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How Well Do Subnational Borrowing Regulations Work?

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Abstract

There are many positive aspects associated with subnational borrowing, including additional funding and promoting intergenerational equity. However, it may also endanger fiscal sustainability and macro stability due to moral hazard and soft budget constraints, making borrowing controls justified and common. This study reviews the different types of ex-ante and ex-post subnational borrowing regulations used in the international experience based on a large panel of developed and developing countries. Each type of regulations has advantages and disadvantages, with varying suitability to a country's circumstances.

It is found that the presence of subnational tax autonomy contributes to an increase in the general government primary balance but not significantly for subnational primary balances. A history of subnational bailouts is associated with lower primary balances, on average, at all levels. The "golden rule" and limits on debt and borrowing appear effective at all levels of government. However, none of the broad types of subnational borrowing regulations seem to have a distinct significant direct effect on the narrow definition of fiscal sustainability at the subnational level.

JEL Classification: H70, H74, H63, H81

Contents

1. INTRODUCTION[1]

Existing literature widely acknowledges the importance of infrastructure for economic growth, quality of life, and poverty reduction.[2] With deep decentralization trends throughout all regions of the world, as well as subnational governments in charge of about two-thirds of total public infrastructure spending, there has been a natural increase in the importance of subnational borrowing for financing this infrastructure.[3]

Although some countries prohibit borrowing by subnational governments,[4] others allow it, as they believe the efficiency and equity benefits of borrowing outweigh the associated macroeconomic risks.[5] Factors, such as a lack of institutional capacity and history of subnational government defaults in other decentralized systems, give central governments reasons to regulate subnational government autonomy by introducing effective borrowing controls. The challenge is to achieve borrowing autonomy while preserving fiscal discipline by preventing the insolvency of subnational governments and assuring national fiscal sustainability.[6]

Subnational governments have fewer incentives than central governments to be concerned with the macroeconomic impact of their policies. Subnational governments do not bear—or at least they perceive so—the full cost of their actions; they are not concerned with national fiscal sustainability as central governments are.[7] While well-designed fiscal decentralization systems, especially on the side of subnational revenue autonomy, can enhance or at least not harm fiscal sustainability (Fukasaku and De Mello 1998), decentralization can pose significant risks to fiscal sustainability. A disciplined subnational borrowing process is thus needed (Ter-Minassian 1997b).[8]

Due to the potential long-term consequences of subnational borrowing on fiscal sustainability and macroeconomic stability, most countries manage subnational borrowing and debt by implementing ex-ante and/or ex-post regulations. Ex-ante regulations can consist of direct control by the central government, fiscal rules predetermined in constitutions or organic laws, or a reliance on financial markets and their mechanisms to control borrowing. Ex-post regulations comprise sanctions for noncompliance of rules and imprudent behavior. There is consensus that both ex-ante and ex-post regulations should be used simultaneously, and should consider both borrowers and lenders (Webb 2004). Reliance on only ex-ante controls gives both

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[1] Several sections of this paper build on Martinez-Vazquez and Vulovic (2015).

[2] See, for example, OECD (2006) and World Bank (1994).

[3] See Martinez-Vazquez and Timofeev (2015).

[4] This is the case in many developing countries. Among developed countries, Denmark is among the few that have an outright prohibition.

[5] The advocates of subnational borrowing typically emphasize four potential benefits: (i) expansion of the subnational fiscal space for infrastructure financing, (ii) efficient and intergenerationally equitable outcomes from infrastructure financing through borrowing, (iii) increased fiscal transparency of subnational governments, and (iv) a deepening of national financial markets. Empirically, a positive effect of the availability of subnational borrowing on the provision of infrastructure service has been found (Freire and Petersen 2004, Leigland 1997, Peterson and Hammam 1998).

[6] Fiscal discipline requires imposing constraints on all three fiscal aggregates: total revenues, fiscal balance, and public debt (Fölscher 2007).

[7] Past macroeconomic crises involving public debt, such as those in Argentina, Brazil, East Asia, and the Russian Federation, have brought up fiscal sustainability as an important component of macroeconomic stability. The more recent experience of peripheral European countries during the global financial crisis has made the link between fiscal sustainability and macroeconomic stability much more salient.

[8] The empirical literature on this issue is inconclusive, but this is not surprising given that the outcomes are dependent on the decentralization system design and actual operation.

the borrowers and lenders incentives for irresponsible behavior, since it bears no consequences. Reliance on only ex-post regulations may give space to large subnational governments to overborrow and build up debts so large that the central government cannot enforce them to bear the consequences, given their importance in the national economy.

One view is that in regulating subnational borrowing, financial markets impose enough rules on debtors and creditors. Other legal rules are unnecessary, as market conditions already impose effective sanctions through higher interest rates and denial of lending. However, the history of subnational borrowing in some countries undergoing decentralization suggests that exclusive reliance on financial markets in maintaining subnational fiscal discipline may not be enough (Ter-Minassian and Craig 1997). The necessary conditions of developed financial markets, availability of financial information, and no bailouts by the central government are generally not met, and defaults can have long-term consequences.[9]

A commonly accepted definition of fiscal sustainability states that the fiscal balance and underlying trends are such that in a steady state, the ratio of outstanding debt and debt servicing to gross domestic product (GDP) does not increase over time (Ishihara 2010). Similarly, the International Monetary Fund (2001) defined a set of fiscal policies as sustainable if a borrower is able to continue servicing its debt without an unrealistically large future correction to its income and expenditure. For the purpose of this study, fiscal policy is defined as sustainable if the present value of future primary surpluses equals the current level of debt.

This study examines the factors that are important in choosing particular types of subnational borrowing regulations. It then looks at the impact of regulated subnational borrowing on fiscal sustainability, and whether this impact differs when subnational governments have adequate revenue autonomy. Finally, it assesses if any borrowing regulatory framework performs in a superior manner in maintaining fiscal sustainability.

Despite the importance of these issues, little systematic empirical work has been done on the effect of subnational borrowing on fiscal sustainability. The existing literature does not offer a definitive answer on whether borrowing at the subnational level should be allowed, and if so, how it should be regulated. The few cross-country empirical studies that have evaluated these effects used either some aggregate measure of borrowing autonomy that did not take into account different types of regulations, monitoring, and enforcement, or focused only on the effect of fiscal rules. Most of these studies also suffered from econometric issues, including not addressing the potential reverse causality between fiscal sustainability and types of borrowing regulations, not modeling a dynamic process in fiscal sustainability, or solely focusing on the subnational rather than general government fiscal performance.

For this study, unbalanced panel data between 1990 and 2008 for 57 industrialized, developing, and transitioning countries are used. Two alternative dependent variables are employed: the primary balance (i.e., Revenues – [Expenditures – Interest Payments]) at the general government level (i.e., entities that fulfill the functions of government as their primary activity and can be divided into central, state, and local government subsectors, depending on a country [IMF 2001]) and subnational level (i.e., all levels of government below the central government level). The main variables of interest are four broad types of subnational borrowing regulations first categorized by Ter-Minassian and Craig (1997): market discipline, fiscal rules (with a distinction made

[9] As an example, in the 1840s, eight states defaulted on their debts in the United States yet continued paying a premium on their debt into the 1990s (English 1996).

between centrally imposed and self-imposed rules), administrative regulation, and cooperation regulation. The results obtained from using these types of subnational borrowing regulations are compared with those obtained from prohibiting borrowing at the subnational level.

Section 2 reviews the literature on the effect of subnational borrowing and regulations on fiscal sustainability. Section 3 reviews the spectrum of ex-ante and ex-post subnational borrowing regulations, and section 4 presents the empirical methodology and discusses the results. Section 5 concludes.

2. LITERATURE REVIEW

2.1 Fiscal Decentralization, Fiscal Sustainability, and Macroeconomic Stability

In the 1990s, researchers began focusing on macroeconomic problems that can arise as governments give greater responsibility to subnational governments (Hunter and Shah 1996; Prud'homme 1995; Ter-Minassian 1997a; Ter-Minassian 1997b; Fornasari, Webb, Zou 2000). However, the effects of fiscal decentralization on macroeconomic stability have never been settled in empirical literature. Recently, several studies have found either no effect or a positive effect of decentralization on fiscal performance and macroeconomic stability (Schaltegger and Feld 2009, Freitag and Vatter 2008, Shah 2005, Shome 2002, Stein 1999). There is also evidence that the effects of decentralization on macroeconomic stability depend on the level of economic development and what that may represent in terms of institutions. For example, some studies found that fiscal decentralization is more likely to generate instability in developing countries (Fukasaku and De Mello 1998, De Mello 2000), while other papers discovered more stable outcomes for developed countries (Neyapti 2010, Baskaran 2009, Martinez-Vazquez and McNab 2006).

