



WP/05/54

IMF Working Paper

How Should Subnational Government
Borrowing Be Regulated?
Some Cross-Country Empirical Evidence

Raju Singh and Alexander Plekhanov

IMF Working Paper

Fiscal Affairs Department

How Should Subnational Government Borrowing Be Regulated? Some Cross-Country Empirical Evidence

Prepared by Raju Singh and Alexander Plekhanov¹

Authorized for distribution by Gerd Schwartz

March 2005

Abstract

This Working Paper should not be reported as representing the views of the IMF.

The views expressed in this Working Paper are those of the author(s) and do not necessarily represent those of the IMF or IMF policy. Working Papers describe research in progress by the author(s) and are published to elicit comments and to further debate.

Countries have adopted various institutional responses to subnational government borrowing. Using a sample of 44 countries 1982–2000, this paper provides a panel data analysis to determine the most effective borrowing constraints for containing local fiscal deficits. The results suggest that no single institutional arrangement is superior under all circumstances. The appropriateness of specific arrangements depends upon other institutional characteristics, particularly the degree of vertical fiscal imbalance, the existence of any bailout precedent, and the quality of fiscal reporting.

JEL Classification Numbers: H74, H77

Keywords: Fiscal federalism, local government, debt, budget deficit, fiscal discipline

Author(s) E-Mail Address: rsingh2@imf.org; ap339@cam.ac.uk

¹ Fiscal Affairs Department (IMF) and Faculty of Economics and Politics (Cambridge University), respectively. This paper was prepared while Mr. Plekhanov was a summer intern with the Fiscal Affairs Department. The authors are grateful to Nicoletta Battini, Thomas Helbling, and Anwar Shah for their comments and suggestions, and to Jamal Ismayilov for excellent research assistance.

| Contents | Page |
|---|------|
| I. Introduction | 3 |
| II. Institutional Framework | 3 |
| A. Sources of Subnational Fiscal Indiscipline | 3 |
| B. The Role of Vertical Fiscal Imbalances | 5 |
| C. Classification of Controls | 6 |
| D. Empirical Evidence | 8 |
| III. Empirical Analysis | 10 |
| A. Short-Run vs. Long-Run Analysis | 10 |
| B. Data | 10 |
| C. Control Variables | 11 |
| D. Empirical Analysis of the Long Run | 14 |
| E. Empirical Analysis of the Short Run | 19 |
| IV. Conclusion and Recommendations | 24 |
| References | 26 |
| Tables | |
| 1. Subnational Borrowing Controls: Summary | 11 |
| 2. Determinants of Subnational Fiscal Balances: Cross-Sectional Analysis | 15 |
| 3. Dynamic Panel Analysis | 22 |
| Figures | |
| 1. Marginal Effects of Different Subnational Borrowing Controls on Average Subnational Fiscal Balance | 17 |
| 2. Marginal Effect of Centrally Imposed Rules on Average Subnational Fiscal Balance in Industrial and Emerging Countries | 18 |
| 3. Marginal Effects of Different Subnational Borrowing Controls on Average Subnational Fiscal Balance | 19 |
| Appendix | |
| Data Sources | 30 |
| Appendix Tables | |
| 4. Subnational Borrowing Controls Across the World | 31 |
| 5. Statistically Insignificant Control Variables: Impact on Subnational Fiscal Balance | 32 |
| 6. Performance of Different Regimes in the Presence of Bailout History | 33 |

I. INTRODUCTION

Over the last few decades, countries around the world have gradually moved towards the greater decentralization of fiscal revenue and spending responsibilities. As a result, subnational economic policies have taken an increasingly important role in ensuring macroeconomic stability. National governments have adopted different institutional responses to the difficulties of decentralized decision making, especially addressing the need to improve policy coordination across levels of government and contain subnational borrowing.

Various case studies have identified different approaches to controlling subnational borrowing, but none has indicated which institutional arrangement is the most successful. Furthermore, only a few papers have conducted cross-country empirical analysis and even these few focused on the presence of borrowing constraints rather than on their specific design.

This paper attempts to bridge the gap with a cross-country analysis on a large sample of countries. It focuses on the impact on subnational budget deficits of different approaches to controlling subnational government borrowing, and attempts to identify the determinants of the effectiveness of each institutional arrangement.

Section II briefly describes the main sources of fiscal indiscipline at the subnational level, presents a classification of different approaches to controlling subnational borrowing, and reviews the existing empirical literature. Section III discusses general issues related to the empirical analysis and presents the results for long-run and short-run dynamics. Section IV concludes.

II. INSTITUTIONAL FRAMEWORK

A. Sources of Subnational Fiscal Indiscipline

Wildasin (2004) argues that if intergovernmental transfers are costless and borrowing costs are the same across all tiers of government, the intergovernmental structure of borrowing does not matter. However, there are several reasons to believe that intergovernmental transfers do cost; also, subnational governments may be more inclined to overspend, undertax, and borrow excessively than national governments. These reasons may arise from the common pool problem, soft budget constraints, interregional competition, unfunded federal mandates, or short electoral cycles.

Common pool

The common pool problem stems from the separation of the costs and benefits of public spending. If a public project benefits predominantly a particular jurisdiction but receives financing through a common pool of taxes from the whole country, the jurisdiction pays only a small fraction of the costs of the project while enjoying a large share of its benefits. The

lack of full responsibility for the costs of a project results in excessive spending² and creates a clear incentive for regions to compete for federal transfers that enable them to finance region-specific projects out of a common pool. This competition can take various forms. Ideally, regions would compete on the basis of the quality of their proposed spending projects. Less ideally, they could signal that they are in particular need of federal assistance by running large budget deficits or accumulating unsustainable debts, and hope that central government grants would eventually bail them out.

Soft budget constraints

The possibility of a bailout does not stem from the existence of a common pool *per se*, but from the way it functions. When transfers are based on ex post financial needs rather than ex ante characteristics, the central government can bail out regions experiencing financial difficulties. In this case, the budget constraint faced by the subnational government becomes “soft”: if regional authorities undercollect taxes, overspend, or default on the debt, they expect the federal government to cover the gap between actual and “affordable” expenditure. Moreover, lenders also lose incentive to police regional governments because they view their investments as protected by a federal government guarantee.³

These problems would not exist if central governments could commit credibly to never revising transfer allocations ex post, that is, to a no-bailout policy. Although such a policy stance may be optimal in the long run, it is difficult to commit to in the short run, especially if it involves a painful local default or a reduction in the provision of basic public services—schools closed or pensions unpaid. Persson and Tabellini (1996) and Bordignon, Manasse, and Tabellini (2001) show formally that a national government is likely to find it beneficial to bail out a financially distressed region in order to maximize the federation’s social welfare. In addition, a default by one region can increase the cost of borrowing for all other regions in a federation, so neighbor regions may be interested in providing the defaulting region with a bailout transfer.

Interregional competition

If regions actively compete for mobile capital and labor, their rivalry may encourage setting inefficiently low tax rates or spending excessively on infrastructure projects financed by borrowing. Cai and Treisman (2004) suggest that if regional governments are in charge of only tax collection but not tax administration, they may have the incentive not to enforce tax collection on their territory, thus reducing the de facto tax burden in the region.

On the other hand, if regions share the same tax base with the federal government and both tiers of government have tax-setting powers, the equilibrium level of taxation is likely to be

² Also see Weingast, Shepsle, and Johnsen (1981), who show that bargaining in a legislature comprised of regional representatives will lead to overprovision of spending programs with benefits concentrated in particular regions.

³ For a more detailed discussion of soft budget constraints and their consequences see Kornai, Maskin, and Roland (2003).

excessive because neither government fully internalizes the negative effect of raising tax rates on the tax base (Keen, 1998, and Keen and Kotsogiannis, 2002). Thus, inefficiencies at the subnational level may arise under different decentralization arrangements.

Unfunded federal mandates

In 1992, a ruling of the German Federal Constitutional Court obliged the federal government to provide supplementary transfers (de facto bailouts) to the Länder of Saarland and Bremen (Wurzel, 1999). The court agreed that most of the expenditure of the distressed jurisdictions was mandated constitutionally even though the federal funding allocated to the regions had been insufficient to finance the mandatory expenditure.

Such rulings create the sense that regional authorities are not responsible if federal mandates are initially incompatible with sustainable fiscal policies. This may result in a lack of incentive for sound public expenditure management at the regional level, widespread bailout expectations, and soft budget constraints for subnational governments. Moreover, voters will not hold subnational officials responsible for disparities between revenue assignments and expenditure responsibilities, blaming the central government instead. Therefore, electoral accountability will no longer discipline subnational governments.

Short electoral cycles

If voters are unable to take into account the costs of public spending, governments can gain political credit by increasing spending or cutting taxes before the elections. Politicians with short planning horizons may not fully internalize the future costs of borrowing. Besley and Case (1995) empirically confirm that fiscal preferences of incumbents differ from those of “lame ducks.”

This factor is not unique to subnational governments; short political cycles undermine the central government’s fiscal discipline as well.⁴ However, short political cycles may have greater effect at the subnational level, where local economic performance and public spending are likely to contribute significantly to reelection chances. At the national level, other policy issues and foreign affairs may play a greater role.

B. The Role of Vertical Fiscal Imbalances

Oates (1972) argued that decentralizing public spending leads to increased efficiency. Local governments can better assess the needs of local communities, match diverse preferences, and therefore allocate resources more efficiently than the central government can. In addition, local governments also have the information necessary to select more cost-effective projects.

Decentralized spending, however, creates a gap between the subnational governments’ own revenue from local property taxes and their expenditure responsibilities. This gap, filled by

⁴ See Alesina and Perotti (1995) for empirical evidence and discussion.

federal transfers from centralized tax revenues, is referred to as a vertical fiscal imbalance, usually measured as the ratio of transfers to total subnational government revenue.

