.

Future work should also pay more attention to an additional omitted variable—partisanship. If a subnational government is controlled by the same party that controls the central government, it may be tempted to over-spend if it believes the center will be more likely to provide a bailout in the near future. However, as Dillenger and Webb (1999) and Jones et al. (2000) point out, co-partisanship may also provide the opposite incentive—the center may be able to force fiscal discipline on its co-partisan provinces in order to protect the national value of the party label. While it would be virtually impossible to collect partisanship data for all of the subnational governments examined here (e.g. France alone has over 36,000 local governments), future disaggregated single-country studies or small-*n* comparisons can help distinguish between these possibilities.

³¹ 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

VII. IMPLICATIONS AND CONCLUSIONS

Fiscal decentralization and political federalism may indeed complicate macroeconomic management, but their effects are contingent on other institutional factors. In the long run, aggregate subnational deficits are highest among the lower-level governments that are most dependent on intergovernmental transfers and most free of hierarchical borrowing restrictions. 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 dangerous combination of subnational borrowing and transfer-dependence is most pronounced among states and provincial governments in federations, but unlike previous studies,³² federalism has very little *independent* effect on fiscal outcomes. When other factors are accounted for, federations display neither larger nor faster-growing subnational or total deficits than unitary systems. Moreover, panel data analyses reveal that the negative impact of growing transfer-dependence on fiscal outcomes is, if anything, more pronounced among unitary systems. 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.”

From a policy perspective, these empirical results are hard to ignore. The combination of wide-ranging subnational borrowing autonomy and increasing transfer-dependence is 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 may be particularly severe in large formal federations, where

provision. On Argentina see Jones, et al. (2000); on Germany see Rodden (2000); on the United States see Rogers and Rogers (2000).

³² Previous cross-national studies have sought out differences in macroeconomic management between federal and unitary countries. See, e.g. Treisman (2000) showing that federations have more stable inflation rates and Wibbels (2000), showing that federations run larger deficits than unitary systems in a sample of developing countries.

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, 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, the data also show 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 spending and borrowing.

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.³³ 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 the center is resolute in its no-bailout pledge. 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.

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

³³ See, e.g. Lowry, Alt, and Ferree (1999), Besley and Case (1995), Bayoumi, Goldstein, and Woglom (1995), Feld and Kirchgassner (1999).

the same time, the center can be politically too weak, fragmented, or even beholden to certain subnational governments 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).

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.