2.2 Moral Hazard

Conceptually, the need for subnational borrowing controls results from the presence of a common pool problem and implied soft budget constraints. The common pool problem arises from the separation of costs and benefits of public spending. If a certain capital investment mostly benefits one jurisdiction but is financed through a common pool, the said jurisdiction pays only a small fraction of the cost while enjoying a large fraction of the benefits. This sets incentives for excessive spending, with all jurisdictions competing for federal funds or otherwise behaving in fiscally irresponsible ways to finance investments (Rodden 2002; Purfield 2004; Ahmad, Albino-War, Singh 2005; Hillman 2009). Such actions raise the presence of moral hazard with subnational borrowing activities.[10]

The moral hazard problem would not exist if central governments could credibly commit to no ex-post changes in the allocation of transfers, that is, to a no-bailout policy (Hernández-Trillo, Cayeros, González 2002, Goodspeed 2002). However, it is difficult to achieve such a commitment (Wildasin 1997; Persson and Tabellini 1996; Noel 2000; Bordignon, Manasse, Tabellini 2001).

[10] Moral hazard is present when "one party to a transaction may undertake certain actions that (a) affect the other party's valuation of the transaction but that (b) the second party cannot monitor/enforce perfectly" (Kreps 1990:577).

2.3 Supply and Demand for Borrowing

Financial institutions represent the supply side of subnational borrowing. This borrowing takes place through loans from financial and other credit institutions, or through the capital market with the issuance of securities and bonds. Both loans and bonds have different strengths and weaknesses involving costs, maturities, and transparency, but the two sources ideally can operate side by side (Peterson 2003, Peterson and Hammam 1998).

Regardless of whether loans or bonds are chosen, a borrower's creditworthiness is likely to be an important criterion for lenders in making investment decisions. The creditworthiness of subnational governments is the main demand-side requirement for subnational borrowing. Creditworthiness refers to the borrower's ability and willingness to repay debt, and can be influenced by economic and financial as well as political and institutional factors (Peterson 1998, Spahn 1999).[11]

One form of signaling that reduces borrowing costs is reputation. A good reputation earned by full and timely repayment of debt may lower the cost of borrowing by reducing information asymmetries (Diamond 1989, Thakor 1991). For borrowers who do not yet have established reputations, another form of signaling is collateral (Diamond 1989). However, collateral cannot always be used in subnational borrowing transactions.

2.4 Regulation of Subnational Borrowing and Its Effects

Imposing borrowing controls at the subnational level may be needed to preserve macroeconomic stability as well as to safeguard subnational public finances. There are different ways in which central governments can contribute to prudent borrowing, which have been much debated (Peterson and Hammam 1998). The literature on subnational borrowing has emphasized the ability of higher levels of government to provide implicit guarantees on subnational government debt as one of the main problems with subnational borrowing, as this leads to a classic moral hazard situation. Therefore, when devolving borrowing responsibility to lower levels of government, the question is whether such a risk can be successfully controlled by some kind of rule, or if the credit market alone is sufficient. The central government must also decide whether to provide a sovereign guarantee.

Much recent literature was based on the initial classification of types of subnational borrowing regulations into four broad categories by Ter-Minassian and Craig (1997). They concluded that sole reliance on market-based regulations is unlikely to be effective, and that a rule-based approach is generally preferable to administrative control. Yet as Balassone, et al. (2002) found from the experiences of Austria, Belgium, Germany, Italy, and Spain, the effectiveness of fiscal rules can be compromised if only central governments are held accountable.

There has not been an *a priori* agreement on what type of regulation is most effective, however. For example, Rodden and Eskeland (2003) concluded that effective control of subnational borrowing requires either strong hierarchical oversight or strong market mechanisms. Based on the experience of European countries, Rattsø (2002) observed

[11] In developed countries, signals of subnational creditworthiness include borrower's debt, finances, administration, and economy (Cluff and Farnham 1984; Fabozzi, Fabozzi, Feldstein 1995; Hausker 1991). However, in developing countries, additional factors may affect a municipality's creditworthiness, including intergovernment transfer structure, history of defaults, legal issues, economic conditions, outstanding debt, and pledged security.

that no particular type of regulation has worked better than others. A similar conclusion was reached by Kennedy and Robbins (2003) from several case studies from the industrial world.

There is no conclusive empirical evidence on whether institutional constraints and rules discipline government budget outcomes and promote macroeconomic stability. Final outcomes depend not only on the type of control being used but also on country idiosyncrasies (Plekhanov and Singh 2007).

2.5 Evidence from Single Country Studies

Looking at individual states in the United States, Abrams and Dougan (1986) concluded that restrictions on borrowing and spending have not been significant in explaining budget outcomes at the state level. Several other empirical studies reached much less definite conclusions, however. Alt and Lowry (1994) emphasized the key importance of balanced budget state laws, which was also confirmed by Poterba (1994, 1995), who also empasized the role of constitutional limitations on borrowing and indebtedness. For the United States, most concluded that states with stronger rules run smaller deficits, receive higher bond ratings, pay lower premiums, and adjust to shocks more quickly (Alesina and Bayoumi 1996, Poterba 1994, Poterba and Rueben 1999, Poterba and Von Hagen 1999). Less conclusive results were obtained by Kenyon (1991) on the effects of caps on federal and local tax-exempt bond issues. Also, Clingermayer and Wood (1995) provided weak evidence that tax and expenditure limitations may increase state indebtedness.

The empirical results from European countries were even less conclusive. Derycke and Gilbert (1985) supported the hypothesis that central government macroeconomic policies do affect local government borrowing decisions in France. However, Dufrénot, Frouté, and Schalck (2010) found that the "golden rule" (i.e., that governments will only borrow to invest) is not effective in regulating regions' borrowing in France. On the other hand, Cabasés, Pascual, and Vallés (2007) provided support to the effectiveness of institutional borrowing restrictions in introducing financial discipline in the borrowing policies adopted by local governments in Spain. Furthermore, Claeys, Ramos, and Suriñach (2008) concluded that, in Germany, the application of fiscal rules is not strict because the central government cannot make the lower tiers of government stabilize debt.

In Brazil, Martell (2008) found that the constraints imposed by fiscal arrangements have been effective in controlling expenditures and that long-term discipline is maintained through rule-based, not market-based, control. Braun (2006) discovered that in Argentina, fiscal rules have not worked because the federal fiscal institutions lead to a serious common pool problem that, in turn, causes a deficit bias.

2.6 Evidence from Cross-Country Studies

Using cross-country data between 1985 and 1987, Von Hagen and Eichengreen (1996) found that that the introduction of subnational borrowing constraints in the European Union increases subnational indebtedness.[12] Fornasari, Webb, and Zou (2000), based on a panel of 31 developed and developing countries, found that constraining

[12] This result should be taken with caution, however, given that their analysis controlled only for GDP and was based on a relatively small sample of 36 observations.

subnational borrowing[13] does not seem to have any consistent effect on subnational fiscal deficits. Alesina, et al. (1999) found a negative correlation between fiscal rules limiting debt levels and fiscal deficits in Latin America.

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 are free to borrow. Hence, the study provided support to the conjecture that subnational borrowing should be controlled, at least in countries with high vertical fiscal imbalances. Moreover, based on a sample of 15 federations, Rodden and Wibbels (2002) found that higher expenditure decentralization is associated with smaller overall deficits, especially when states have wide-ranging autonomy over taxation.

In contrast, in a more recent study, Rodden and Wibbels (2010) found that when subnational governments have more borrowing autonomy, expenditures are less income-elastic than when borrowing is more tightly regulated. In most federations, the more restricted the access to credit markets, the more pro-cyclical fiscal policy is. Plekhanov and Singh (2007) analyzed effects on subnational fiscal balance by observing separately the four broad regulations defined by Ter-Minassian and Craig (1997). They discovered that no single framework seems superior under all circumstances, and that appropriateness of any given regulation depends on the vertical fiscal imbalance, bailout expectations, and quality of reporting.[14] In a similar vein, using a sample of 17 Organisation for Economic Co-operation and Development (OECD) countries, Thornton and Mati (2008) found that changes in fiscal balances of subnational and central governments are highly positively correlated, especially when fiscal relations are managed by rules.[15]

In the European Union, Afonso and Hauptmeier (2009) found that the existence of general and central government fiscal rules positively contribute to higher responsiveness of primary surpluses to government indebtedness. Interestingly, this effect does not exist in the case of subnational fiscal rules. Similarly, Ayuso-i-Casals, et al. (2007) found a positive relationship between numerical fiscal rules and lower deficits, and Debrun and Kumar (2007) and Debrun, et al. (2008) reported that stricter and broader fiscal rules are associated with higher cyclically adjusted primary balances.

Overall, the literature does not offer a definite answer on whether borrowing at the subnational level should be allowed, and if so, how it should be regulated. One issue, however, it is noted that the distinction between borrowing only for financing long-term capital investments and for covering operating expenses is important. Thus, there is consensus that the primary objective of subnational borrowing should be to increase infrastructure services delivery (Freire and Petersen 2004, Leigland 1997, Peterson and Hammam 1998). Subnational borrowing is argued to contribute to more efficient infrastructure services delivery and improved local governance, in terms of transparency, accountability, and financial management (Freire and Petersen 2004).

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[13] Measured by a dummy equal to 1 if Ter-Minassian and Craig (1997) indicates that the country either completely prohibits subnational borrowing or imposes a nondiscretionary rule to constrain it ex ante.