Vertical fiscal imbalances tend to exacerbate the moral hazard and adverse incentives created by the common pool problem, soft budget constraints, and other factors discussed earlier, leading to poor subnational fiscal discipline and the need to control subnational borrowing. A high vertical fiscal imbalance implies a high proportion of regional spending financed from the common pool and soft budget constraints for subnational governments, if transfers tend to be discretionary. Moreover, subnational governments with high vertical fiscal imbalances can argue that the central government is to blame for subnational budget deficits or failure to repay subnational debt. Even tax competition can take more distortionary forms in the presence of high vertical fiscal imbalances: Cai and Treisman (2004) present several cases in China, Russia, and the United States where regional authorities have tried to attract private investment by protecting local enterprises from federal tax collectors. Of all the factors affecting subnational fiscal discipline discussed earlier, only short political cycles have no direct impact on vertical fiscal imbalances.

C. Classification of Controls

Faced with these challenges, countries have adopted various institutional approaches to contain subnational borrowing. Following Ter-Minassian (1997) these approaches have usually been grouped into four broad categories: market discipline, administrative constraints, rule-based controls, and cooperative arrangements.

Market discipline

Some countries rely on capital markets to contain subnational borrowing. In this case, the central government does not set any limits on subnational borrowing and local governments are free to decide how much to borrow, whom to borrow from, and what to spend the borrowed money on. Subnational governments may also decide by themselves to adopt a fiscal rule in an attempt to enhance their credit standing in the market. Such self-imposed rules exist in Canada, Switzerland, and the United States.

As Lane (1993) points out, however, several conditions are necessary for financial markets to exert effective discipline over subnational borrowing. First, markets should be free and open, with no regulation on financial intermediaries that could place subnational governments in a privileged-borrower position (e.g., portfolio composition requirements). Second, adequate information on the borrower's outstanding debt and repayment capacity should be available to potential lenders. Third, there should be no perceived chance of a bailout by the central government in a case of impending default. Finally, the borrower should have institutions ensuring adequate policy responsiveness to market signals.

Administrative constraints

In several countries, the central government is empowered with direct control over subnational borrowing. This control may take various forms, including the setting of annual (or more frequent limits) on the overall debt of individual subnational jurisdictions (as in

Lithuania since 2001); special treatment or prohibition of external borrowing (as in Mexico); review and authorization of individual borrowing operations (including approval of the terms and conditions, as in India or Bolivia); or the centralization of all government borrowing with on-lending to subnational governments (as in Latvia and Indonesia).

Administrative procedures introduce strict controls over subnational borrowing while preserving a flexible fiscal policy. They also ensure some coordination of the country's external borrowing, closely linking it to other macroeconomic policies. However, the implied approval of individual spending and borrowing initiatives of subnational governments by the central government introduces an explicit or implicit guarantee of local and regional public debt. Having granted permission, the federal government may find it more difficult to refuse a bailout later on, should the regional government run into trouble.

Imperfect information on local investment projects and local needs introduces a further drawback. Although subnational governments can potentially select the most necessary and cost-efficient spending programs, central authorities lacking the necessary information will select only "average" quality ones. Moreover, perceiving their borrowing as guaranteed by the central government, local administrations may be inclined to submit any project for central government approval regardless of its quality and risk, because in the worst case, the losses will be covered out of the common resource pool.

Rule-based controls

The central government can also try to contain subnational borrowing by imposing a fiscal rule. Both federal and unitary states have relied on standing rules specified in the constitution or in laws to control subnational borrowing, in an effort to confer credibility on the conduct of macroeconomic policies. Such rules introduce a constraint on fiscal policy to guarantee that fundamentals will remain predictable and robust regardless of the government in charge. Rules may take the form of restrictions on overall budget deficits (Austria, Spain), operating budget deficits (Norway), indicators of debt-servicing capacity (Spain, Japan, Brazil, Korea), level of accumulated subnational debt (Hungary), or level of spending (Belgium, Germany). Alternatively, "golden rules" establish no ceilings but limit borrowing to investment purposes (Germany).

Fiscal rules are attractive since they may be clear, transparent, and relatively easy to monitor. Easily understood by economic agents, rules may also improve the credibility of fiscal policy. The main disadvantage of the rule-based approach is a subtle trade-off between ensuring compliance and preserving flexibility. Strict fiscal rules with universal coverage leave little room for maneuver in case of unexpected economic downturns, while flexible fiscal rules with escape clauses lack credibility and fail to impose sufficient discipline when easy to circumvent in practice.

Furthermore, if restrictions apply only to current balances, expenditure can be reclassified from current to capital (see case studies in Ter-Minassian, 1997). If restrictions do not apply to off-budget items or semigovernmental organizations (such as enterprises owned by local governments), debt can quickly accumulate off budget. For example, when Australia relaxed restrictions on the finances of subnational semigovernmental authorities in 1982, the debt of

regional public enterprises tripled over the next two years and the decision was eventually reversed in 1984 (Craig, 1997).

In Denmark and Hungary, local governments used sale-and-lease-back operations to circumvent borrowing restrictions, forcing the Danish central government to revise the definition of borrowing to include renting and leasing arrangements (Jørgen and Pedersen, 2002). Local governments in the United States earlier exploited lease-arrangement schemes (Granof, 1984). Ahmad, Singh, and Fortuna (2004) argue that even in China, where regional governments must run balanced budgets and generally cannot borrow, provincial authorities managed to accumulate substantial “hidden” off-budget debts.

Cooperative arrangements

Under the cooperative approach, variations of which exist in several European countries and in Australia, a negotiation process between the federal and the lower levels of government designs subnational borrowing controls. Subnational governments are actively involved in formulating macroeconomic objectives and the key fiscal parameters underpinning these objectives, thus becoming coresponsible for their achievements. This process leads to an agreement on the overall deficit targets for the general government, as well as on the main items of revenue and expenditure. Specific limits are then agreed upon for the financing requirements of individual subnational jurisdictions.

In Australia, a loan council coordinating the fiscal policies and borrowing decisions of Australian states was set up in 1929. The council currently comprises treasurers or heads of government of each state and the Commonwealth treasurer, who presides over deliberations. The council is in charge of analyzing and approving financing requirements of each state and of the Commonwealth as a whole, as well as monitoring the execution of the decisions.

The main strength of the cooperative approach is that it combines many individual advantages of the other three approaches. By promoting a dialogue between the tiers of government, it has the potential to ensure the coordination of macroeconomic policy, while retaining sufficient flexibility. It raises awareness among subnational governments of the macroeconomic implications of their budgetary choices. Finally, it does not automatically imply a central government guarantee for subnational borrowing.

However, its hybrid nature is also its main weakness. When poorly implemented, cooperative arrangements produce the flaws of other approaches instead of their advantages. They may undermine the leadership of the central government, soften subnational government budget constraints, promote bargaining for federal transfers, and hamper policy coordination. By trying to deal with all the challenges simultaneously, the cooperative approach may end up dealing effectively with none.

D. Empirical Evidence

What has been the evidence up to now? After reviewing several case studies, Ter-Minassian and Craig (1997) were the first to classify subnational borrowing constraints. They recognize that the sole reliance on market discipline for containing subnational borrowing is not likely

to be successful. More generally, they suggest that a rule-based approach to controlling debt appears to be preferable to administrative controls in terms of transparency and certainty. They also suggest that cooperative arrangements could be a promising new development to involve subnational governments in formulating and implementing medium-term fiscal adjustment programs, thus encouraging budgetary responsibility.

Ter-Minassian, Albino-War, and Singh (2004) arrive at similar conclusions by examining differences in average subnational fiscal outcomes in 15 countries having different subnational borrowing regimes. They conclude that self-imposed fiscal rules tend to be associated with better fiscal outcomes, reflecting a greater subnational commitment to fiscal soundness. This approach worked best when there was little experience of bailouts. However, the analysis of simple means does not control for numerous factors that affect subnational fiscal balances (e.g., vertical fiscal imbalance) and thus needs to be refined.

Rodden and Eskeland (2003) summarize other case studies, emphasizing that either strong hierarchical oversight or strong market mechanisms must be in place to contain subnational borrowing effectively. In contrast, Rattsø (2002), reviewing the experience of European countries, notes that decentralized governments can achieve fiscal stability in different ways, and concludes that all the countries considered have been successful in avoiding serious fiscal imbalances.

The econometric evidence on the impact of borrowing constraints on subnational fiscal policy has been so far limited and mixed. In a sample of 30 countries, von Hagen and Eichengreen (1996) observe that the introduction of borrowing constraints increases subnational indebtedness. However, this dependence may not be causal; their regression does not control for factors other than GDP. Fornasari, Webb, and Zou (2000) found that constraining subnational borrowing did not seem to have any consistent effect on subnational fiscal deficits in a panel of 31 countries. Jin and Zou (2002) found similar results in 32 countries for the size of subnational governments. In contrast, Rodden (2002) using panel data on 33 countries, concluded that the largest deficits are run by subnational governments that rely heavily on federal transfers and at the same time are free to borrow.

The methodology of the studies has evolved over time. While von Hagen and Eichengreen (1996), Fornasari, Webb, and Zou (2000), and Jin and Zou (2002) used a dummy for the presence of controls, Rodden (2002) used a quasi-continuous index to reflect the degree of borrowing autonomy. This index initially suggested by the IDB (1997) is a rational number between 1 and 5; it takes into account institutional features, such as whether every new debt requires explicit authorization by the upper-tier government, whether formal limits are in place, and whether subnational governments own banks and public enterprises. A major advantage of this approach is its ability to compress information about subnational borrowing autonomy into a single index, preserving degrees of freedom for the statistical analysis. The disadvantage is that it focuses exclusively on the impact of the *degree* of borrowing autonomy on fiscal outcomes and cannot show the *types* of borrowing constraints that perform better. In other words, it confirms that subnational borrowing should be controlled (at least in the countries with high vertical fiscal imbalances), but cannot suggest how.