References

- Anderson, T.W. and Cheng Hsiao. 1981. "Estimation of Dynamic Models with Error Components." *Journal of the American Statistical Association* 76: 598-606.
- Arellano, Manuel and Stephen Bond. 1991. "Some Tests of Specification for Panel Data: Monte Carlo Evidence and an Application in Employment Equations." *The Review of Economic Studies* 58: 277-97.
- Baltagi, Badi. 1995. *Economic Analysis of Panel Data*. West Sussex, England: Wiley.
- Bayoumi, Tamim, Morris Goldstein, and Geoffrey Woglom. 1995. "Do Credit Markets Discipline Sovereign Borrowers? Evidence from the U.S. States." *Journal of Money, Credit, and Banking* 27: 1046-59.
- Beck, Nathaniel and Jonathan Katz. 1995. "What to do (and not to do) with Time Series Cross Section Data." *American Political Science Review* 89: 634-47.
- Besley, Timothy and Anne Case. 1995. "Incumbent Behavior: Vote-Seeking, Tax-Setting, and Yardstick Competition." *American Economic Review* 85: 25-45.
- Bird, Richard. 1986. *Federal Finance in Comparative Perspective*. Toronto: Canadian Tax Foundation.
- Blaas, Hans and Petr Dostál. 1989. "The Netherlands: Changing Administrative Structures." In Robert Bennett, ed., *Territory and Administration in Europe*. London and New York: Printer.
- Blondal, Jon. 1998. "Fiscal Federalism in OECD Member Countries." In Kiichiro Fukasaku and Ricardo Hausmann, eds., *Democracy, Decentralization and Deficits in Latin America*. Washington, D.C.: Inter-American Development Bank and OECD.
- Breton, Albert. 1996. *Competitive Governments: An Economic Theory of Politics and Public Finance*. Cambridge: Cambridge University Press.
- Bury, Piotr and Carl-Johan Skovsgaard. 1988. "Local Government Finance." In Jerzy Regulski, Susanne Georgi, Henrik Toft Jensen, Barrie Needham, eds., *Decentralization and Local Government: a Danish-Polish Comparative Study in Political Systems*. New Brunswick, NJ: Transaction Press.
- Cielecka, Anna and John Gibson. 1995. "Local Government in Poland." In Andrew Coulson, ed., *Local Government in Eastern Europe: Establishing Democracy at the Grassroots*. Aldershot: Edward Elgar.
- Courchene, Thomas. 1994. *Social Canada in the Millennium: Reform Imperatives and Restructuring Principles*. Toronto: C.D. Howe Institute.
- Cremer, Jacques and Thomas Palfrey. 1999. "Political Confederation." *American Political Science Review* 93: 69-93.
- Cukierman, Alex. 1992. *Central Bank Strategy, Credibility, and Independence: Theory and Evidence*. Cambridge, MA and London: MIT Press.
- Dillinger, William and Steven Webb. 1999. "Fiscal Management in Federal Democracies: Argentina and Brazil." Policy Research Working Paper Number 2121. Washington, D.C: World Bank.
- Eichengreen, Barry and Jürgen von Hagen. 1996. "Fiscal Restrictions and Monetary Union: Rationales, Repercussions, Reforms." *Empirica* 23: 3-23.
- Elazar, Daniel J. 1995. "From Statism to Federalism: A Paradigm Shift." *Publius* 25: 5-18.

- Feld, Lars and Gebhard Kirchgässner. 1999. "Public Debt and Budgetary Procedures: Top Down or Bottom Up? Some Evidence from Swiss Municipalities." In James Poterba and Juergen von Hagen, eds., *Fiscal Institutions and Fiscal Performance*. Chicago: U. of Chicago.
- Fornisari, Francesca, Steven Webb, and Heng-fu Zou. 1998. "Decentralized Spending and Central Government Deficits: International Evidence." Washington, D.C.: World Bank.
- Fukasaku, Kiichiro and Luiz de Mello. 1998. "Fiscal Decentralization and Macroeconomic Stability: The Experience of Large Developing and Transition Economies." In Kiichiro Fukasaku and Ricardo Hausmann, eds., *Democracy, Decentralization and Deficits in Latin America*. Washington, D.C.: Inter-American Development Bank and OECD.
- Gilbert, Guy and Alain Guengant. 1989. "France: Shifts in Local Authority Finance," in Robert Bennett, ed., *Territory and Administration in Europe*. London and New York: Printer.
- Harloff, Eileen Martin. 1988. *The Structure of Local Government in Europe*. The Hague: International Union of Local Authorities.
- Hecht, Arye. 1988. "The Financing of Local Authorities," in Daniel Elazar, Chaim Kalchheim, eds., *Local Government in Israel*. New York: University Press of America.
- Helmsing, A.H.J. "Rural Local Government Finance. Past Trends and Future Options," in A.H.J. Helmsing, N.D. Matizwa-Mangiza, D.R. Gasper, C.M. Brand, K.H. Wekwete, eds., *Limits to Decentralization in Zimbabwe: Essays on the Decentralization of Government and Planning in the 1980s*. The Hague: Institute of Social Studies Press.
- Hines, James and Richard Thaler. 1995. "The Flypaper Effect." *Journal of Economic Perspectives* 9: 217-226.
- Inman, Robert. 2001. "Local Fiscal Discipline in U.S. Federalism." In Jonathan Rodden, Jennie Litvack, and Gunnar Eskeland, eds., *Decentralization and the Challenge of Hard Budget Constraints*. Typescript. Washington, D.C.: World Bank.
- Inter-American Development Bank. 1997. "Fiscal Decisionmaking in Decentralized Democracies." In *Latin America After a Decade of Reforms, Economic and Social Progress in Latin America Report*. Washington, D.C., Johns Hopkins.
- _____. 1999. "Decentralization and Fiscal Discipline in Sub-National Governments: The Bailout Problem," Typescript. Washington, D.C.: Inter-American Development Bank.
- Jones, Mark, Pablo Sanguinetti, and Mariano Tommasi. 2000. "Politics, Institutions and Fiscal Performance in a Federal System: An Analysis of the Argentine Provinces." *Journal of Development Economics* 61: 305-33.
- King, Gary, Michael Tomz and Jason Wittenberg. 2000. "Making the Most of Statistical Analyses: Improving Interpretation and Presentation." *American Journal of Political Science* 44: 347-361.
- Kitchen, Harry and Melville McMillan. 1985. "Local Government and Canadian Federalism." In Richard Simeon, ed., *Intergovernmental Relations*. Ottawa: Minister of Supply and Services Canada.
- Litvack, Jennie, Junaid Ahmad and Richard Bird. 1998. "Rethinking Decentralization in Developing Countries." Washington, D.C.: World Bank.
- Lowry, Robert, James Alt and Karen Ferree. 1998. "Fiscal Policy Outcomes and Electoral Accountability in the American States." *American Political Science Review* 92: 759-74.
- Newton, Michael, with Peter Donaghy. 1997. *Institutions of Modern Spain: A Political and Economic Guide*. Cambridge: Cambridge University Press.
- Nurminen, Eero. 1989. "Finland: Present and Futures in Local Government." In Robert Bennett, ed., *Territory and Administration in Europe*. London and New York: Printer.