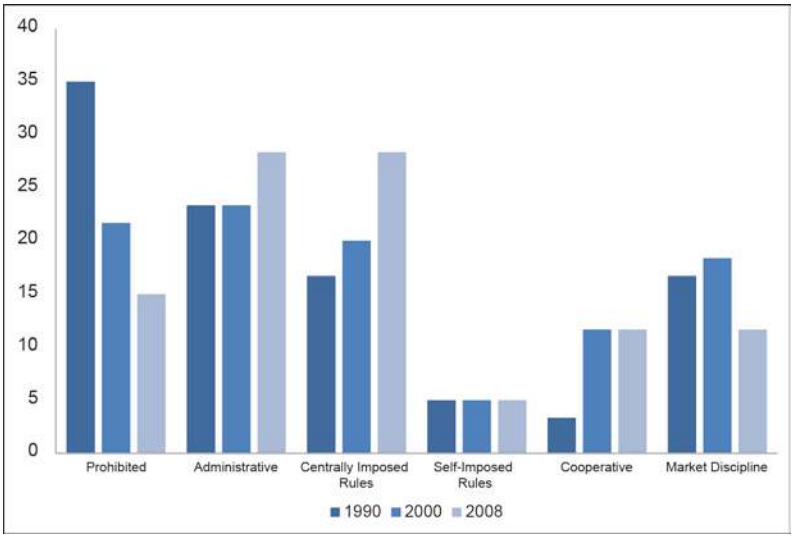
[14] However, two limitations in that study must be emphasized. First, a potential misspecification problem existed due to the lack of an assumption of dynamics of the subnational budget balance, causing the effect of its past values to be included in the error term, potentially resulting in endogeneity and autocorrelation. Second, the study restricted the analysis to the effects of regulations on only subnational fiscal balances when actually central and general government budget balances may be more affected.

[15] Similar to Plekhanov and Singh (2007), this study also suffered from various methodological issues. Not only were the dynamics in fiscal balances not taken into account, but endogeneity in subnational borrowing regulations was not addressed.

3. SUBNATIONAL BORROWING REGULATIONS IN THE INTERNATIONAL EXPERIENCE

As Figure 1 presents, most countries that introduced borrowing at the subnational level after 1990 prefer centrally imposed rules or direct control by the central government as the dominant type of regulation. There has been a relative decrease in sole reliance on financial markets in regulating subnational borrowing, which may be explained by experience gained from recent crises in which subnational borrowing played a major role.

Figure 1: Broad Types of Ex-Ante Subnational Borrowing Regulations
(relative frequency in the sample) (%)



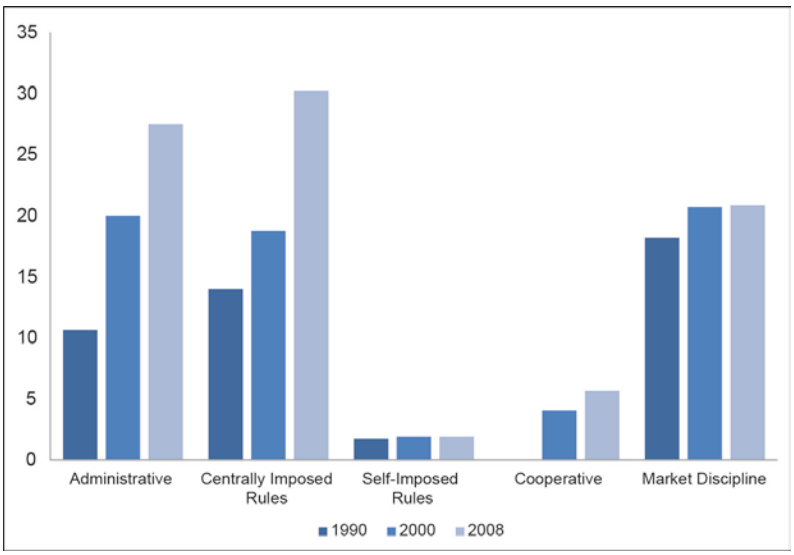
Note: Sample consists of 60 industrialized, developed, and transitioning countries.
Source: Authors' calculations.

In the last 2 decades, there has also been an increased trend of imposing legal sanctions for noncompliance, mostly when subnational borrowing is dominantly regulated by centrally imposed rules (Figure 2).

This trend of imposing legal sanctions for noncompliance is mostly due to countries that have introduced borrowing at the subnational level during this period, rather than changing those that have already been present in the subnational capital market (Figure 3).

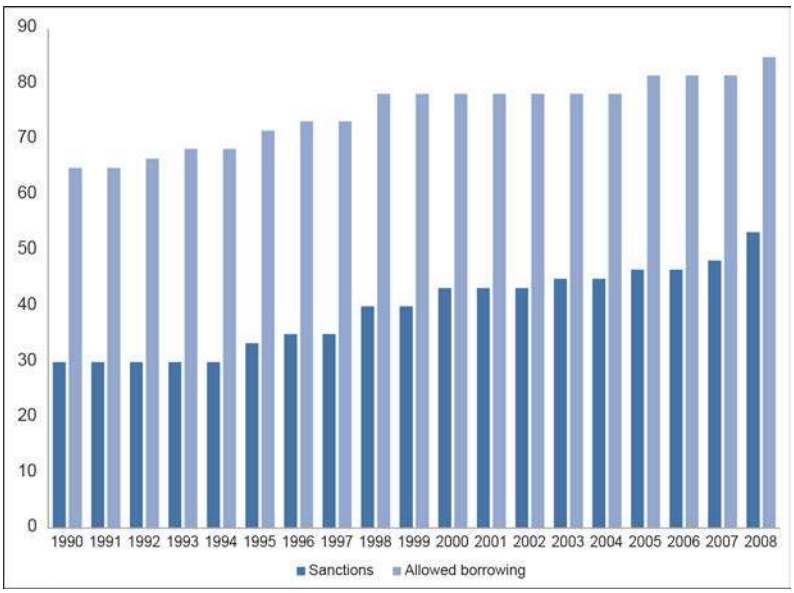
In this section, the four main institutional settings that are used to regulate the operations of subnational credit markets are reviewed. They represent ex-ante regulations, and sanctions for noncompliance as an ex-post regulation of subnational borrowing. The ex-ante regulations reviewed comprise the four broad types defined by Ter-Minassian and Craig (1997): market discipline, fiscal rules, administrative regulation, and cooperative regulation.

Figure 2: Sanctions for Noncompliance by Type of Ex-Post Subnational Borrowing Regulations
(relative frequency in the subsample) (%)



Note: Subsample consists of 39 countries in 1990, 47 in 2000, and 51 in 2008 that allow subnational borrowing.
Source: Authors' calculations.

Figure 3: Allowing Borrowing at the Subnational Level and Imposing Legal Sanctions for Noncompliance
(relative frequency in the sample) (%)



Note: Sample consists of 60 industrialized, developed, and transitioning countries.
Source: Authors' calculations.

3.1 Ex-Ante Regulations

Ex-ante regulations consist of ex-ante control and monitoring of subnational borrowing and fiscal performance. These regulations specify the purpose, types, and procedures of subnational borrowing. Liu and Waibel (2006) summarized the key elements of ex-ante regulations commonly used: (i) allowing borrowing only for financing long-term

capital investments, (i.e., the "golden rule"); (ii) setting limits on key fiscal variables, such as the primary and/or fiscal deficit and debt service ratio; and (iii) requiring subnational governments to establish medium-term fiscal frameworks and transparent budgetary processes. To improve fiscal transparency, more countries are introducing credit-rating systems for subnational governments as part of regulatory frameworks for subnational borrowing.

3.1.1 Market Discipline

In some countries, the government relies solely on capital markets to regulate subnational borrowing. Market discipline means that the financial markets are capable of sending appropriate signals to prevent a borrower from entering "unsustainable areas," and borrowing is limited by lenders' willingness to invest. Credit agencies, such as Standard and Poor's, Moody's, and Fitch, provide lenders and borrowers with information about the risk of default. Subnational governments generally have direct access to financial markets to meet their borrowing requirements. Restricted access to foreign capital markets limits the available options and creates a suboptimal financial sector portfolio (Giugale, Trillo, Oliveira 2000).

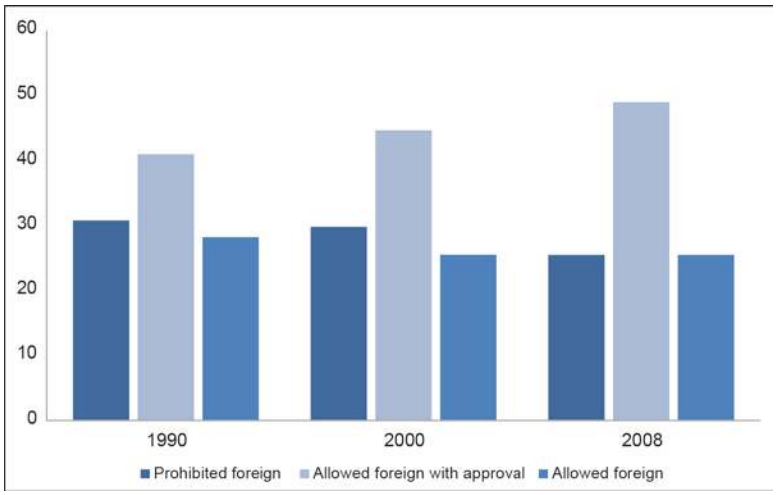
There are certain conditions that need to be satisfied for private financial markets to be an effective control instrument for subnational borrowing: (i) capital markets must be free and open, (ii) potential lenders must have available information about the borrower's outstanding debt and repayment capacity, (iii) there should be no possibility of a bailout of lenders by the central government, and (iv) borrowers must have the ability to respond with adequate policies to the signals sent by the market (Lane 1993).