III. EMPIRICAL ANALYSIS

A. Short-Run vs. Long-Run Analysis

This paper tries to assess whether the design of subnational borrowing controls leads to particular fiscal outcomes, measured as the aggregate subnational fiscal balance-to-revenue ratio. By doing so, we distinguish between long-run and short-run effects. Cross-sectional analysis can show the impact of institutional features and federal arrangements on average long-run subnational and consolidated fiscal balances. Panel data analysis indicates how the central government can affect the subnational fiscal balance in a given year and whether it has any effective control over subnational fiscal outcomes in the short run.

Many studies that do not make a clear distinction between short-run analysis and long-run analysis find it difficult to explain some seemingly contradictory results (e.g., coefficients of opposite signs in Arellano-Bond (1991) and between regressions in Rodden (2002)). The same explanatory variables can produce different effects in cross-sectional and panel data settings. In a cross-sectional analysis, the degree of decentralization and vertical fiscal imbalance, averaged over the years, reflects different decentralization arrangements. On the other hand, an increased vertical fiscal imbalance from one year to the next may reflect an increase in federal transfers to subnational jurisdictions. Likewise, an increase in the degree of expenditure decentralization may reflect an attempt to shift part of the fiscal burden away from the center to subnational governments in a consolidation effort.

Inferring long-run characteristics from the short-run panel estimations may produce misleading results. The long-run analysis should assess the impact on subnational fiscal outcomes of different institutional arrangements, such as reducing vertical fiscal imbalances from 60 to 15 percent (moving to local fiscal autonomy). However, no country has recently undergone such a dramatic change over a short period. Panel data analysis can only infer the long-run impact of these two arrangements from local variations in vertical fiscal imbalances of around 15 percent and around 60 percent (and possibly around several other points in the middle). Cross-sectional analysis, by contrast, is able to estimate the influence of the two institutional arrangements directly.

B. Data

This paper uses a newly collected dataset on the subnational borrowing regimes and fiscal outcomes of 44 countries (industrial and emerging, federal and unitary) 1982–2000. The data come mostly from the IMF Government Financial Statistics (GFS).⁵ Unless otherwise indicated, the first level of subnational government provides the data for each country.⁶

⁵ Individual data sources are listed in Appendix 1. GFS data on transfers may not always be consistent across countries. In some cases, shared revenues are classified as transfers, while in others they are coded as subnational government own revenue. There may thus be a problem measuring vertical fiscal imbalances. However, comparing measures of this variable constructed using GFS and a number of other sources (IDB, 1997, OECD, 1999 and 2000) revealed differences only for few countries.

⁶ The results do not change qualitatively if data on consolidated subnational government are used instead.

We classified all countries according to the design of their subnational borrowing controls (see Table 1) and identified regime changes, if any. If countries changed their subnational borrowing regime during the period for which data are available (e.g., Germany or Hungary), we included them in two different cross-sectional units so that each subperiod (before the regime change and after the regime change) could provide an unambiguous measure of subnational borrowing controls. For countries using several institutional features simultaneously, the classification has tried to emphasize the predominant approach, even though the institutional framework governing intergovernmental fiscal relations is complex and the grouping of countries may not always be clear cut (details are presented in Appendix II). Moreover, because of data constraints, the constructed panel is unbalanced and fewer countries represent certain specifications.

In addition to borrowing regimes, we identified bailout precedents. A country was considered to have a bailout history if significant bailouts of subnational governments had taken place in the past and no institutional reform (such as the recent legal prohibition of bailouts in Brazil) had taken place to alter expectations of future bailouts.

Table 1. Subnational Borrowing Controls: Summary

| <i>Regime</i> | (Number of countries) | | | | |
|-------------------------|-----------------------|----------|------------|----------------------|-------------------------|
| | Total | Emerging | Industrial | With Bailout History | Without Bailout History |
| Unrestricted | 13 | 5 | 8 | 6 | 7 |
| Self-imposed rules | 3 | 1 | 2 | 1 | 2 |
| Centrally imposed rules | 12 | 6 | 6 | 4 | 8 |
| Administrative | 15 | 13 | 2 | 7 | 8 |
| Cooperative | 9 | 2 | 7 | 4 | 5 |
| Total | 52 | 27 | 25 | 22 | 30 |

Sources: Appendix I.

C. Control Variables

Numerous factors indirectly related to the design of subnational borrowing constraints may also affect subnational fiscal balances; these required controls.

1. *Degree of decentralization*: A higher degree of decentralization (proxied by the share of subnational government expenditure in general government expenditure) can lead to inferior fiscal outcomes in the long run, because it hampers macroeconomic coordination, or in the short run, because it may reflect the central government's attempt to shift part of the fiscal burden onto subnational governments.

2. *Common standards of public expenditure management (PEM)*: Common standards for subnational governments' budgeting and financial reporting facilitate monitoring their budget execution, making the enforcement of rules more effective. Von Hagen and Harden (1994) and Poterba and von Hagen (1999) confirmed that transparent budget procedures contributed to improving fiscal discipline in the 1980s and early 1990s. This study uses a dummy variable for the presence of common standards.

3. *Governance features*: Several variables examined:
 - Corruption (measured using a survey-based perception index) may have an (indirect) negative effect on subnational fiscal discipline, insofar as it is associated with weak fiscal institutions.
 - Central bank independence (measured by Cukierman's (1992) index) imposes a harder budget constraint on all levels of government and may improve fiscal outcomes.
4. *Cost of debt service*: Lower real interest rates, higher inflation, and lower debt service spending (measured by the ratio of debt servicing expenditure to gross national income) make borrowing cheaper and thus may encourage higher budget deficits.
5. *Macroeconomic situation*: Fixed-year effects capture the current phase of the global business cycle. The unemployment rate for localized business cycles is chosen as a highly procyclical variable and its effect on subnational government surplus may well be negative.
6. *Political variables*: Several variables examined:
 - A dummy variable for parliamentary democracies: Persson and Tabellini (2003) found evidence of significant differences in the fiscal behavior of governments in presidential and parliamentary democracies.
 - A dummy variable for regional representation in the upper chamber of the parliament: Rodden (2002) pointed out that an upper chamber of the parliament comprised of regional representatives increased the veto power of the regions, negatively affecting fiscal discipline.
 - A dummy variable for national elections: Johansson (2003) used data on Swedish municipalities to show that federal grants can be used as tactical instruments in the election campaign. This suggests that the central government may distribute transfers more generously in election years, reducing subnational budget deficits. Though data on local and regional election years are unavailable, a dummy variable for presidential elections (parliamentary elections for parliamentary democracies) captures the influence of national elections on local government finance.⁷
 - The Herfindahl index of political fractionalization: Rodden (2002) found that political cohesion contributed to improving subnational fiscal outcomes.
 - A dummy variable for elected subnational authorities: Elected subnational authorities may have less fiscal discipline because of short-term electoral objectives requiring increases in spending.

⁷ If the elections are held in the first quarter of the year, the previous year was coded as an election year instead.

- The Index of ethno-linguistic fractionalization (showing the probability that two randomly selected individuals belong to different ethnolinguistic groups): In more fractionalized countries, the autonomy and bargaining power of ethnic regions may be higher, undermining the central government's ability to impose fiscal discipline throughout the country.

7. *Demographic variables*: Several variables examined:

- Population density: Lower population density can put additional pressure on subnational governments because the provision of public goods is on average more costly than in densely populated areas.
- Dependency ratio (the share of population below the age of 15 or above the age of 64): A higher dependency ratio also could put additional fiscal pressure on subnational governments, because young and elderly consume a disproportionately large share of public goods and services and receive a larger share of social transfers.

8. *Development variables*: GDP per capita and a dummy distinguishing emerging markets from industrial economies take into account the better fiscal positions and institutions of developed countries.

9. *Size variables*: Several variables examined:

- Size of general government (the ratio of government expenditure to GDP) may influence fiscal balances, as larger governments may find it harder to balance their budgets.
- Area: Rodden (2002) reported that larger countries (in terms of area) run higher fiscal surpluses, on average.

10. *Federal structure*: Several variables examined:

- A federation dummy, because a federal structure may increase the bargaining power of the regions, undermining fiscal discipline.
- The average size of subnational jurisdictions (measured by the average subnational government expenditure-to-GDP ratio), because large jurisdictions may find it easier to borrow and are more likely to undertake large-scale investment projects requiring outside sources of financing.
- Horizontal imbalances (interregional disparities in per capita income and budget expenditure) calling for equalization programs that result in a higher reliance on federal transfers.⁸

⁸ Because of data constraints, the impact of horizontal fiscal imbalances on fiscal outcomes could not be estimated.

D. Empirical Analysis of the Long Run

This section examines the long-run effects of controlling subnational borrowing. Because subnational fiscal indiscipline is aggravated by the degree of vertical fiscal imbalance, the marginal effect of restricting subnational borrowing is expected to depend on this variable:

$$\alpha_{ij} = \alpha_{0j} + \alpha_{1j} * v\hat{f}_i \quad (1)$$

where $v\hat{f}_i$ is the vertical fiscal imbalance in country i and α_{0j} is the component of the marginal effect of approach j (e.g., cooperative arrangements) that does not depend on the vertical fiscal imbalance.

The basic linear specification for subnational fiscal balances (equation 2) is similar to that used by Rodden (2002). In addition, it includes a dummy variable for bailout history (*bailout*), dummy variables for each subnational borrowing regime, and interaction terms for the degree of vertical fiscal imbalance ($v\hat{f}_{it}$) and each regime dummy. The sets of regime dummies and interaction terms together capture the marginal effects as modeled in equation (1):

$$SS_{it} = \beta_0 + \alpha_{01}self_i + \alpha_{02}coop_i + \alpha_{03}central_i + \alpha_{04}admin_i + \beta_1v\hat{f}_{it} + \alpha_{11}self_i*v\hat{f}_{it} + \alpha_{12}coop_i*v\hat{f}_{it} + \alpha_{13}central_i*v\hat{f}_{it} + \alpha_{14}admin_i*v\hat{f}_{it} + \beta_2CS_{it} + \gamma bail_{it} + \delta controls_{it} + \varepsilon_{it}, \quad (2)$$

where countries are indexed by i and years by t , SS is the subnational government fiscal balance measured as the ratio of budget surplus to total revenue; *self*, *coop*, *central*, and *admin* are dummy variables for self-imposed rules, cooperative arrangements, centrally imposed rules, and administrative controls respectively; *controls* are the vector of control variables; and ε_{it} is the error term.