- Oates, Wallace. 1972. *Fiscal Federalism*. New York: Harcourt Brace Jovanovich.
- _____. 1979. "Lump-Sum Intergovernmental Grants Have Price Effects." In P. Mieszkowski and W. Oakland, eds., *Fiscal Federalism and Grants-in-Aid*. Washington, D.C.: The Urban Institute.
- _____. 1991. "On the Nature and Measurement of Fiscal Illusion: A Survey." In Wallace Oates, ed., *Studies in Fiscal Federalism*. Brookfield, VT: Edward Elgar.
- _____. 1999. "An Essay on Fiscal Federalism." *Journal of Economic Literature* 37: 1120-1149.
- Padilla, Perfecto. 1993. "Increasing the Financial Capacity of Local Governments." In Perfecto Padilla, ed., *Strengthening Local Government Administration and Accelerating Local Development*. Manila: University of the Philippines.
- Persson, Torsten and Guido Tabellini. 1998. "The Size and Scope of Government: Comparative Politics with Rational Politicians." 1998 Alfred Marshall Lecture, EEA Congress, Berlin.
- Prud'homme, Remy. 1995. "On the Dangers of Decentralization," *The World Bank Research Observer* 10: 2.
- Rattso, Jorn. 1999. "Vertical Fiscal Imbalance in a Welfare State: Norway," in Jonathan Rodden, Jennie Litvack, and Gunnar Eskeland, eds., *Decentralization and the Challenge of Hard Budget Constraints*. Unpublished Manuscript, World Bank.
- _____. 2000. "Spending Growth with Vertical Fiscal Imbalance: Decentralized Government Spending in Norway: 1880-1990." Typescript. Norwegian University of Science and Technology.
- Riker, William. 1964. *Federalism: Origin, Operation, Significance*. Boston: Little, Brown.
- Rodden, Jonathan, Gunnar Eskeland and Jennie Litvack, eds. 2001. *Decentralization and the Challenge of Hard Budget Constraints*. Typescript. Washington, D.C.: World Bank.
- Rodden, Jonathan. 2000. "And the Last Shall be First: Federalism and Deficits in Germany." Typescript. MIT.
- _____. 2001a. "Reviving Leviathan: Fiscal Federalism and the Growth of Government." Typescript. MIT.
- _____. 2001b. "Federalism and Soft Budget Constraints in Germany," in Jonathan Rodden, Jennie Litvack and Gunnar Eskeland, eds., *Decentralization and the Challenge of Hard Budget Constraints*. Typescript. Washington, D.C.: World Bank.
- Rogers, Diana Lim and John Rogers. 2000. "Political Competition and State Government Size: Do Tighter Elections Produce Looser Budgets?" *Public Choice* 105: 1-21.
- Roubini, Nouriel and Jeffrey Sachs. 1989. "Political and Economic Determinants of Budget Deficits in the Industrial Democracies." *European Economic Review* 33 (5): 903-938.
- Samuels, David and Richard Snyder. 2000. "The Value of a Vote: Malapportionment in Comparative Perspective." *British Journal of Political Science*. Forthcoming.
- Segodi, R. 1993. "Financing District Development in Botswana," in A.H.J. Helmsing and K.H. Wekwete, eds., *Subnational Planning and Eastern Africa: Approaches, Finances, and Education*. Aldershot: Grower.
- Spahn, Paul Bernd. 1997. "Switzerland." In Teresa Ter-Minassian, ed., *Fiscal Federalism in Theory and Practice*. Washington, D.C.: International Monetary Fund.
- Stein, Ernesto. 1998. "Fiscal Decentralization and Government Size in Latin America." In Kiichiro Fukasaku and Ricardo Hausmann, eds., *Democracy, Decentralization and Deficits in Latin America*. Washington, D.C.: Inter-American Development Bank and OECD.