Market-based subnational borrowing regulations can also take different forms. Dillinger (2003) compared the United States and European models for market-based mechanisms, and concluded that while the United States relies primarily on municipal bonds, Europe relies on specialized banks to finance subnational borrowing, with municipal bonds becoming more popular. Some specialized banks in Europe are owned by municipalities (e.g., in Finland and Sweden), while others were founded by national governments and later privatized (e.g., Dexia in France). The largest owners of municipal bonds in the United States are individual investors, mutual and money market funds, and commercial banks. There, after being issued, municipal bonds can be sold in the secondary market, and are considered relatively safe from default, despite some recent examples.

There has been an increasing trend of allowing subnational borrowing in foreign capital markets over the last 2 decades, but mostly only with an approval by the central government authority (Figure 4).

As previously mentioned, the availability of information and full transparency on outstanding debt and capacity to pay are essential to market discipline. However, obtaining reliable financial information, especially from subnational governments, often requires significant effort. Not all subnational governments follow a standardized accounting plan, hold uniform registers of their assets and liabilities, or publish information on debt and capacity to pay. Hidden extrabudgetary funds weaken transparency. Moral hazard also undermines the effectiveness of market discipline in checking subnational governments' excessive indebtedness. Bailouts encourage the expectation of future rescues and moral hazard behaviors of both borrowers and lenders.

Figure 4: Allowing Subnational Borrowing in Foreign Capital Markets
(relative frequency in the subsample) (%)



Note: Subsample consists of 39 countries in 1990, 47 in 2000, and 51 in 2008 that allow subnational borrowing.
Source: Authors' calculations.

Market signals, such as interest rates, can additionally affect borrowers' financial behavior in choosing more solvent fiscal policies. Borrowers must be sensitive to the market signals for market discipline to be effective; decisions on borrowing should change depending on the interest rate.

In many parts of the world, capital markets at the local level are inadequately developed to be able to provide efficient discipline to subnational governments; thus, credit-rating agencies at the subnational level are becoming increasingly important to evaluate the performance of intergovernment systems. In this same context, some subnational governments have adopted fiscal responsibility rules that are self-imposed, trying to improve their credit ratings. Examples of these trends are seen in Canada, Switzerland, and the United States. Some countries in Latin America, such as Argentina, Brazil, Colombia, and Peru, have also sought to follow this approach, at least partially, with the introduction of fiscal responsibility laws (Webb 2004).

Provinces in Canada may borrow for any purpose, whenever, wherever, and however they wish. There are neither internal nor external federal controls over provincial borrowing, and they do not even need to provide any information on their borrowing to the federal government (Bird and Tassonyi 2001). Unlike provinces, municipalities face a very explicit hard budget constraint, however; local borrowing requires prior provincial approval and is severely limited.[16]

However, even Canada's fully developed financial markets have not been fully able to control excessive indebtedness of its subnational governments. In fact, in the mid-1990s, subnational debt reached 23% of GDP (Bird and Tassonyi 2001), prompting the provinces to adopt fiscal adjustment programs. Similarly, Argentina and Brazil, without meeting all necessary market conditions, relied on a market-discipline approach in the 1980s, which had unfortunate consequences. In Brazil, subnational debt jumped from 1% of GDP in the early 1970s, to 20% in the mid-1990s, with five large federal bailout interventions (three for states and two for municipalities) (Bevilaqua 2002).

[16] Similar to provinces in Canada, municipalities in Finland and Sweden do not need authorization from higher authorities to raise loans, and can borrow from both domestic and foreign sources without any special conditions (Council of Europe 1996 and 2009).

3.1.2 Fiscal Rules

Rules-based regulations consist of fiscal rules imposed by the central government and specified in constitutions or organic laws. Such rules introduce constraints on fiscal choices by subnational governments to guarantee that fiscal outcomes remain predictable and robust regardless of the government in charge. Rules may take different forms: ceilings on debt or total borrowing, deficit targets, maximum expenditure rules, the "golden rule," or rules related to debt repayment capacity.

Borrowing and debt ceilings represent the borrower's upper legal limits of total indebtedness and are generally simple and easy to monitor. A deficit target has the advantage of being easily understood by the public, but it may be unsuccessful in preventing excessive debt accumulation because of off-budget items. The most common deficit target rules are those targeting the overall budget deficit (e.g., Austria, Belgium, Spain, and most states in the United States) or the operating deficit (e.g., Norway). Deficit target rules can also be met at higher levels of revenues and expenditures, which may have macroeconomic implications.

Expenditure rules set the limits on the expenditure level, and are conceptually simple, easy to monitor, and can be most directly controlled. However, an expenditure limit can be more difficult to implement at the subnational level than a deficit target and may not necessarily be able to prevent debt accumulation, since spending could be pushed below the line.

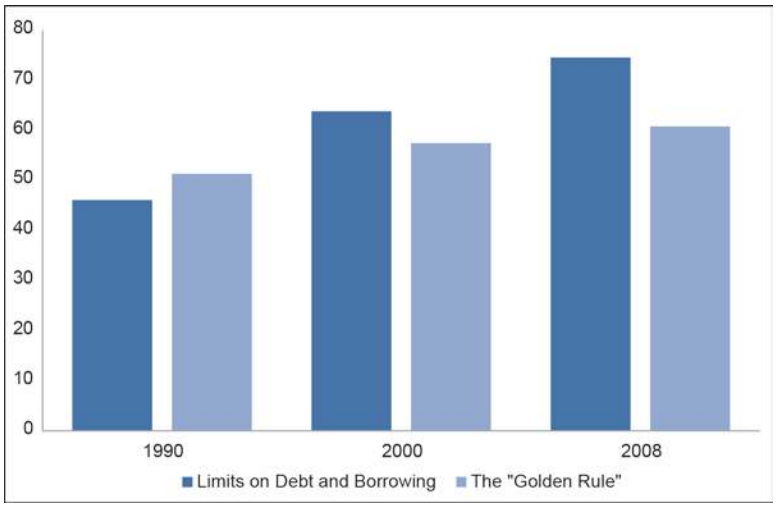
The "golden rule" mostly satisfies the intergenerational equity justification for borrowing. However, borrowing for infrastructure does not guarantee by itself macroeconomic and debt stability. Typically, infrastructure investments are required to provide "adequate" economic and social rates of return to be desirable or be approved. Many countries currently implement some form of the "golden rule" (e.g., Germany, Spain, the United Kingdom, and most states in the United States).

Finally, rules related to the capacity to repay debt attempt to stimulate the workings of the market discipline approach by relating the limits on indebtedness to expected debt service (e.g., Colombia and Hungary in the 1990s). These rules, however, may not be as effective in controlling debt accumulation if financial conditions are manipulated.

Fiscal rules have the advantage of being generally transparent, more effective in addressing long-term sustainability and intergenerational equity, and relatively easy to monitor. They can, however, be counterproductive if poorly designed or inadequately enforced. Most countries using the rule-based approach use a variety of rules, some of which are redundant. The main disadvantage of the rule-based approach is the trade-off between ensuring compliance and preserving flexibility. Strict fiscal rules leave little room for adjustments in case of unexpected economic downturns, while more flexible fiscal rules lack credibility and may fail to impose sufficient discipline. In practice, the efficacy of fiscal rules for subnational governments primarily depends on the ability to monitor the debt.

There has been an increased trend to impose limits on subnational debt and borrowing during the last 2 decades (Figure 5). The use of the "golden rule" has also increased, but not by as much.

Figure 5: Imposing Limits on Borrowing and Debt and the "Golden Rule"
(relative frequency in the subsample) (%)



Note: Subsample consists of 39 countries in 1990, 47 in 2000, and 51 in 2008 that allow subnational borrowing.
Source: Authors' calculations.

All but one state in the United States (i.e., Vermont) has a balanced budget requirement. Budget rules vary significantly across states, mostly applying only to the operating budget (i.e., general fund). In addition, as of 2008, 30 states also operate under tax or expenditure limitations (Waisanen 2008). Several studies have investigated the effectiveness of subnational government rules in the context of states, with most authors concluding that rules do enforce some budget discipline, in terms of lower deficits and quicker reaction to negative fiscal shocks (Poterba 1994, Alesina and Bayoumi 1996, Poterba and Von Hagen 1999, Poterba and Rueben 1999).

In the European Union, within the Stability and Growth Pact that limits the overall level of public debt as well as annual total budget deficits, it has been questioned whether the debt limit should be shared among levels of government. In most countries, it is assumed that the central government is responsible for the overall limit of public debt. Indeed, public debt is much lower at the subnational compared to the central government level, being just above 8% of total debt in Germany to around 19% in Switzerland (Swianiewicz 2004). In most European Union countries, the ratio of the subnational debt to GDP is low, on average around 5%. The only outliers are the Netherlands and Spain, with over 8%. In Belgium, only the central government is responsible for complying with the European Union fiscal rules, but it does have agreements set between the central and subcentral levels of government, so commitments to complying with these constraints is shared among all levels of government.