Following Rodden (2002), the central government fiscal balance (measured as the ratio of central government surplus to total central government revenue and denoted as CS) is also included for several reasons. First, the average fiscal balance of the central government is a proxy for a society's general preference for sustainable fiscal policy. Second, for countries where subnational government data are available only for a few years, the average fiscal balance of the central government captures possible business cycle effects. Third, the variable partly absorbs the effects of severe financial crises that affect average fiscal performance.

Since the focus of the long-run analysis is on *average* subnational outcomes, equation (2) was estimated using a panel of the estimator that exploits cross-sectional differences between the time averages of variables for every country. The results appear in Column 1 of Table 2.

Consistent with our priors, the presence of a bailout history is associated with a statistically significant weaker subnational fiscal performance (5.4 percentage points higher subnational

Table 2. Determinants of Subnational Fiscal Balances: Cross-Sectional Analysis

| <i>Model</i> | 1 | 2 | 3 | 4 |
|--|--|---------------------|-------------------------|---------------------------|
| | <i>Linear</i> | <i>IV</i> | <i>Common Standards</i> | <i>Emerging Countries</i> |
| <i>Method</i> | <i>Between</i> | <i>Two-Stage</i> | <i>Between</i> | |
| <i>Dependent variable</i> | <i>Subnational Surplus to Revenue (SS)</i> | | | |
| Central government surplus (<i>CS</i>) | 0.396 (0.101)*** | 0.346 (0.121)*** | 0.437 (0.120)*** | 0.398 (0.098)*** |
| Decentralization (<i>dec</i>) | 0.006 (0.078) | -0.107 (0.095) | -0.005 (0.091) | 0.011 (0.078) |
| Self-imposed rule (<i>self</i>) | 0.085 (0.151) | 0.115 (0.441) | | 0.096 (0.147) |
| Centrally imposed rule (<i>central</i>) | -0.089 (0.047)* | 0.046 (0.573) | -0.084 (0.046)* | -0.109 (0.047)** |
| Cooperative controls (<i>coop</i>) | -0.147 (0.066)** | 0.097 (0.209) | -0.150 (0.055)** | -0.154 (0.064)** |
| Administrative controls (<i>admin</i>) | 0.008 (0.044) | 0.105 (0.356) | -0.025 (0.047) | 0.016 (0.042) |
| VFI * <i>self</i> | -0.453 (0.644) | -0.132 (2.178) | | -0.511 (0.625) |
| VFI * <i>central</i> | 0.219 (0.101)** | 0.141 (0.501) | 0.210 (0.091)** | 0.203 (0.098)** |
| VFI * <i>coop</i> | 0.201 (0.112)* | -0.031 (0.395) | 0.007 (0.136) | 0.212 (0.109)* |
| VFI * <i>admin</i> | 0.015 (0.077) | -0.004 (0.173) | 0.056 (0.083) | 0.017 (0.075) |
| Common standards of PEM * <i>coop</i> | | | 0.156 (0.065)** | |
| Common standards of PEM * <i>central</i> | | | 0.013 (0.043) | |
| VFI * centrally imposed rules * <i>emerge</i> | | | | 0.170 (0.092)* |
| GDP (log, in PPP terms) | 0.017 (0.017) | 0.023 (0.045) | 0.005 (0.018) | 0.021 (0.016) |
| Size of government | -0.075 (0.122) | -0.079 (0.186) | | -0.049 (0.119) |
| Bailout history (<i>bailout</i>) | -0.054 (0.020)*** | -0.045 (0.025)* | -0.021 (0.019) | -0.053 (0.019)*** |
| Constant | -0.091 (0.134) | -0.200 (0.580) | -0.021 (0.178) | -0.144 (0.133) |
| Number of observations | 584 | 584 | 427 | 584 |
| Number of groups | 52 | 52 | 36 | 52 |
| R2 (between) | 0.57 | 0.48 | 0.78 | 0.61 |

Notes:

1. Standard errors in parentheses. Values significant at 10% level are marked with *, at 5% with **, at 1% with ***.

2. First stage multinomial logit regression included GDP, federation dummy, vertical fiscal imbalance, and constant. N = 52; Pseudo R² = 0.29.

3. VFI is vertical fiscal imbalance. PEM is public expenditure management.

budget deficits⁹). Subnational governments also tend to be more disciplined in countries with more disciplined central governments; however, the level of decentralization as such does not seem to have any significant long-run effect on subnational government discipline.¹⁰

Concerning subnational borrowing constraints, self-imposed fiscal rules seem to perform better than centrally imposed rules, but only with low vertical fiscal imbalances.¹¹ The marginal effect of rules imposed on subnational borrowing by the central government and the effect of cooperative arrangements tend to increase rapidly as vertical fiscal imbalances widen (because the positive coefficients on the interaction terms are relatively large and statistically significant). The coefficient on the interaction term for the administrative approach is also positive, but relatively small and statistically insignificant, reflecting the possibility that administrative rules fail to solve the problem of soft budget constraints in the long run.

Figure 1 plots the marginal effects of the different borrowing regimes on subnational fiscal outcomes for different levels of vertical fiscal imbalance.¹² The fact that all centrally initiated restrictions appear to be harmful when vertical fiscal imbalances are at zero should not be misinterpreted: zero vertical fiscal imbalances simply do not exist. The area where self-imposed rules appear to be optimal (at vertical fiscal imbalances below 16 percent) includes only five countries, but the area where centrally imposed fiscal rules perform best of all (at vertical fiscal imbalances above 47 percent) covers 15 countries. Administrative controls seem to be superior between these two thresholds, while cooperative arrangements and unrestricted borrowing never outperform these alternative institutional frameworks.

In order to examine the impact of common financial reporting and budgeting standards on the effectiveness of subnational borrowing controls, equation (2) was augmented with interaction terms between the dummy for common standards of public expenditure management and dummies for the different subnational borrowing regime.¹³ The results reported in Column 3 of Table 2 show that the success of cooperative arrangements depends on the presence of common standards in financial reporting (the positive coefficient on the interaction term is large and statistically significant).

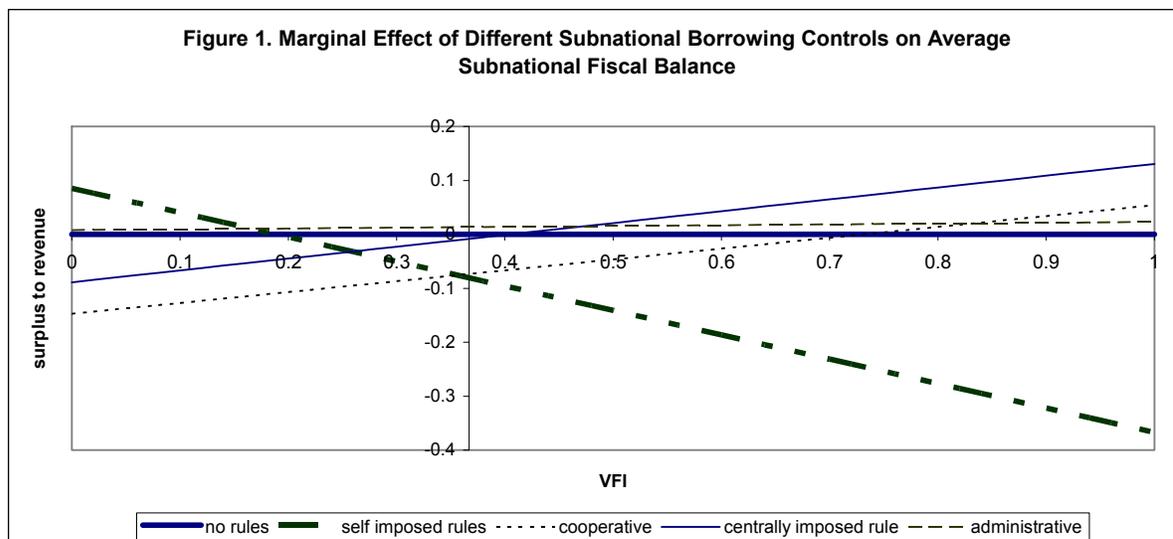
⁹ All marginal effects are measured in percentage points of total subnational government revenue rather than as percent.

¹⁰ To preserve degrees of freedom and to avoid possible multicollinearity, additional controls were omitted unless statistically significant. Table A2 in Appendix 2 summarizes the evidence on the impact of additional controls.

¹¹ However, the standard error of the corresponding coefficient is high because only three countries in the sample are characterized by self-imposed rules.

¹² The vertical axis crosses the horizontal one at the mean level of vertical fiscal imbalance. The horizontal axis corresponds to the case of unrestricted subnational borrowing.

¹³ Lack of sufficient observations did not allow inclusion of self-imposed fiscal rules in this analysis.