- Alfred Stepan, "Federalism and Democracy: Beyond the U.S. Model." *Journal of Democracy* 10: 19-33.
- Tanzi, Vito. 1995. "Fiscal Federalism and Decentralization: A Review of Some Efficiency and Macroeconomic Aspects." In *World Bank Annual Conference on Development Economics*. Washington, D.C.: World Bank.
- Ter-Minassian, Teresa and Jon Craig. 1997. "Control of Subnational Borrowing." In Teresa Ter-Minassian, ed., *Fiscal Federalism in Theory and Practice*. Washington, D.C.: IMF.
- Treisman, Daniel. 1999. "Political Decentralization and Economic Reform: A Game-Theoretic Analysis," *American Journal of Political Science* 43: 488-517.
- Triesman, Daniel. 2000. "Decentralization and Inflation: Commitment, Collective Action, or Continuity?" *American Political Science Review* 94: 837-858.
- Von Hagen, Juergen and Barry Eichengreen. 1996. "Federalism, Fiscal Restraints, and European Monetary Union." *American Economic Review* 86: 134-38.
- Von Hagen, Jürgen, Massimo Bordignon, Matz Dahlberg, Bhahan Grewal, Per Petterson and Helmut Seitz. 2000. "Subnational Government Bailouts in OECD Countries: Four Case Studies." Inter-American Development Bank Working Paper R-399.
- Watts, Ronald. 1996. *Comparing Federal Systems in the 1990s*. Kingston: Queen's University Press.
- Weingast, Barry, Kenneth Shepsle, and Christopher Johnsen. 1988. "The Political Economy of Benefits and Costs: A Neoclassical Approach to Distributive Politics," *Journal of Political Economy* 89: 642-664.
- Wibbels, Erik. 2000. "Federalism and the Politics of Macroeconomic Policy and Performance," *American Journal of Political Science* 44: 687-702.
- Wildasin, David. 1997. "Externalities and Bailouts: Hard and Soft Budget Constraints in Intergovernmental Fiscal Relations." Typescript. Vanderbilt University.
- Winer, Stanley. 1980. "Optimal Fiscal Illusion and the Size of Government." *Public Choice* 35: 607-22.