Switzerland's approach to subnational borrowing regulations is an example of self-imposed fiscal rules. Twenty-six cantons in Switzerland apply different regulations, which are set in each canton's law. In many cantons, borrowing is allowed only for financing capital expenditures and if the local and/or cantonal government has the financial capacity to pay the interest on debt, as well as the amortization, out of the current budget. Dafflon (2002a) discussed the subnational borrowing regulation practices in Fribourg Canton, where for each project that cannot be financed from current revenues, borrowing requires canton approval.

3.1.3 Administrative Regulation

The administrative approach is opposite from the market discipline approach, giving the central government direct control over subnational borrowing. It may take different forms, such as setting an annual or even more frequent limit on overall subnational government debt; prohibiting external borrowing; reviewing individual borrowing operations, including approving terms and conditions; or centralizing all government borrowing with onlending to subnational governments. The approval of each borrowing issuance requires an evaluation of financial terms and conditions under which each operation is contracted. The administrative approach is more frequently used by unitary countries and less by federal countries.

Direct involvement of the central government in micromanaging each credit operation at the subnational government level is a disadvantage of this approach, since it is the opposite of the fiscal decentralization idea. Moreover, this approach may unnecessarily increase bureaucracy, cause undesirable inefficiencies in the financial system, and may even be incompatible with a country's constitution if it allows the subnational government free access to the capital market. Another disadvantage is the moral hazard resulting from the fact that the central government may find it difficult to refuse to financially support the lower levels of the government in cases of impending defaults.

The administrative approach also has advantages. The central government can control both the macroeconomic and external debt policy. Moreover, the central government's control may increase the subnational borrower's credibility, given that foreign lenders often require a central government guarantee, and it may also result in better terms and conditions received in foreign financial markets.

Denmark, Greece, Ireland, Mexico, and the United Kingdom practice the administrative control approach in regulating subnational borrowing. In Mexico, states and municipalities, including their decentralized agencies and public enterprises, can only borrow domestically to finance investment outlays up to the ceilings set by their respective legislatures. Unlike several other countries in Latin America, Mexico does not have a fiscal responsibility law even under consideration. It uses financial sector regulations instead to motivate state-level prudence.

In the United Kingdom, a local authority may not, without the consent of the Treasury, borrow from a lender from abroad or in a currency other than pounds sterling. There, borrowing limits do differ among subnational governments (Watts 2002); limits are allocated depending on their specific needs for housing and education. Allocations are increased or decreased based on the efficiency and effectiveness of local governments and can be adjusted for special needs (Dafflon 2002b).

Denmark provides another interesting example. In general, subnational borrowing there is prohibited, but in some cases, this rule is waived. Permission for borrowing issuance, for which the municipalities apply individually, is granted if the overall borrowing ceiling has not been exceeded and if the municipality's debt does not exceed 30% of its expenditures. The borrowing and debt ceilings are negotiated annually with local government associations. Further, the general rule is that, if borrowing is permitted, both current and capital budgets need to be balanced. Nevertheless, during the 1990s, between 40% and 80% of municipalities' deficits were financed through borrowing, resulting in local debt of 4.5% of GDP in 1998 (Jorgen and Pedersen 2002).

3.1.4 Cooperative Regulation

Under this approach, subnational borrowing controls are designed through a negotiation process between the central and lower levels of government. Subnational governments are actively involved in reaching an agreement on overall general government deficit targets, main revenue and expenditure items, as well as limits on financing individual subnational jurisdictions. This approach is in practice in some European countries and Australia.

The cooperative approach combines many individual advantages of the other three approaches, which is both its main strength and weakness. A clear advantage lies in promoting dialogue and the exchange of information across various government levels, as well as in raising awareness of the macroeconomic implications of budgetary choices. To be effective, this approach requires the central government to be strong and able to effectively guide intergovernment negotiations, which in many emerging markets may not be the case (Joumard and Kongsrud 2003). Moreover, because it combines components of other three approaches, when it is poorly implemented, it reproduces the flaws of other approaches, instead of their advantages (Ahmad, Albino-War, Singh 2005).

In Austria, a "consultation mechanism" between different levels of government and the Stability and Growth Pact were implemented in 1999 (Thöni, Garbislander, Haas 2002) to ensure lowering and maintaining the overall deficit below 3% of GDP. Similar arrangements exist in Spain (Laborda, Martinez-Vazquez, Escudero 2006).

During the 1980s, Australia centralized regulation of subnational borrowing through the Loan Council, but this direct control system was ineffective. The functions of the Loan Council were restructured in the mid-1990s, and excessive indebtedness is now cooperatively controlled (Craig 1997, Dillinger 2003, Koutsogeorgopoulou 2007). Jurisdictions are required to submit their total financial requirements for the upcoming year to the Loan Council, with no requirements for submitting specific project details. Then, the Loan Council evaluates these nominations in regard to the jurisdictions' fiscal position, infrastructure needs, and macroeconomic implications of borrowing. If the Loan Council has concerns about certain nominations, it has the right to request that the jurisdiction justify the nomination, and if needed, it can amend its fiscal strategy. So far, the restructured Loan Council, complemented by financial markets and credit-rating agencies, has been successful in controlling subnational fiscal behavior (Craig 1997, Koutsogeorgopoulou 2007, Webb 2002).

In Belgium, subnational borrowing is supervised by the High Council of Finance, which is composed of members nominated by the federal, regional, and community levels, and the National Bank of Belgium. The committee monitors and analyzes the borrowing requirements of all levels of government at regular intervals, and, based on a concept of sustainability, formulates recommendations about the medium- and long-term budgetary targets for the different government levels. Based on its recommendations, agreements between the central government and regions are formulated, covering 5–6 years and committing the subnational governments to meeting specific annual budgetary targets in terms of their borrowing requirements. To ensure that public finances are consistent with the budgetary targets, municipalities are subject to the "golden rule." On the recommendation of the High Council of Finance, the central government can limit the borrowing capacity of a noncompliant region to prevent endangering economic stability or the external balance. So far, however, the council has not considered it necessary to use this sanction (OECD 2007).

According to Liebig, et al. (2008), the subnational borrowing regulation in South Africa is a combination of the cooperative and marked-based approach. The cooperative component originates in the Constitution, where Article 3 requires a cooperative government. Furthermore, different spheres of the government control each other in terms of who borrows how much. Subnational entities can generally borrow as much as they want. The municipal councils authorize borrowing issuances, and there are no countrywide debt limits.

3.2 Ex-Post Regulations

As already pointed out, the effectiveness of ex-ante regulations is limited without ex-post mechanisms for dealing with subnational insolvency. Although ex-ante regulations are important for minimizing the risk of defaults, they cannot prevent them in all cases. Subnational insolvency may occur because of subnational fiscal and debt mismanagement but also because of external shocks.

Ex-post control mechanisms consist of a set of predetermined rules for allocating the default risk. They provide a basis for both borrowers and lenders' expectations that in case of insolvency, they both share the burden. Properly designed ex-post regulations enforce hard budget constraints on subnational governments.

Countries generally apply two main approaches in ex-post regulation of subnational borrowing: judicial and administrative approaches. The judicial approach involves the courts, which make key decisions and give guidance on the restructuring process. The advantage of the judicial approach is that it neutralizes political pressure. However, the ability of courts to impose fiscal adjustments on subnational governments is limited. The administrative approach, however, often allows intervention of higher levels of government in resolving the subnational insolvency.

Depending on factors, such as history, political, and economic structure, countries apply various approaches for ex-post regulation of subnational borrowing. Brazil and Hungary apply the administrative approach, while South Africa and the United States prefer a combination of judicial and administrative approaches. There is also a uniform approach across states in the United States for dealing with municipal distress.

Any ex-post control mechanism consists of three central elements. The first is the definition of insolvency that acts as a procedural trigger. Different countries define insolvency differently. While Hungary and the United States define insolvency as inability to pay debt, South Africa uses one definition for serious financial problems and another for persistent violation of financial commitments. The second element is the debtor's fiscal adjustment to bring spending in line with revenues, as well as borrowing with capacity to service debt. Even when subnational governments have significant autonomy in controlling expenditures and raising revenues, fiscal adjustment often requires difficult political choices of reducing spending and raising revenues. Finally, negotiations must be included between the debtor and creditor to restructure debt obligations. In case of the administrative approach, a higher government level tends to restructure subnational debt into longer-term debt instruments, which occurred in Brazil in 1997. However, the debt discharge is typically limited to the judicial approach (Liu 2008).

4. EMPIRICAL ANALYSIS AND FINDINGS

4.1 Data on Subnational Borrowing Regulations

The empirical analysis is based on data for 57 developed, developing, and transitioning countries, between 1990 and 2008. Data on the main variables of interest, subnational borrowing regulations, are based on information collected from various sources, such as laws, country reports, and individual country or regional studies.[17] This information considers whether borrowing is allowed at the subnational level, and if so, how it is regulated and controlled. Countries usually implement a combination of different types of regulations in an attempt to control subnational borrowing and to improve subnational creditworthiness. For the purpose of this study, information about subnational borrowing regulations refers to the dominant regulation in a particular country and year. Based on this information, countries are classified into the following six broad categories, with the following basic criteria:

(i) **Prohibited**. Subnational governments are not allowed to borrow in private capital markets.