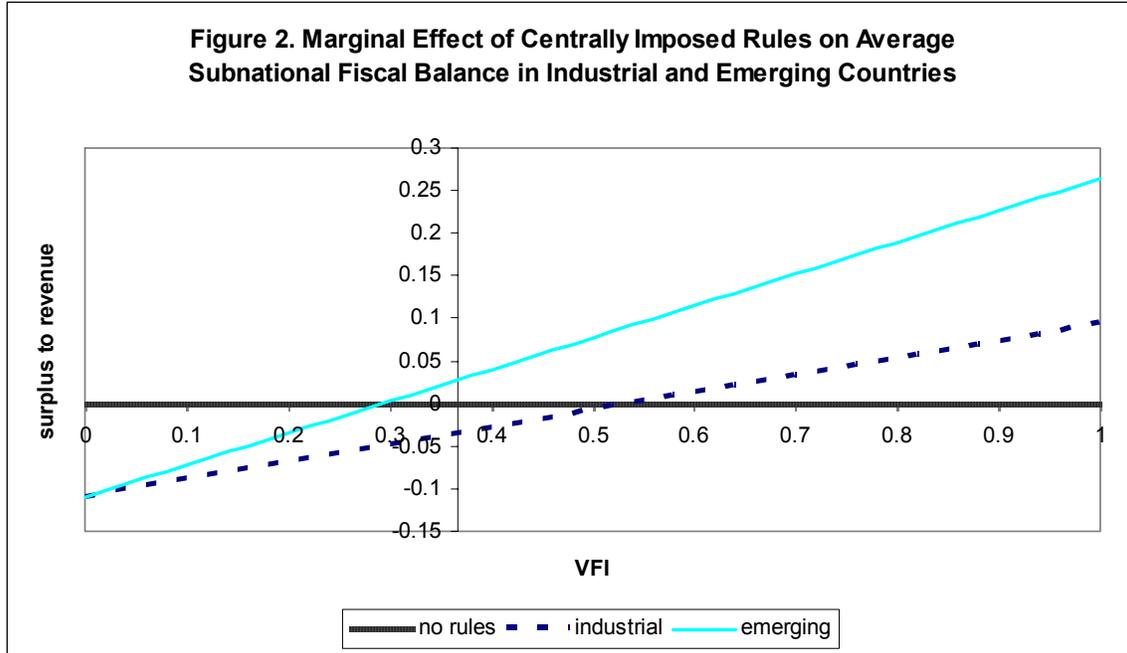


Soft budget constraints and common pool problems affect local finances in all countries. However, in emerging economies that tend to have weaker institutions, fiscal discipline at the subnational level may also be weaker. At first glance, the average subnational fiscal balance in the subsample of industrial countries is -2.3 percent, compared with -4.2 percent in the subsample of emerging economies. Therefore, given this initial difference in fiscal problems, the marginal effect of introducing restrictions on subnational borrowing could be high in emerging economies, especially in those with high vertical fiscal imbalances.

Testing this hypothesis is difficult, however, because emerging economies more often adopt administrative rules, while industrial countries almost exclusively utilize cooperative arrangements. Thus, a differential effect of subnational borrowing constraints in emerging and industrial countries can be only tested for centrally imposed fiscal rules (adopted by six emerging economies and six industrial countries in the sample). A positive and statistically significant coefficient on the interaction term $vfi*central*emerge$ added to equation (2) would provide evidence in support of the hypothesis (*emerge* being the emerging-country dummy).

The results appear in Column 4 of Table 1. Figure 2 plots the marginal effects of centrally imposed rules in industrial countries and emerging economies against the degree of vertical fiscal imbalances. The results show that in emerging economies there is an even stronger case for adopting centrally imposed fiscal rules because they start outperforming other approaches at substantially lower levels of vertical fiscal imbalance and their marginal effect grows faster as vertical fiscal imbalances widen.

Finally, we investigated the interaction between a bailout history and subnational borrowing constraints. Appendix Table 6 in Appendix II shows the difference in the coefficients of the interaction terms ($VFI * regime$) separately for countries with and without a bailout history. In the presence of bailouts, the performance of cooperative arrangements deteriorates significantly. The performance of centrally imposed rules is the least affected (a bailout history is estimated to increase the deficit by only 1.4 percent of total revenue at the mean level of the vertical fiscal imbalance, which is highly statistically insignificant).

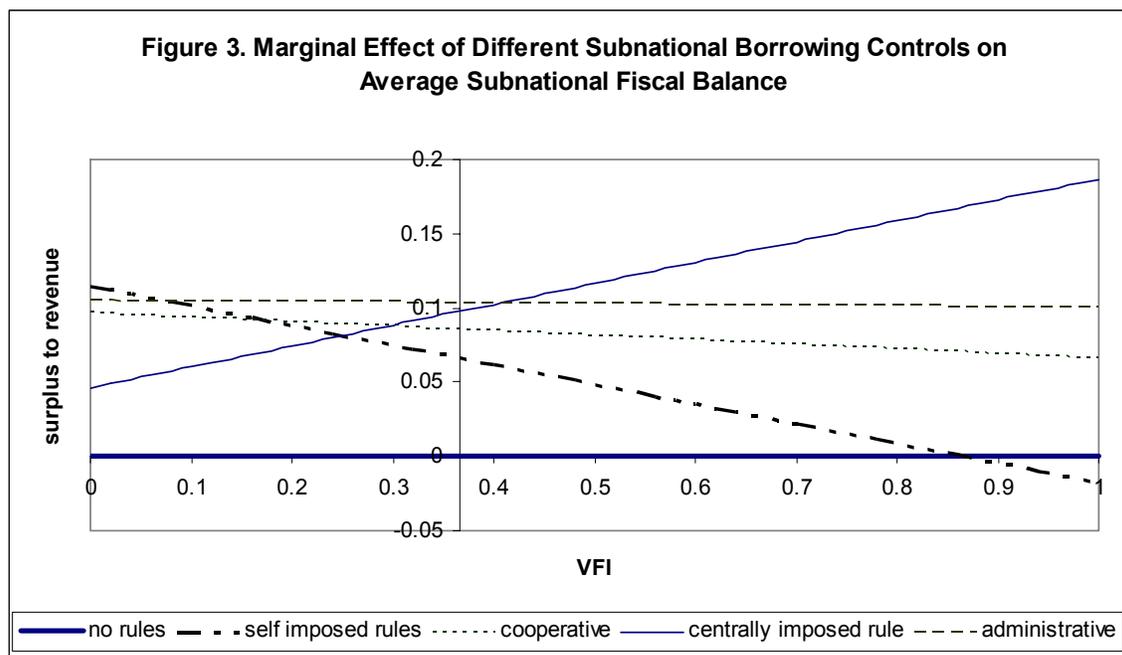


The between estimates presented in Figure 1 could be biased, however, if subnational borrowing controls were not strictly exogenous. Although subnational borrowing regimes influence average subnational fiscal outcomes, the latter could in turn affect the choice of subnational borrowing regimes. Countries with less disciplined subnational governments may have to adopt stricter rules, whereas countries with more disciplined subnational governments could rely on market discipline. The fact that most countries chose subnational borrowing controls before the period under consideration and hence the average subnational fiscal balances could not directly affect the choice partly alleviates the potential endogeneity problem that arises. However, concerns still exist insofar as current average subnational fiscal balances tend to correlate with past averages.

A consistent two-stage estimator similar to the two-stage least squares addresses the problem of endogeneity. Since the potentially endogenous regressors are a set of mutually exclusive dummies, the first stage is modified to incorporate a multinomial logit model instead of the usual linear regression. The small sample size limited the first stage regression. The preferred specification included the degree of vertical fiscal imbalance, GDP, a federation dummy, and a constant. The probabilities of adopting each approach estimated in the first stage are then used instead of their respective dummy variables in the second stage to estimate equation (2).

The results reported in Column 2 of Table 2 show that the main qualitative results hold. Figure 3, based on the two-stage estimates, looks very similar to Figure 1. However, there are two obvious distinctions. First, unrestricted subnational borrowing is associated now with inferior subnational fiscal outcomes, relative to any other approach (the horizontal axis has plunged). Second, the positive marginal impact of cooperative arrangements decreases when vertical fiscal imbalances widen. Both observations imply countries that do not impose limits on subnational borrowing or that opt for a cooperative approach have intrinsically more

disciplined subnational governments, whereas countries with intrinsically less disciplined subnational governments opt for fiscal rules or administrative controls.



E. Empirical Analysis of the Short Run

The cross-sectional analysis does not reveal how the central government can affect subnational fiscal outcomes in the short run. A panel approach is necessary for insights into the short-run dynamics of subnational fiscal balances. The basic specification includes three main central policy variables: the level of vertical fiscal imbalance (as a proxy for current transfers), central government fiscal balance (to study the degree of coordination of fiscal policies), and the degree of decentralization (as a proxy for changes in expenditure responsibilities at the subnational level, denoted dec_{it}). In addition, because of the cyclical character of government revenue and expenditure, we expected a positive correlation between current and lagged subnational budget deficits. The estimated equation will thus be

$$SS_{it} = \alpha_i + \phi SS_{it-1} + \beta dec_{it} + \delta vfi_{it} + \lambda CS_{it} + \mu Controls_{it} + \varepsilon_{it} . \quad (3)$$

where α_i is a country-specific fixed effect that controls for all time invariant factors (such as being a federal or unitary state, having an independent central bank, being a parliamentary or presidential democracy, and other unobserved factors).

The estimation of equation (3) is not straightforward. At least the lagged dependent variable SS_{it-1} is not strictly exogenous so that fixed and random effects estimators are inconsistent.¹⁴ With the downward bias inversely proportional to the time-series dimension, this becomes a

¹⁴ Nickell (1981) discusses the consequences of the violation of strict exogeneity assumptions for the fixed effects estimator.

serious problem in a short panel. The Arellano and Bond (1991) generalized method of moments (GMM) approach circumvents this difficulty. After taking first differences in equation (3), the fixed regional effects disappear:

$$\Delta SS_{it} = \varphi \Delta SS_{it-1} + \beta \Delta dec_{it} + \delta \Delta vfi_{it} + \lambda \Delta CS_{it} + \mu \Delta Controls_{it} + \Delta \varepsilon_{it}. \quad (4)$$

The regressor ΔSS_{it-1} is still correlated with the error term $\Delta \varepsilon_{it-1}$. But all lags of higher order $\Delta SS_{it-2}, \Delta SS_{it-3}, \dots$ are uncorrelated with residuals, and could serve as instruments in the GMM framework.