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

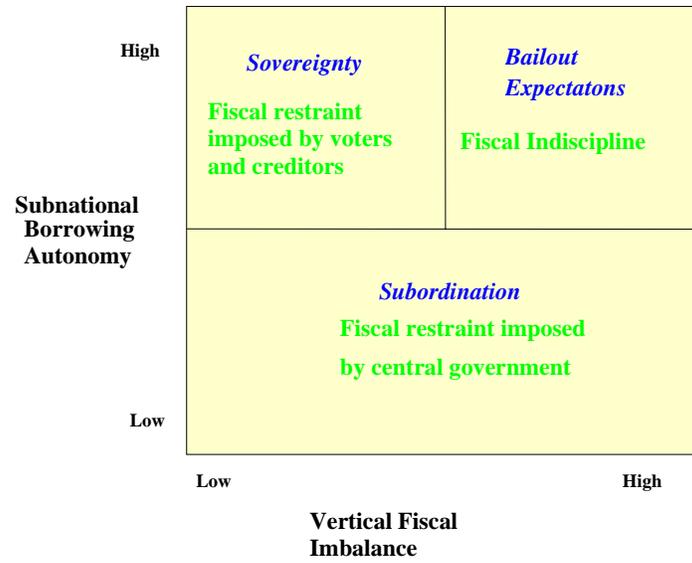


Figure 2: Summary of Hypotheses

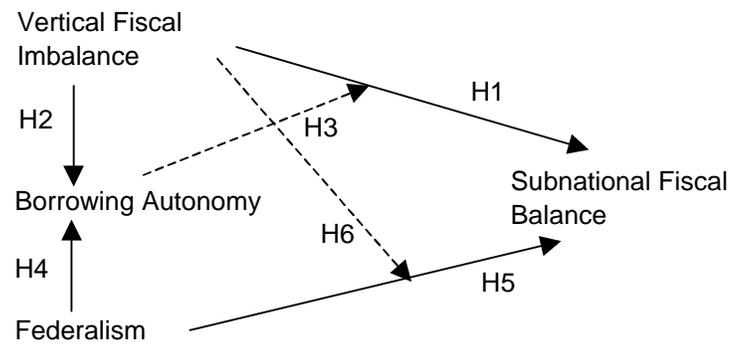


Figure 3: Conditional Effect of Vertical Fiscal Imbalance on Subnational Surplus/Expenditure

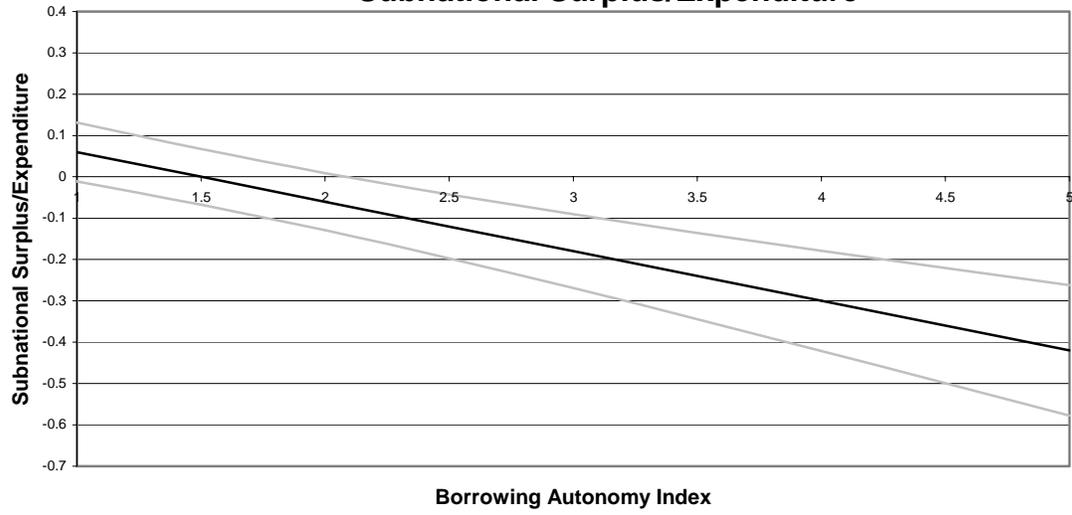


Figure 4: Average Subnational Surplus/Expenditure predicted by Model 2 at low and high values of Vertical Fiscal Imbalance and Borrowing Autonomy

	High	-.059	-.142
Borrowing Autonomy	Low	.009	.021
		Low	High
		Vertical Fiscal Imbalance	

Predicted values of dependent variable in model 2 at low and high (20th and 80th percentile) values of the components of the interaction term (other variables held at their means).