(ii) **Administrative.** Each borrowing issuance requires approval from the central government authority.

(iii) **Cooperative.** A decision on each borrowing issuance is cooperatively made by members of a body (e.g., a council or committee) that consists of representatives of all government units.

(iv) **Centrally imposed rules.** Regulation is based on fiscal rules (e.g., deficit targets, maximum expenditure rules, or rules related to debt payment capacity) imposed by the central government that are clearly specified in the constitution or organic laws.

(v) **Self-imposed rules**. Subnational borrowing is regulated by fiscal rules that subnational governments imposed on themselves to improve their creditworthiness.

(vi) **Market-based.** Only financial markets regulate borrowing at the subnational level.

Besides the six categories described above, the following three qualitative indicators of subnational borrowing regulations are observed separately:

(i) restricting subnational borrowing for solely financing capital investments (i.e., the “golden rule”);

(ii) imposing ceilings on debt or total borrowing; and

(iii) allowing borrowing in foreign capital markets, which consists of (a) not allowed to borrow in the foreign market, and (b) allowed to borrow with or without approval from the central government authority.

Therefore, if ceilings on debt or total borrowing and/or the “golden rule” are the only fiscal rules that regulate subnational borrowing, then regulation is classified as marked-based. Moreover, because the effectiveness of fiscal rules significantly depends on legal sanctions for noncompliance, this indicator is observed as well.

[17] The details on the sources by country are available upon request.

Countries implement three types of legal sanctions for noncompliance: administrative, political, and financial sanctions. However, for the purpose of this study, these types of sanctions are not separately identified.

Table 1 presents the sample structure in terms of subnational borrowing regulations. There were 16 changes of dominant subnational borrowing regulations during the observation period.[18] Furthermore, 28 countries in the sample restricted borrowing for financing only capital investments at some point during the observation period, while 37 countries imposed limits on debt and borrowing.

Table 1: Subnational Borrowing Regulations, Sample Structure, 1990–2008

Regulation	Number of Observations	% of Total	Number of Countries
Prohibited	143	18	16
Administrative	154	19	17
Cooperative	116	14	7
Centrally imposed rules	190	23	19
Self-imposed rules	45	6	3
Market-based	159	20	11
Total	**807**	**100**	**73[a]**
Golden rule	356	44	28
Limit on debt or borrowing	427	53	37
Foreign: allowed	219	27	13
Foreign: with approval	257	32	23

[a] Does not add up to 57, because some countries changed dominant borrowing regulations during the sample period.
Note: 57 countries, data based on an unbalanced panel.

4.2 Empirical Methodology

To estimate the effects of subnational borrowing and regulations on fiscal sustainability, the relationship between subnational outstanding debt and borrowing regulations is reviewed, as well as the primary fiscal balance. The primary balance is observed at both the general and subnational government levels. Regardless of whether the general or subnational government primary balance is observed, it is almost certain that the current period primary balance depends on its levels in previous years and a set of variables representing the supply and demand for borrowing, as well as the institutional setup in the country. Therefore, the objective model to be tested is

$$y_{it} = \alpha y_{it-1} + \beta B_{it} + \gamma R_{m,it} + \theta R_{f,it} + \varphi F_{it} + \delta X_{it} + \upsilon_i + \varepsilon_{it} \quad (1)$$

In equation (1), y_{it} represents the ratio of the primary fiscal balance to GDP in country i in year t, $i = 1, \dots n, t = 1, \dots T$, while y_{it-1} represents its value in year $t-1$. Next, B_{it} represents the level of outstanding debt at the subnational level in country i in year t. $R_{m,it}$ is a vector of dummy variables representing six broad types of regulation of subnational borrowing in county i in year t, $(m = 1, \dots 6)$. Vector $R_{f,it}$ includes dummy variables representing the presence of the "golden rule," limits on subnational borrowing, allowing borrowing in the foreign market, and existence of sanctions for noncompliance, $(f = 1, \dots, 4)$. Furthermore, F_{it} represents a vector of measures of fiscal decentralization, including the share of intergovernment transfers in total subnational

[18] Note that 15 countries have changed regime once, and one (Bulgaria) has changed it twice.

revenues, a dummy variable that takes the value 1 if the transfer allocation is based on a stable formula; the share of subnational expenditures in total general government expenditures; and a dummy that takes a value of 1 if the subnational authority is able to set and/or change rates for income, business, or consumption taxes.

Next, X_{it} represents a vector of other control variables generally thought to affect primary fiscal balances, including urbanization, population growth, age dependency, government stability, government fractionalization, corruption index, central bank independence, bailout history, GDP per capita, inflation rate, and central government budget balance (for the subnational government regressions). Finally, υ_i stands for unobserved country fixed effects.

Before proceeding with the estimation, several econometric problems need to be addressed that may arise when estimating equation (1):

(i) The borrowing regulation variables in $R_{m,it}$ are assumed to be endogenous. This is because causality may run in both directions, from the primary balance to the decision how to regulate borrowing and vice versa, and these regressors may be correlated with the error term.

(ii) Time-invariant country characteristics (i.e., fixed effects), such as geography and demographics, may be correlated with the explanatory variables. The fixed effects are contained in the error term u_{it} in equation (1), which consists of the unobserved country-specific effects, ν_i, and the observation-specific errors, e_{it}, $u_{it} = \nu_i + e_{it}$.

(iii) The presence of the lagged dependent variable y_{it-1} is likely to give rise to autocorrelation.

To address the first issue, one would usually choose an instrumental variables approach. However, because the potentially endogenous variables in $R_{m,it}$ are a set of mutually exclusive dummy variables, the first stage in the instrumental variable regression is modified to incorporate a multinomial logit model instead of the usual linear regression. The multinomial logit methodology, which allows estimating probabilities with which a country chooses a particular type of regulation, is discussed below.

To address the second and third problems, the generalized method of moments (GMM) estimator is used (Arellano and Bond 1991), which was first proposed by Holtz-Eakin, Newey, and Rosen (1988). The difference GMM estimator uses first differences to transform equation (1) into

$$\Delta y_{it} = \alpha \Delta y_{it-1} + \beta \Delta B_{it} + \gamma \Delta R_{m,it} + \theta \Delta R_{f,it} + \varphi \Delta F_{it} + \delta \Delta X_{it} + \Delta \upsilon_i + \Delta \varepsilon_{it} \quad (2)$$

Because fixed country-specific effects do not vary over time, they disappear by this transformation, solving the second problem. That is,

$$\Delta u_{it} = \Delta \nu_i + \Delta \varepsilon_{it} \quad (3)$$

or

$$u_{it} - u_{it-1} = \nu_i - \nu_i + \varepsilon_{it} - \varepsilon_{it-1}$$

$$u_{it} - u_{it-1} = \varepsilon_{it} - \varepsilon_{it-1}$$

Next, the autocorrelation (i.e., the third problem) is addressed by instrumenting the first-differenced lagged dependent variable with its past levels. The Blundell and Bond (1998) methodology is applied, and equation (1) is estimated using the system GMM estimator. To satisfy the assumption of no correlation across individuals in the idiosyncratic disturbances, it is important to include time dummies into the regression, which makes this assumption more likely to hold (Roodman 2006).

4.3 Determinants of Subnational Borrowing Regulations

To evaluate the determinants of choosing a particular type of subnational borrowing regulation, a multinomial logit model is used.

As already mentioned, vector $R_{m,it}$ consists of $m = 1,2, \dots 6$ borrowing regulation variables. Based on the vector $R_{m,it}$, variable R_{it}^{*} is designed in the following manner:

$$R_{it}^{*} = \begin{cases} m_1, if\ R_{1,it} = 1, (prohibited\ borrowing) \\ m_2, if\ R_{2,it} = 1, (administrative\ regulation) \\ m_3, if\ R_{3,it} = 1, (cooperative\ regulation) \\ m_4, if\ R_{4,it} = 1, (centrally\ imposed\ rules) \\ m_5, if\ R_{5,it} = 1, (self - imposed\ rules) \\ m_6, if\ R_{6,it} = 1, (market - based\ regulation) \end{cases}$$

The probability of choosing any of categories $m = 2, 3, \dots, 6$ is compared to the probability of choosing the reference category (e.g., prohibited borrowing). This requires the calculation of five equations, one for each category relative to the reference category.

Hence, if the first category is the reference one, then, for $m = 2, 3, \dots, 6$,

$$ln \frac{P(R_{it}^{*}=m)}{P(R_{it}^{*}=1)} = \alpha_m + \sum_{k=1}^{K} \beta_{mk} W_{ik} = Z_{mi} \ , m = 2, \dots 6 \quad (4)$$

where W_{ik} is the vector of variables representing potential determinants of subnational borrowing regulations, which are discussed next.