The same approach deals with potentially endogenous variables on the right hand side of equation (3). Current-year subnational balances may affect the central government fiscal balance through additional transfers to distressed regions. Alternatively, sound subnational fiscal balances may encourage the central government to shift additional expenditure responsibilities onto subnational governments. It is therefore necessary to find instruments for central government fiscal balances, vertical fiscal imbalances and the degree of decentralization. If the fiscal balance of the central government CS_{it} is correlated with the error term ε_{it} , the first lag ΔCS_{it-1} and the differenced residual $\Delta \varepsilon_{it}$ are still correlated. However, all lags of order 2 and higher ($\Delta CS_{it-2}; \Delta CS_{it-3}; \dots$) are not correlated with the differenced error term and could serve as instruments for the endogenous variable ΔCS_{it} . The other endogenous variables can be instrumented in a similar way.

Since taking first differences cancels out fixed effects, the effect of time-invariant country-specific characteristics cannot be directly identified from equation (3). However, appropriate interaction terms can still reveal the impact of different subnational borrowing arrangements and bailout history on the ability of the central government to affect subnational fiscal balances in the short run:

$$SS_{it} = \alpha_i + \varphi SS_{it-1} + \beta dec_{it} + \delta_1 vfi_{it} * Bailout_i + \delta_0 vfi_{it} * NoBailout_i + \lambda_1 CS_{it} * Bailout_i + \lambda_0 CS_{it} * NoBailout_i + \mu Controls_{it} + \varepsilon_{it}. \quad (5)$$

Equation (5) allows for different coefficients on normalized federal transfers vfi in the subsamples of countries with and without bailout history (δ_1 and δ_0 respectively) and for different responses to changes in the central government fiscal balance (λ_1 and λ_0 respectively). Coefficients λ and δ can be interpreted as proxies for the coordination of fiscal policies across different tiers of government. A high λ means that subnational governments respond to changes in central government fiscal balances by appropriately adjusting their own fiscal balance (the direction of causality is ensured by using instruments for central government fiscal balances). A high value of δ indicates that fiscal policies can be coordinated by means of federal transfers.

In a similar way, augmenting equation (3) with appropriate interaction terms¹⁵ shows the impact of different subnational borrowing regimes on the short-run subnational fiscal balance dynamics:

$$SS_{it} = \alpha_i + \varphi * SS_{it-1} + \beta dec_{it} + \delta_2 vfi_{it} * NoRules_i + \delta_3 vfi_{it} * Coop_i + \delta_4 vfi_{it} * Central_i + \delta_5 vfi_{it} * Admin_i + \lambda_2 CS_{it} * NoRules_i + \lambda_3 CS_{it} * Coop_i + \lambda_4 CS_{it} * Central_i + \lambda_5 CS_{it} * Admin_i + \mu Controls_{it} + \varepsilon_{it} . \quad (6)$$

Table 3 summarizes the main results of the panel data regressions. Model A studies the short-run implications of bailouts. The results confirm our prior finding that bailouts undermine fiscal discipline. In the absence of bailouts, both federal transfers and central government fiscal balances have a highly significant positive impact on subnational fiscal outcomes represented by the coefficients on the interaction terms $VFI * NoBailouts$ and $CS * NoBailouts$. The estimate of the gap-closing effect of federal transfers (0.154) indicates, however, that most of the transfer money will be used to inflate expenditure rather than close the fiscal deficit.

In the presence of a bailout history, by contrast, a central government no longer seems able directly to affect subnational budget outcomes in the short run. The responsiveness of subnational fiscal balances to transfers and central government fiscal balances (captured by the coefficients on $VFI * Bailouts$ and $CS * Bailouts$ respectively) drops abruptly and becomes statistically insignificant.

Model B reports the short-run effects of different subnational borrowing constraints.¹⁶ The results suggest that centrally imposed rules achieve the highest level of fiscal policy coordination. The coefficients on its interaction terms both with transfers (vfi) and with central government fiscal balance (CS) are positive, large, and statistically significant, implying that both federal transfers and central government budget surplus affect subnational fiscal balances positively.

¹⁵ Inclusion of all interaction terms (for both subnational borrowing regimes and bailout histories) is not feasible, because the partitioning of the sample becomes too fine.

¹⁶ Insufficient data did not allow the assessment of the impact of self-imposed fiscal rules.

Table 3. Dynamic Panel Analysis

| Model | A | B | Rank |
|--|--|--------------------------|------|
| | <i>Bailouts</i> | <i>Borrowing Regimes</i> | |
| <i>Method</i> | <i>Arellano-Bond</i> | | |
| <i>Dependent Variable</i> | <i>Subnational Surplus to Revenue (SS)</i> | | |
| Subnational Surplus to Revenue (SS) | 0.266 | 0.255 | |
| 1st lag | (0.077)*** | (0.072)*** | |
| VFI * Bailouts | 0.113 (0.070) | | |
| VFI * No Bailouts | 0.154 (0.037)*** | | |
| VFI * No Rules | | -0.069 (0.084) | 4 |
| VFI * Coop | | 0.116 (0.169) | 3 |
| VFI * Central | | 0.106 (0.052)** | 2 |
| VFI * Admin | | 0.180 (0.041)*** | 1 |
| CS * Bailouts | 0.031 (0.048) | | |
| CS * No Bailouts | 0.093 (0.032)*** | | |
| CS * No Rules | | 0.136 (0.044)*** | 1-2 |
| CS * Coop | | 0.134 (0.049)** | 1-2 |
| CS * Central | | 0.100 (0.049)** | 3 |
| CS * Admin | | -0.018 (0.025) | 4 |
| Decentralization (<i>dec</i>) | -0.291 (0.088)*** | -0.304 (0.105)*** | |
| GDP (log, in PPP terms) | -0.122 (0.049)** | -0.155 (0.050)*** | |
| Population density | 0.0006 (0.0003)* | 0.0008 (0.0002)*** | |
| Size of government | 0.001 (0.130) | -0.041 (0.097) | |
| Constant | 0.003 (0.001)** | 0.003 (0.001)*** | |
| Number of observations | 480 | 480 | |
| Number of groups | 49 | 49 | |
| Test of no 2nd order Autocorrelation in residuals | -0.95 (p = 0.341) | -1.14 (p = 0.255) | |

Notes:

1. Standard errors in parentheses. Values significant at 10% level are marked with *; at 5%, with **; and at 1%, with ***.
2. The null hypothesis of second order autocorrelation in residuals cannot be rejected at 5 % significance level. In the presence of second order autocorrelation Arellano-Bond estimator may be inconsistent.
3. CG balance is central government surplus-to-revenue ratio

At low levels of vertical fiscal imbalances, the response to changes in transfers is arguably less important since transfers generally play a modest role. In this case, the responsiveness of subnational fiscal balances to the central government balance captured by the interaction terms $CS*regime$ is important. The highest responsiveness seems to occur when subnational governments are free to borrow or when cooperative arrangements are in place. However, policy coordination under these arrangements seems to be more difficult by means of transfers because the respective coefficients on interaction terms with vfi are insignificant and even negative in the case of unrestricted borrowing.

As vertical fiscal imbalances widen and transfers become the main policy instrument, administrative controls increasingly deliver better responses of subnational fiscal balances to federal transfers (the corresponding coefficient on the interaction term with vfi is the largest of all, and statistically significant at the one percent level). This result may stem from central government involvement in microlevel decisions at the subnational level. The central government is able to influence subnational fiscal outcomes directly by means of transfers in the short run; however, soft budget constraints and economic inefficiencies result in the long run.

Generally, these results seem to be more plausible than those reported in Rodden (2002) for several reasons. First, macroeconomic cycles suggest that subnational fiscal balances depend significantly and positively on their lagged values. This is the case in Table 3, although Rodden (2002) finds a significantly negative dependence of subnational surpluses on their lags, indicating an unexpected mean-reverting behavior.

Second, a significantly negative coefficient on the degree of decentralization (dec) is consistent with the view that greater decentralization in the short run leads to a deterioration of subnational fiscal outcomes. This reflects the attempt by the central government to shift the burden of public spending onto local authorities and contrasts with the significantly positive effect of decentralization reported by Rodden (2002).

Third, Rodden's estimates suggest that there is no comovement of central government and local government fiscal balances (i.e., the coefficient on central government fiscal balance (CS) is small and insignificant). This is surprising, as we expect both central and subnational governments to run countercyclical policies and hence experience positively correlated fiscal positions. Indeed, the positive and highly significant coefficient on CS in Table 3 suggests the comovement of fiscal balances.

Finally, the observed positive marginal effects of vertical fiscal imbalances (following from mostly positive coefficients on the interaction terms involving vfi) should not be surprising. A positive change in the degree of vertical fiscal imbalances in a given year reflects primarily higher transfers from the center to the regions or municipalities. These transfers should have a positive impact on subnational public finance that year, even if vertical fiscal imbalances as an institutional feature are associated with inferior fiscal outcomes in the long run.