Table 1: Simultaneous Estimates of Average Subnational Fiscal Balance and Borrowing Autonomy (1986-1996)

	Model 1		Model 2		Model 3	
Subnational Surplus/Expenditure Equation						
Vertical Fiscal Imbalance	-0.062	(0.098)	0.232926	(0.052) ***		
Borrowing Autonomy	-0.037	(0.073)			-0.018	(0.057)
Federal Dummy	-0.020	(0.077)	0.020	(0.021)		
(VFI)x(Borrowing Autonomy)			-0.143	(0.023) ***		
(VFI)x(Constituent unit in Federation)					-0.084	(0.043) **
(VFI)x(Local Government)					-0.010	(0.110)
Persons per Jurisdiction	-0.004	(0.004)	-0.006	(0.003) **	-0.004	(0.003)
Log Area	0.005	(0.009)	0.010	(0.006)	0.0023	(0.009)
Subnational Expenditure/Total	-0.190	(0.131)	-0.183	(0.068) ***	-0.209	(0.147)
Log GDP per Capita	0.017	(0.038)	0.021	(0.014)	0.009	(0.034)
Dependency Ratio	-0.010	(0.120)	-0.064	(0.080)	-0.017	(0.125)
Population Density	0.00001	(0.0002)	0.0001	(0.0001)	-0.00003	(0.0002)
Central Bank Independence	0.026	(0.091)	-0.013	(0.046)	0.028	(0.076)
System (Pres/Parl)	-0.002	(0.023)	-0.012	(0.010)	0.002	(0.020)
Index of Political Cohesion	0.003	(0.016)	0.014	(0.011)	0.005	(0.013)
Central Govt. Surpl./Expenditure	-0.123	(0.205)	-0.203	(0.088) **	-0.124	(0.166)
State-Prov. Surpl./Exp	0.724	(0.208) ***	0.760	(0.175) ***	0.711	(0.206) ***
Constant	-0.103	(0.320)	-0.262	(0.170)	-0.048	(0.314)
"R ² "	0.68		0.77		0.63	
Borrowing Autonomy Equation						
Vertical Fiscal Imbalance	-1.437	(0.490) ***	-1.438	(0.490) ***	-1.439	(0.490) ***
Federal Dummy	0.961	(0.224) ***	0.962	(0.224) ***	0.966	(0.221) ***
Log GDP per Capita	0.411	(0.141) **	0.411	(0.141) **	0.411	(0.141) **
Log Population	0.135	(0.078) *	0.134	(0.078) *	0.133	(0.077) *
System (Pres/Parl)	-0.206	(0.122) *	-0.206	(0.122) *	-0.207	(0.122) *
Constant	-3.216	(2.042)	-3.199	(2.042)	-3.180	(2.027)
"R ² "	0.56		0.56		0.56	
Groups	38		38		38	

3-stage least squares, Standard Errors in parentheses., ***p<.01, **p<.05, *p<.10

Table 2: Estimates of Average Subnational Fiscal Balance (1986-1996)

	Model 4		Model 5	
Vertical Fiscal Imbalance	0.222	(0.056) ***		
(VFI)x(Borrowing Autonomy)x(Fed)	-0.131	(0.020) ***		
(VFI)x(Borrowing Autonomy)x(Local)	-0.137	(0.031) ***		
(VFI)x(High Borrowing Autonomy)x(Fed)			-0.133	(0.050) ***
(VFI)x(High Borrowing Autonomy)x(Local)			-0.018	(0.063)
(VFI)x(Low Borrowing Autonomy)x(Fed)			-0.029	(0.058)
(VFI)x(Low Borrowing Autonomy)x(Local)			0.010	(0.047)
"R ² "	0.77		0.60	