Therefore, for each choice, there will be five predicted log odds, one for each category relative to the reference category.[19]

Probabilities for $m = 2, 3, \dots, 6$ are

$$P(R_{it}^{*} = m) = \frac{exp(Z_{mi})}{1 + \sum_{m=2}^{6} exp(Z_{mi})}, m = 2, \dots, 6 \quad (5)$$

While, for the reference category, $m = 1$.

$$P(R_{it}^{*} = 1) = \frac{1}{1 + \sum_{m=2}^{6} exp(Z_{mi})} \quad (6)$$

[19] Note when $m = 1$, then $\ln(1) = 0 = Z_{11}\ and\ exp(0) = 1$.

4.4 Determinant Variables of Subnational Borrowing Regulations

To resolve the reverse causality issue in equation (1), an exogenous instrument must be found, which is correlated with borrowing regulations but not with the fiscal balance. Recalling the nature of all fiscal decentralization variables, it is difficult to find an exogenous instrument that allows obtaining an unbiased estimate of subnational borrowing regulations on fiscal balance. Besides other factors, the ability of subnational governments to access private financial markets significantly depends on the depth of the country's financial markets and development of financial institutions. The depth of financial markets has an effect on how subnational borrowing is regulated, but at the same time is not directly affected by the size of the fiscal deficit, thus representing a potential instrument for subnational borrowing regulations.

The development of financial markets is expected to significantly affect subnational borrowing autonomy. First, the supply of funds in the financial market affects subnational governments' ability to borrow; second, the depth of the financial market is correlated with the development of financial institutions. Hence, it is expected that countries with more developed financial markets are more likely to allow more borrowing autonomy to subnational governments. To measure the depth of financial markets, two variables are used: the liquid liabilities indicator and index of financial freedom.

The liquid liabilities indicator represents the ratio of liquid liabilities to GDP, where liquid liabilities consist of currency held outside of the banking system plus demand- and interest-bearing liabilities of banks and nonbank financial intermediaries. Thus, the liquid liabilities indicator is a typical measure of financial depth.

The index of financial freedom is a measure of banking efficiency as well as of independence from government control and interference in the financial sector. It is created based on five broad areas that are considered to assess an economy's overall level of financial freedom that ensures easy and effective access to financing opportunities for people and businesses in the economy.[20] An overall score from 0 to 100 rates an economy's financial freedom.

The depth of the financial market represents the supply of borrowing. On the demand side, important variables that affect the decision on how to regulate borrowing are the government primary balance, subnational outstanding debt, expenditures and own revenues, subnational tax autonomy, GDP per capita, and population growth. Besides the supply and demand for borrowing, the decision on how to regulate borrowing depends also on political and institutional determinants, such as government stability, government fractionalization, and bailout history.

Subnational governments' ability to borrow in private financial markets depends on their creditworthiness, which in turn, depends on different factors, including their ability to repay debt. Subnational governments with more own revenue are expected to have a greater ability to repay debt, everything else constant, especially if, at the same time, they have more tax autonomy (i.e., the ability to set and/or change tax rates for important tax instruments). Higher subnational expenditures may indicate larger subnational expenditure needs and higher demand for financing and, therefore, may

[20] The extent of government regulation of financial services, degree of state intervention in banks and other financial firms through direct and indirect ownership, extent of financial and capital market development, government influence on the allocation of credit, and openness to foreign competition (Heritage Foundation 2011).

positively affect the decision to allow subnational governments to borrow in the capital market. GDP per capita and population growth represent indicators of demand for public services, suggesting that with their increase, there may be a higher probability of allowing borrowing at the subnational level.

As discussed previously, GDP per capita is supposed to account for better fiscal performance of developed countries and more developed financial markets. More stable governments are expected to be more likely to impose harder budget constraints on all levels of government, suggesting a higher probability of choosing more decentralized subnational borrowing regulations. Taking into account governments' ability to make decisions cooperatively, one would expect that countries with less fractionalized governments are more likely to have cooperatively regulated subnational borrowing, or borrowing regulated by fiscal rules. Finally, bailout history is likely to be highly correlated with current bailout expectations and can be used as an instrument for bailout expectations. It is expected that countries with a history of bailouts may be more likely to choose more centralized types of subnational borrowing regulations.

4.5 Results of the Determinants of Subnational Borrowing Regulations

The probabilities with which countries choose subnational borrowing regulation types are estimated using the multinomial logit regression. Table 2 presents the relative risk ratios of choosing particular subnational borrowing regulations for unit increase in independent variables.

Given that both general and subnational government primary balances are observed to be potential determinants of subnational borrowing regulations, Table 2 presents the estimated relative risks for both options. As the results show, the liquid liabilities variable seems to be relatively significant in choosing cooperative regulation and regulation based on centrally imposed rules, compared to administrative regulations.

However, as mentioned above, a conclusion cannot be made about the probabilities of choosing among the regulation types presented in the table. Because this study includes comparison among six categories, this way of presenting the relative risk ratios of choosing one category over the other is somewhat confusing. It is more useful for the purpose of analysis to present the results as in Table 3 and Table 4, where it is possible to compare the effects of independent variables on the relative risk of choosing one type of regulation over the other.

The results in Table 3 and Table 4 suggest that the depth of the financial market is particularly important for choosing cooperative regulations and regulations based on centrally and self-imposed rules, over the other types of regulations. Furthermore, countries with a higher general government primary balance are most likely to choose administrative, self-imposed rules, and market-based regulations over the other types. Moreover, countries with a higher subnational primary balance are more likely to choose self-imposed rules and market-based regulations over the others, and are least likely to prohibit borrowing at the subnational level. Finally, countries with higher subnational outstanding debt are more likely to choose self-imposed rules to regulate borrowing. The results also suggest that higher-income countries choose cooperative regulations and self-imposed rules over the others. Next, higher subnational expenditures seem to lead to a higher probability of choosing administrative and cooperative regulations. Finally, countries in which subnational governments have tax autonomy are more likely to choose more decentralized types of regulations, such as self-imposed rules and market-based regulations.

Table 2: Factor Changes in Relative Risk Ratios of Choosing Particular Subnational Borrowing Regulation versus Prohibiting Subnational Borrowing
(for unit increase in independent variable)

	Primary Balance = General Government Primary Balance				
	Prohibited	**Cooperative**	**Central Rule**	**Self-Rule**	**Market**
Liquid liabilities	7.593`	0.205*	0.062***	0.351	0.950
	(6.328)	(0.671)	(0.600)	(0.849)	(0.611)
Financial freedom	1.228*	0.982	0.998	1.019	0.986
	(0.090)	(0.010)	(0.008)	(0.016)	(0.009)
Primary balance	0.000*	0.000*	13.576	42.452	0.305
	(1.955)	(0.177)	(3.383)	(7.344)	(3.544)
Subnational government debt	0.000	6.740***	8.110***	6.351***	7.021***
		(4.255)	(4.068)	(4.458)	(4.080)
GDP per capita	0.761	2.514***	1.847***	3.350***	1.004
	(1.393)	(0.163)	(0.132)	(0.215)	(0.136)
Subnational government expenditures	1.032	4.923	0.000***	0.000**	0.000**
	(5.309)	(2.928)	(2.910)	(4.993)	(2.891)
Subnational government own revenues	5.532*	0.000***	0.420	0.139	0.002***
	(4.971)	(1.865)	(1.604)	(2.531)	(1.835)
Tax autonomy	0.000***	3.137**	1.781	4.729*	7.402***
	(1.663)	(0.409)	(0.385)	(0.632)	(0.386)
Government stability	0.640	1.082	0.880	1.118	0.891
	(0.473)	(0.094)	(0.080)	(0.150)	(0.085)
Government fractionalization	3.153	2.338	6.279***	9.751*	0.870
		(0.608)	(0.509)	(0.900)	(0.554)
Bailout	1.156	0.238***	0.973	0.026***	0.693
	(3.658)	(0.368)	(0.291)	(0.624)	(0.316)
Population growth	0.000	2.212	0.000***	2.487***	0.000**
	(2.209)	(2.113)	(1.928)	(3.149)	(1.800)
Pseudo R-sq.			0.442		
Chi2			1,212.833		
P			0.000		
	Primary Balance = Subnational Government Primary Balance				
	Prohibited	**Cooperative**	**Central Rule**	**Self-Rule**	**Market**
Liquid liabilities	0.008	0.365	0.096***	0.753	1.995
	(6.486)	(0.675)	(0.586)	(0.848)	(0.606)
Financial freedom	1.303*	0.981	0.992	1.012	0.982*
	(0.121)	(0.010)	(0.008)	(0.017)	(0.009)
Primary balance	4.542	1.401**	2.501**	2.301***	1.881***
	(9.424)	(1.537)	(2.286)	(1.237)	(1.529)
Subnational government debt	0.000	4.751***	4.801***	1.501***	1.621***
		(2.272)	(2.053)	(1.497)	(1.094)
GDP per capita	26.347	2.627***	1.818***	3.256***	1.006
	(1.980)	(0.170)	(0.135)	(0.213)	(0.142)
Subnational government expenditures	1.012	1.905	0.000***	0.000**	0.000***
	(5.274)	(3.043)	(0.945)	(0.309)	(0.967)
Subnational government own revenues	1.473*	0.001***	0.846	1.679	0.025*
	(2.506)	(0.868)	(1.536)	(2.632)	(0.808)

continued on next page

Table 2 *continued*

	Primary Balance = Subnational Government Primary Balance				
	Prohibited	**Cooperative**	**Central Rule**	**Self-Rule**	**Market**
Tax autonomy	0.000***	3.235**	2.414*	9.119***	11.980***
	(1.384)	(0.439)	(0.412)	(0.663)	(0.419)
Government stability	0.341*	1.087	0.930	1.242	0.936
	(0.524)	(0.094)	(0.082)	(0.152)	(0.088)
Government fractionalization	3.160	2.169	5.500***	7.292*	0.750
		(0.612)	(0.516)	(0.912)	(0.568)
Bailout	0.016	0.340**	1.197	0.029***	0.824
	(1.579)	(0.368)	(0.293)	(0.644)	(0.326)
Population growth	7.601	2.711	0.000***	1.246***	0.000***
	(7.727)	(2.602)	(1.055)	(1.988)	(1.397)
Pseudo R-sq.			0.445		
Chi2			1,222.516		
P			0.000		

GDP = gross domestic product.