IV. CONCLUSION AND RECOMMENDATIONS

Assessing the impact of an institutional framework on fiscal outcomes is a challenging task. The institutional framework governing intergovernmental fiscal relations is complex, and classifying countries often requires a judgement call. Some countries may be using several institutional features simultaneously, others may opt for different institutional mechanisms over time. In addition, other institutional characteristics that also affect fiscal policy may accompany the adoption of a specific fiscal framework, and disentangling these effects is difficult. The use of a broad range of controls (see Tables 2 and A2) and instrumental variables alleviates self-selection and endogeneity problems, but does not remove them entirely. Methods of controlling for self-selection, either semiparametric (propensity score-based) or parametric (Heckman's estimator), are unfortunately very demanding in terms of degrees of freedom, particularly in the presence of endogenous variables, and could not be performed on the available sample. Nevertheless, the empirical results presented in this paper suggest some broad conclusions:

- First, no single institutional arrangement seems to be superior to all the others under all circumstances. The appropriateness of any given borrowing constraint requires assessment in the light of other institutional characteristics, particularly the degree of vertical fiscal imbalances, the existence of any bailout precedents, and the quality of fiscal reporting.
- Giving unconstrained borrowing authority to subnational governments is unlikely to be an optimal solution. At low levels of vertical fiscal imbalances, fiscal rules adopted by subnational governments themselves seem to lead to better fiscal outcomes.
- As vertical fiscal imbalances widen, however, the positive effect of self-imposed rules declines rapidly and centrally imposed fiscal rules seem to become the best option, both in the short and long runs, especially in emerging economies.
- For high vertical imbalances, administrative procedures may provide the central government with even tighter control over subnational government fiscal outcomes in the short run (compared to both fiscal rules and cooperative arrangements). However, the implicit guarantee of subnational debt related to these controls seems to undermine fiscal discipline in the long run.
- The adoption of common standards of financial reporting is crucial for the success of cooperative arrangements and may increase the effectiveness of centrally imposed fiscal rules.
- Central governments should avoid bailing out subnational governments whenever possible, as bailouts significantly erode the effectiveness of borrowing controls. When considering a bailout, the central government should weigh carefully the short-term benefits against the long-term negative consequences. In the presence of bailout experiences, centrally imposed fiscal rules seem to be the most effective.

Fiscal rules may take a wide variety of forms, however. As already discussed, some rules establish a debt ceiling or target fiscal deficit, while others cap expenditure. Coverage differs also. In addition, borrowing constraints may be enforced in different ways. In some countries, it is left to financial markets to sanction fiscally undisciplined local governments. Others support a more cooperative approach, whereby subnational governments agree to impose administrative as well as financial sanctions and penalties among themselves. Higher levels of government can also retain the right to punish subnational governments for noncompliance. Some countries have even adopted bankruptcy procedures for subnational governments in case of a crisis, in order to avoid bailouts and achieve a more transparent resolution process. Finally, transfer systems may take various forms and a given level of vertical fiscal imbalance might capture different incentives. Constrained by data availability, this paper could not deal with the interactions of these important institutional features and leaves this to future research.

REFERENCES

- Ahmad, Ehtisham, Raju J. Singh, and Mario Fortuna, 2004, "Toward More Effective Redistribution: Reform Options for Intergovernmental Transfers in China," IMF Working Paper 04/98 (Washington: International Monetary Fund).
- Alesina, Alberto, and Roberto Perotti, 1995, "The Political Economy of Budget Deficits," *Staff Papers*, International Monetary Fund, Vol. 42 (March), pp. 1–31.
- Arellano, Manuel, and Stephen R. Bond, 1991, "Some Tests of Specification for Panel Data: Monte Carlo Evidence and an Application to Employment Equations," *Review of Economic Studies*, Vol. 58 (April), pp. 277–97.
- Besley, Timothy, and Anne Case, 1995, "Does Electoral Accountability Affect Economic Policy Choices? Evidence from Gubernatorial Term Limits," *Quarterly Journal of Economics*, Vol. 110 (August), pp. 769–98.
- Bird, Richard M., and François Vaillancourt, eds., 1999, *Fiscal Decentralization in Developing Countries* (New York: Cambridge University Press)
- Bordignon, Massimo, Paulo Manasse, and Guido Tabellini, 2001, "Optimal Regional Redistribution Under Asymmetric Information," *American Economic Review*, Vol. 91, No. 3, pp. 709–23.
- Cai, Hongbin, and Daniel Treisman, 2004, "State Corroding Federalism," *Journal of Public Economics*, Vol. 88 (March), pp. 819–43.
- Craig, Jon, 1997, "Australia," in *Fiscal Federalism in Theory and Practice*, ed. by Teresa Ter-Minassian (Washington: International Monetary Fund).
- Cukierman, Alex, 1992, *Central Bank Strategy, Credibility, and Independence: Theory and Evidence* (Cambridge, Massachusetts: MIT Press).
- Dabla-Norris, Era, and Paul R. Wade, 2002, "The Challenge of Fiscal Decentralization in Transition Countries," IMF Working Paper 02/103 (Washington: International Monetary Fund).
- Dafflon, Bernard, ed., 2002, *Local Public Finance in Europe: Balancing the Budget and Controlling Debt* (Cheltenham, U.K.: Edward Elgar).
- Fornasari, Francesca, Steven B. Webb, and Heng-fu Zou, 2000, "The Macroeconomic Impact of Decentralized Spending and Deficits: International Evidence," *Annals of Economics and Finance*, Vol. 1, No. 2, pp. 403–33.
- Granof, Michael H., 1984, "A Fundamental Flaw of Debt Limitations for State and Local Governments," *Journal of Accounting and Public Policy*, Vol. 3 (Winter), pp. 293–310.

- Inter-American Development Bank, 1997, *Latin America after a Decade of Reforms, Economic and Social Progress in Latin America, 1997 Report* (Washington).
- Jin, Jing, and Heng-fu Zou, 2002, "How Does Fiscal Decentralization Affect Aggregate, National, and Subnational Government Size?" *Journal of Urban Economics*, Vol. 52 (September), pp. 270–93.
- Johansson, Eva, 2003, "Intergovernmental Grants as a Tactical Instrument: Empirical Evidence from Swedish Municipalities," *Journal of Public Economics*, Vol. 87 (May), pp. 883–915.
- Jørgen, Niels, and Mau Pedersen, 2002, "Local Government and Debt Financing in Denmark," in *Local Public Finance in Europe: Balancing the Budget and Controlling Debt*, ed. by Bernard Dafflon (Cheltenham, UK: Edward Elgar).
- Keen, Michael J., 1998, "Vertical Tax Externalities in the Theory of Fiscal Federalism," *Staff Papers*, International Monetary Fund, Vol. 45 (September), pp. 454–85.
- Keen, Michael J., and Christos Kotsogiannis, 2002, "Does Federalism Lead to Excessively High Taxes?" *American Economic Review*, Vol. 92 (March), pp. 363–70.
- Kornai, János, Eric Maskin, and Gérard Roland, 2003, "Understanding the Soft Budget Constraint," *Journal of Economic Literature*, Vol. 41 (December), pp. 1095–136.
- Lane, Timothy D., 1993, "Market Discipline," *Staff Papers*, International Monetary Fund, Vol. 40 (March), pp. 53–88.
- Nickell, Stephen, 1981, "Biases in Dynamic Models with Fixed Effects," *Econometrica*, Vol. 49 (November), pp. 1417–26.
- Oates Wallace E., 1972, *Fiscal Federalism* (New York: Harcourt Brace Jovanovich).
- Organisation for Economic Co-operation and Development, 1999, "Taxing Powers of State and Local Government," *OECD Tax Policy Studies*, No. 1 (Paris).
- Organisation for Economic Co-operation and Development, 2000, *Surveys on Fiscal Design Across Levels of Government: Report on Activities* (Paris).
- Organisation for Economic Co-operation and Development, 2003, *OECD / World Bank Budget Practices and Procedures Survey* (Paris).
- Persson, Torsten, and Guido Tabellini, 1996, "Federal Fiscal Constitutions: Risk Sharing and Moral Hazard," *Econometrica*, Vol. 64 (May), pp. 623–46.
- Persson, Torsten, and Guido Tabellini, 2003, *The Economic Effects of Constitutions* (Cambridge, Massachusetts: MIT Press).

- Poterba, James M, and Jürgen von Hagen, eds., 1999, *Fiscal Institutions and Fiscal Performance*, National Bureau of Economic Research conference report (Chicago: University of Chicago Press).
- Purfield, Catriona, 2004, “The Decentralization Dilemma in India,” IMF Working Paper 04/32 (Washington: International Monetary Fund).
- Rattsø, Jørn, 2002, “Fiscal Controls in Europe: A Summary,” in *Local Public Finance in Europe: Balancing the Budget and Controlling Debt*, ed. by Bernard Dafflon (Cheltenham, U.K.: Edward Elgar).
- Rodden, Jonathan, 2002, “The Dilemma of Fiscal Federalism: Grants and Fiscal Performance Around the World,” *American Journal of Political Science*, Vol. 46, No. 3, pp. 670–87.
- Rodden, Jonathan, and Gunnar S. Eskeland, 2003, “Lessons and Conclusions,” in *Fiscal Decentralization and the Challenge of Hard Budget Constraints*, ed. by Rodden, Eskeland, and Jennie Litvack (Cambridge, Massachusetts: MIT Press).
- Rodden, Jonathan, Gunnar S. Eskeland, and Jennie Litvack, eds., 2003, *Fiscal Decentralization and the Challenge of Hard Budget Constraints* (Cambridge, Massachusetts: MIT Press).
- Rodden, Jonathan, and Erik Wibbels, 2002, “Beyond the Fiction of Federalism: Macroeconomic Management in Multitiered Systems,” *World Politics*, Vol. 54 (July), pp. 494–531.
- Roeder, Philip G., 2001, “Ethnolinguistic Fractionalization Indices, 1961 and 1985” (unpublished; San Diego: University of California).
- Ter-Minassian, Teresa, ed., 1997, *Fiscal Federalism in Theory and Practice* (Washington: International Monetary Fund).
- Ter-Minassian, Teresa, Maria Albino-War, and Raju Singh, 2004, “Managing Subnational Borrowing,” paper presented at the Authors’ Conference for the Handbook of Fiscal Federalism, Turin, August.
- Ter-Minassian, Teresa, and Jon Craig, 1997, “Control of Subnational Government Borrowing,” in *Fiscal Federalism in Theory and Practice*, ed. by Ter-Minassian (Washington: International Monetary Fund).
- Treisman, Daniel, 2002, “Decentralization and the Quality of Government” (unpublished; Los Angeles: University of California).
- United Nations, 2002, *DMFAS INFO (Newsletter of the Programme on Debt Management and Financial Analysis System)*, No. 14 (2nd Semester).