3-stage least squares, Standard Errors in parentheses. Estimates for control variables and Borrowing Autonomy equation not reported. ***p<.01

Table 3: Determinates of Changes in Subnational Surplus/Expenditure, Dyanmic Panel Data Analysis

<i>Dependent Variable:</i>	Model 6		Model 7	
Δ Subnational Surplus/Expenditure				
<i>Independent Variables:</i>				
Δ Subnational Surplus/Expenditure _{t-1}	-0.008	(0.124)	0.044	(0.114)
Δ Subnational Surplus/Expenditure _{t-2}	-0.187	(0.077) **	-0.183	(0.065) ***
Federal Dummy	0.001	(0.005)	-0.004	(0.005)
Borrowing Autonomy Index	-0.003	(0.003)	0.002	(0.004)
Δ Grants/ Subnational Revenue	-0.058	(0.087)		
(Δ Grants/ Subnational Revenue) x (<i>High</i> Borr. Aut) x (<i>Federal</i>)			-0.319	(0.081) ***
(Δ Grants/ Subnational Revenue) x (<i>High</i> Borr. Aut) x (<i>Local</i>)			-0.536	(0.216) ***
(Δ Grants/ Subnational Revenue) x (<i>Low</i> Borr. Aut) x (<i>Federal</i>)			0.390	(0.072) ***
(Δ Grants/ Subnational Revenue) x (<i>Low</i> Borr. Aut) x (<i>Local</i>)			0.049	(0.101)
Δ Subnational Revenue/Total Govt. Rev.	0.451	(0.218) **	0.514	(0.227) ***
Δ Population (log)	0.019	(0.017)	0.022	(0.019)
Log Area	-0.001	(0.001)	0.001	(0.003)
Δ GDP per capita (log)	0.027	(0.019)	0.019	(0.015)
Δ Dependency Ratio	-0.075	(0.095)	-0.023	(0.081)
Δ Population Density	-0.001	(0.001)	0.003	(0.003)
System (Pres/Parl)	0.007	(0.010)	-0.010	(0.010)
Index of Political Cohesion	0.007	(0.003) **	0.004	(0.003)
Δ Central Govt. Surplus/Expend.	0.002	(0.040)	0.003	(0.044)
Δ State-Prov. Surplus/Expend. (fed)	0.190	(0.138)	0.1911829	(0.125)
Constant	0.011	(0.023)	-0.0003967	(0.031)
Observations	272		272	
Number of Groups	38		38	

Robust standard errors in parentheses

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

Estimates for fixed unit effects not reported.

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

Table 4: Summary of Results

	Cross-Section Averages	Changes over Time
H1	No	No
H2	Yes	-
H3	Yes	Yes
H4	Yes	-
H5	No	No
H6	Yes	No

Table 5: Estimates of Total (Central + Subnational) Fiscal Balance (1986-1996)

	Model 8	
Vertical Fiscal Imbalance	0.073	(0.080)
Federal Dummy	0.018	(0.038)
(VFI)x(Borrowing Autonomy)	-0.098	(0.030) ***
"R ² "	0.72	
Groups	29	

3-stage least squares, Standard Errors in parentheses. Estimates for control variables and Borrowing Autonomy equation not reported. ***p<.01

Table 6: Determinates of Changes in Total (Central + Subnational) Surplus/Expenditure, Dyanmic Panel Data Analysis