- von Hagen, Jürgen, and others, 2000, "Subnational Government Bailouts in OECD Countries: Four Case Studies," Inter-American Development Bank Research Network Working Paper R-399 (Washington).
- von Hagen, Jürgen, and Barry Eichengreen, 1996, "Federalism, Fiscal Restraints, and European Monetary Union," *American Economic Review*, Vol. 86, No 2, pp. 134–38.
- von Hagen, Jürgen, and Ian J. Harden, 1994, "National Budget Processes and Fiscal Performance," in *Towards Greater Fiscal Discipline*, European Economy, Reports and Studies No. 3 (Brussels: European Commission, Directorate-General for Economic and Financial Affairs).
- Weingast, Barry R., Kenneth A. Shepsle, and Christopher Johnsen, 1981, "The Political Economy of Benefits and Costs: A Neoclassical Approach to Distributive Politics," *Journal of Political Economy*, Vol. 89 (August), pp. 642–64.
- Wildasin, David E., 2004, "The Institutions of Federalism: Toward an Analytical Framework," *National Tax Journal*, Vol. 57 (June), pp. 247–272.
- World Bank, 2000, *World Development Report 1999/2000* (Washington).
- Wurzel, Eckhard, 1999, "Towards More Efficient Government: Reforming Federal Fiscal Relations in Germany," OECD Economic Department Working Paper No. 209 (Paris: Organisation for Economic Co-operation and Development).

DATA SOURCES

The dataset was compiled using the following sources:

Data on central and subnational government budgets: IMF Government Finance Statistics, 2002.

Macroeconomic indicators: World Bank, World Development Indicators (2004).

Subnational jurisdictions structure: World Bank (2000), Table A.1.

Corruption perception indices: Transparency International.

Political indicators, election years: World Bank Database of Political Indicators (2000).

Federal / unitary country: classification developed by Treisman (2002).

Characterization of fiscal institutions, borrowing constraints, bailout history: Ter-Minassian (1997); Inter-American Development Bank (1997); Bird and Vaillancourt (1999); OECD (2000); Dabla-Norris and Wade (2002), Table 9; Dafflon (2002); OECD (2003); Rodden, Eskelund, and Litvak (2003); and IMF staff estimates.

Index of horizontal imbalances: Data from Rodden and Wibbels (2002), Table 2.

Data on the standards of budgeting and financial reporting: OECD (2003).

Central Bank Independence index: Cukierman (1992).

Ethnolinguistic Fractionalization: Roeder (2001). The index measures the probability that two randomly selected individuals belong to different ethnolinguistic groups.

Bailout history: OECD (2003); Rodden, Eskelund, and Litvak (2003); Ter-Minassian (1997); United Nations, 2002 (for Chile, Colombia, France); von Hagen and others (2000); and IMF staff estimates.

Data on Russia: Statistical Yearbook of Russia (2003), Goskomstat, Moscow (Rossiyskiy Statisticheskiy Ezhegodnik 2003).

Data on India: Purfield (2004).

Table 4. Subnational Borrowing Controls Across the World

| Country | Regime | Bailout History | Years |
|--------------------|--------------------|-----------------|-----------|
| Argentina | Self-imposed rules | Yes | 1993–2000 |
| Australia 1 | Cooperative | Yes | 1982–1990 |
| Australia 2 | Cooperative | No | 1991–2000 |
| Austria 1 | Central rule | No | 1982–1998 |
| Austria 2 | Cooperative | No | 1999–2000 |
| Belgium | Cooperative | No | 1982–1998 |
| Bolivia | Administrative | No | 1986–2000 |
| Brazil 1 | Administrative | Yes | 1989–1994 |
| Brazil 2 | Central rule | No | 1997–1998 |
| Canada (local) | Central rule | No | 1985–2000 |
| Canada (provinces) | Unrestricted | Yes | 1982–2000 |
| Chile | Administrative | Yes | 1983–2000 |
| Colombia | Central rule | Yes | 1982–1986 |
| Croatia | Unrestricted | No | 1994–2000 |
| Czech Republic | Unrestricted | No | 1993–2000 |
| Denmark | Cooperative | No | 1982–2000 |
| Estonia | Central rule | No | 1991–2000 |
| Finland | Unrestricted | No | 1982–1998 |
| France | Unrestricted | Yes | 1982–2000 |
| Germany 1 | Central rule | Yes | 1982–1991 |
| Germany 2 | Cooperative | Yes | 1992–1998 |
| Guatemala | Administrative | No | 1990–1993 |
| Hungary 1 | Unrestricted | Yes | 1982–1994 |
| Hungary 2 | Central rule | No | 1995–2000 |
| Iceland | Unrestricted | No | 1983–1998 |
| India 1 | Administrative | Yes | 1982–1998 |
| India 2 | Cooperative | Yes | 1999–2000 |
| Indonesia | Administrative | Yes | 1982–1993 |
| Ireland | Administrative | Yes | 1989–1997 |
| Israel | Administrative | No | 1988–2000 |
| Italy | Central rule | Yes | 1985–1999 |
| Latvia | Administrative | Yes | 1994–2000 |
| Lithuania | Central rule | No | 1993–2000 |
| Mexico | Administrative | Yes | 1982–2000 |
| Mongolia | Administrative | No | 1992–2000 |
| Netherlands | Unrestricted | Yes | 1982–1997 |
| New Zealand | Unrestricted | No | 1992–2000 |
| Nigeria | Unrestricted | No | 1995–2000 |
| Norway | Central rule | No | 1982–1999 |
| Peru | Administrative | No | 1991–2000 |
| Philippines | Administrative | No | 1982–1991 |
| Portugal | Unrestricted | No | 1987–1998 |
| Russia | Unrestricted | Yes | 1995–2000 |
| Slovakia | Central rule | No | 1996–2000 |
| South Africa | Cooperative | No | 1982–2000 |
| Spain 1 | Central rule | Yes | 1982–1991 |
| Spain 2 | Cooperative | Yes | 1992–2000 |
| Sweden | Unrestricted | Yes | 1982–1999 |
| Switzerland | Self-imposed rules | No | 1982–2000 |
| United Kingdom | Administrative | No | 1982–1998 |
| United States | Self-imposed rules | No | 1982–2000 |
| Zimbabwe | Administrative | No | 1982–1991 |

Note: Data Missing for Brazil 1995–96. The bailout history for Australia was reset to zero following a change in the mechanism of the enforcement of the decisions of the Loan Council.

Table 5. Statistically Insignificant Control Variables: Impact on Subnational Fiscal Balance

| <i>Variable</i> | <i>Cross-Section</i> | <i>Dynamic Panel</i> | <i>Sign Consistent with Prior Expectation?</i> |
|---------------------------------------|----------------------|----------------------|--|
| Federation | + | N/A | No |
| Region-based representation in senate | - | N/A | Yes |
| Perceived corruption | - | N/A | Yes |
| Inflation | - | - | Yes |
| Real interest rates | + | - | Partly |
| Debt service to gross national income | + | - | Yes |
| Unemployment | - | - | Yes |
| Election years | N/A | ++ | Yes |
| Political cohesion index | + | N/A | Yes |
| Central bank independence | + | N/A | Yes |
| Elected subnational authorities | + | N/a | Yes |
| Proportion of young and elderly | + | -- | Mostly yes |
| Population density | - | + | Partly |
| Horizontal fiscal imbalances | + | N/A | No |
| Area, log | - | N/A | N/A |
| Emerging country | - | N/A | Yes |
| Size of jurisdictions (GDP share) | - | N/A | Yes |
| Ethnolinguistic fractionalization | - | N/A | Yes |
| Parliamentary republic | -- | N/A | Yes |

Notes:

1. + (-) denotes a positive (negative) but insignificant coefficient; ++ (--) denotes that statistical significance approached 10% level in some specifications.

2. N/A appears in the following cases: (1) variables that do not have meaningful time series variation were used only in cross-section; (2) the election dummy has no meaningful cross-sectional averages and (3) there is no prior hypothesis about the effect of area.

Table 6. Performance of Different Regimes in the Presence of Bailout History

| Model | <i>Resistance to Bailouts</i> | Test of Equal |
|--|--|-------------------------------|
| <i>Method</i> | <i>Between</i> | Coefficients |
| <i>Dependent Variable</i> | <i>Subnational Surplus to Revenue (SS)</i> | |
| Central government surplus (<i>CS</i>) | 0.383 (0.101)*** | |
| Decentralization (<i>dec</i>) | 0.004 (0.086) | |
| Self-imposed rule (<i>self</i>) | 0.007 (0.159) | |
| Centrally-imposed rule (<i>central</i>) | -0.061 (0.065) | |
| Cooperative controls (<i>coop</i>) | -0.109 (0.039)*** | |
| Administrative controls (<i>admin</i>) | 0.017 (0.040) | |
| Bailout history (<i>bailout</i>) | -0.014 (0.031) | |
| VFI * <i>self</i> | -0.122 (0.687) | |
| VFI * <i>central</i> * <i>Bailout</i> | 0.105 (0.105) | $\Delta = -0.035$ F = 0.07 |
| VFI * <i>central</i> * <i>nobailout</i> | 0.140 (0.168) | (p = 0.79) |
| VFI * <i>coop</i> * <i>bailout</i> | -0.017 (0.044) | $\Delta = -0.241$ F = 4.48 |
| VFI * <i>coop</i> * <i>no bailout</i> | 0.224 (0.089)** | (p = 0.04)** |
| VFI * <i>admin</i> * <i>bailout</i> | -0.064 (0.057) | $\Delta = -0.186$ F = 1.38 |
| VFI * <i>admin</i> * <i>nobailout</i> | 0.122 (0.112) | (p = 0.25) |
| GDP (log, in PPP terms) | 0.022 (0.017) | |
| Size of government | -0.140 (0.129) | |
| Cconstant | -0.124 (0.136) | |
| Number of observations | 584 | |
| Number of groups | 52 | |
| R ² (between) | 0.59 | |

Note:

1. Standard errors in parentheses. Values significant at 10 percent level are marked with *, at 5 percent with **, at 1 percent with ***. VFI is vertical fiscal imbalance.