<i>Dependent Variable:</i>	Model 9		Model 10	
Δ Total Surplus/Expenditure				
<i>Independent Variables:</i>				
Federal Dummy	-0.030	(0.050)	-0.005	(0.048)
Borrowing Autonomy Index	0.001	(0.012)	-0.003	(0.011)
Δ Grants/ Subnational Revenue	-0.162	(0.121)		
(Δ Grants/ Subnational Revenue) x (<i>High</i> Borr. Aut) x (<i>Federal</i>)			-0.453	(0.205) **
(Δ Grants/ Subnational Revenue) x (<i>High</i> Borr. Aut) x (<i>Local</i>)			-0.739	(0.235) ***
(Δ Grants/ Subnational Revenue) x (<i>Low</i> Borr. Aut) x (<i>Federal</i>)			0.220	(0.164)
(Δ Grants/ Subnational Revenue) x (<i>Low</i> Borr. Aut) x (<i>Local</i>)			-0.089	(0.135)
Δ Subnational Revenue/Total Govt. Rev.	-0.521	(0.173) ***	-0.451	(0.156) ***
Observations	209		209	
Number of Groups	29		29	

Robust standard errors in parentheses

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

Estimates for control variables and fixed country effects not reported.

Appendix 1: Years and Sources

Case	Years	Grant Information	Borrowing Autonomy Index	Borrowing Autonomy Sources
Argentina state	1986-1996	IMF, IDB	4	IMF, IDB
Australia local	1986-1996	IMF	2.1	IMF
Australia state	1986-1996	IMF	2.6	IMF
Austria local	1986-1995	Bird 1986	1.35	IMF, Bird 1986
Austria state	1986-1996	Bird 1986	1.85	IMF, Bird 1986
Bolivia	1987-1995	IMF, IDB	1.5	IMF, IDB
Botswana	1990-1994	Segodi 1995	1	Segodi 1995
Brazil local	1986-1993	IMF, IDB, Shah 1994	3	IMF, IDB, Shah 1994
Brazil state	1986-1994	IMF, IDB, Shah 1994	5	IMF, IDB, Shah 1994
Bulgaria	1988-1996	IMF	1	IMF
Canada local	1986-1994	IMF, Courchene 1994	1.4	IMF, Kitchen & McMillan 1986
Canada state	1986-1995	IMF, Courchene 1994	3.25	IMF
Chile	1986-1988	IDB	1	IDB
Colombia	1985-1986	IMF, IDB	3	IDB
Denmark	1986-1993	GFS, Harloff 1988, Bury & Skovsgaard 1988	1.45	IMF
Finland	1986-1995	GFS, Harloff 1988; Nurminen 1989	3	IMF
France	1986-1996	GFS, Guilbert & Guengant 1989	3	IMF
Germany local	1986-1994	IMF	1.7	IMF
German state	1986-1995	IMF	2.675	IMF
Guatemala	1990-1994	GFS, IDB	2	IDB
India	1986-1994	IMF	2.5	IMF
Ireland	1986-1994	GFS, Harloff 1988	1.75	IMF
Israel	1986-1994	Hecht 1988	2.4	Hecht 1988
Italy	1986-1989, 95-6	GFS, IMF	2.5	IMF
Mexico local	1986-1994	IMF	2	IMF
Mexico state	1986-1994	IMF, IDB	2.8	IMF, IDB
Netherlands	1987-1996	GFS, Blaas & Dostal 1989, Harloff 1988	2.3	IMF
Norway	1986-1995	GFS, Harloff 1988, Rattso 2000	1.6	IMF
Paraguay	1986-1993	IDB	2	IMF, IDB
Peru	1990-1996	IDB	2.5	IMF, IDB
Philippines	1986-1992	GFS, Padilla 1993	1	Padilla 1993
Poland	1994-1996	Cielecka&Gibson 1995	2	Cielecka & Gibson 1995
Portugal	1987-1995	GFS, Harloff 1987	2.5	IMF
Spain local	1986-1994	Newton 1997	2.2	IMF, Newton 1997
Spain state	1986-1995	Newton 1997	2.8	IMF, Newton 1997
Sweden	1986-1996	GFS, Harloff 1988	3	IMF
Switzerland local	1990-1995	IMF	3	IMF
Switzerland state	1990-1996	IMF	3	IMF
UK	1986-1995	GFS, IMF	1.5	IMF
US local	1988-1995	IMF	3	IMF
US state	1988-1996	IMF	3	IMF
Zimbabwe	1986-1991	Helmsing 1991	1	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.

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.