Notes:

1. Coefficients represent factor changes in relative risk for unit increase in independent variable X = exp(b).
2. In parentheses: exp(b) * SD(b)
3. *** p < 0.01; ** p < 0.05; * p < 0.10
4. Administrative regulation is the base category.

Table 3: Factor Change in the Odds, Specification with General Government Primary Balance

		Liquid Liabilities		Financial Freedom		General Government Primary Balance	
Category 1	**Category 2**	**exp(b)**	**P>|z|**	**exp(b)**	**P>|z|**	**exp(b)**	**P>|z|**
Prohibited	Cooperative	5.758	0.482	1.250	0.014	0.000	0.030
Prohibited	Central Rule	5.984	0.371	1.231	0.022	0.000	0.011
Prohibited	Self-Rule	0.171	0.538	1.205	0.042	0.000	0.012
Prohibited	Market	8.518	0.645	1.245	0.016	0.000	0.016
Prohibited	Administrative	7.593	0.650	1.228	0.023	0.000	0.014
Cooperative	Prohibited	0.012	0.482	0.800	0.014	1.790	0.030
Cooperative	Central Rule	3.335	0.050	0.984	0.104	0.000	0.005
Cooperative	Self-Rule	0.585	0.494	0.964	0.025	0.000	0.089
Cooperative	Market	0.216	0.010	0.996	0.686	0.000	0.062
Cooperative	Administrative	0.205	0.018	0.982	0.073	0.000	0.032
Central Rule	Prohibited	0.004	0.371	0.813	0.022	1.930	0.011
Central Rule	Cooperative	0.300	0.050	1.016	0.104	1.080	0.005
Central Rule	Self-Rule	0.175	0.028	0.979	0.196	0.320	0.875
Central Rule	Market	0.065	0.000	1.012	0.166	44.563	0.258
Central Rule	Administrative	0.062	0.000	0.998	0.821	13.577	0.441
Self-Rule	Prohibited	0.020	0.538	0.830	0.042	6.040	0.012
Self-Rule	Cooperative	1.709	0.494	1.038	0.025	3.370	0.089
Self-Rule	Central Rule	5.700	0.028	1.021	0.196	3.127	0.875

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Table 3 *continued*

		Liquid Liabilities		Financial Freedom		General Government Primary Balance	
Category 1	**Category 2**	**exp(b)**	**P>|z|**	**exp(b)**	**P>|z|**	**exp(b)**	**P>|z|**
Self-Rule	Market	0.369	0.182	1.034	0.042	13.343	0.488
Self-Rule	Administrative	0.351	0.217	1.019	0.243	42.452	0.610
Market	Prohibited	0.054	0.645	0.803	0.016	4.340	0.016
Market	Cooperative	4.631	0.010	1.004	0.686	2.738	0.062
Market	Central Rule	5.444	0.000	0.988	0.166	0.022	0.258
Market	Self-Rule	2.709	0.182	0.968	0.042	0.007	0.488
Market	Administrative	0.950	0.933	0.986	0.121	0.305	0.737
Administrative	Prohibited	0.057	0.650	0.814	0.023	1.420	0.014
Administrative	Cooperative	4.874	0.018	1.018	0.073	7.739	0.032
Administrative	Central Rule	6.255	0.000	1.002	0.821	0.074	0.441
Administrative	Self-Rule	2.852	0.217	0.981	0.243	0.024	0.610
Administrative	Market	1.053	0.933	1.014	0.121	3.282	0.737
Prohibited	Cooperative	2.782	0.003	0.000	0.000	0.592	0.271
Prohibited	Central Rule	1.322	0.013	0.000	0.000	0.727	0.501
Prohibited	Self-Rule	3.972	0.012	0.000	0.000	0.572	0.256
Prohibited	Market	3.022	0.005	0.000	0.000	0.718	0.485
Prohibited	Administrative	5.532	0.015	0.000	0.000	0.640	0.345
Cooperative	Prohibited	0.000	0.003	1.867	0.000	1.690	0.271
Cooperative	Central Rule	0.001	0.000	1.761	0.087	1.229	0.024
Cooperative	Self-Rule	0.001	0.006	0.663	0.479	0.968	0.822
Cooperative	Market	0.109	0.181	0.424	0.010	1.213	0.037
Cooperative	Administrative	0.000	0.000	3.137	0.005	1.082	0.403
Central Rule	Prohibited	0.000	0.013	1.057	0.000	1.375	0.501
Central Rule	Cooperative	2.864	0.000	0.568	0.087	0.814	0.024
Central Rule	Self-Rule	3.011	0.630	0.377	0.100	0.787	0.104
Central Rule	Market	2.303	0.000	0.241	0.000	0.987	0.871
Central Rule	Administrative	0.420	0.588	1.781	0.134	0.880	0.108
Self-Rule	Prohibited	0.000	0.012	2.807	0.000	1.747	0.256
Self-Rule	Cooperative	7.758	0.006	1.508	0.479	1.034	0.822
Self-Rule	Central Rule	0.332	0.630	2.656	0.100	1.271	0.104
Self-Rule	Market	6.160	0.064	0.639	0.449	1.254	0.122
Self-Rule	Administrative	0.139	0.436	4.729	0.014	1.118	0.458
Market	Prohibited	0.000	0.005	4.387	0.000	1.393	0.485
Market	Cooperative	9.214	0.181	2.360	0.010	0.824	0.037
Market	Central Rule	0.004	0.000	4.157	0.000	1.013	0.871
Market	Self-Rule	0.013	0.064	1.565	0.449	0.797	0.122
Market	Administrative	0.002	0.001	7.402	0.000	0.892	0.178
Administrative	Prohibited	0.000	0.015	5.927	0.000	1.563	0.345
Administrative	Cooperative	6.423	0.000	0.319	0.005	0.925	0.403
Administrative	Central Rule	2.384	0.588	0.562	0.134	1.137	0.108
Administrative	Self-Rule	7.177	0.436	0.212	0.014	0.895	0.458
Administrative	Market	6.588	0.001	0.135	0.000	1.122	0.178

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Table 3 *continued*

		Subnational Government Debt		GDP per Capita		Subnational Government Expenditures	
Category 1	**Category 2**	**exp(b)**	**P>|z|**	**exp(b)**	**P>|z|**	**exp(b)**	**P>|z|**
Prohibited	Cooperative			0.303	0.392	7.081	0.591
Prohibited	Central Rule	0.000	0.000	0.412	0.524	1.382	0.390
Prohibited	Self-Rule	0.000	0.000	0.227	0.291	6.482	0.398
Prohibited	Market	0.000	0.000	0.758	0.842	5.432	0.444
Prohibited	Administrative	0.000	0.000	0.761	0.844	1.032	0.534
Cooperative	Prohibited			3.304	0.392	0.000	0.591
Cooperative	Central Rule	0.083	0.275	1.361	0.044	1.951	0.000
Cooperative	Self-Rule	0.000	0.001	0.750	0.150	9.161	0.000
Cooperative	Market	0.010	0.030	2.503	0.000	7.671	0.000
Cooperative	Administrative	6.740	0.000	2.514	0.000	4.923	0.089
Central Rule	Prohibited			2.427	0.524	0.000	0.390
Central Rule	Cooperative	12.043	0.275	0.735	0.044	0.000	0.000
Central Rule	Self-Rule	0.001	0.004	0.551	0.004	0.469	0.880
Central Rule	Market	0.116	0.149	1.839	0.000	0.004	0.044
Central Rule	Administrative	8.110	0.000	1.847	0.000	0.000	0.000
Self-Rule	Prohibited			4.403	0.291	0.000	0.398
Self-Rule	Cooperative	9.843	0.001	1.333	0.150	0.000	0.000
Self-Rule	Central Rule	7.326	0.004	1.814	0.004	2.131	0.880
Self-Rule	Market	9.397	0.037	3.336	0.000	0.008	0.333
Self-Rule	Administrative	6.351	0.000	3.350	0.000	0.000	0.007
Market	Prohibited			1.320	0.842	0.000	0.444
Market	Cooperative	4.227	0.030	0.400	0.000	0.000	0.000
Market	Central Rule	8.654	0.149	0.544	0.000	4.431	0.044
Market	Self-Rule	0.011	0.037	0.300	0.000	9.426	0.333
Market	Administrative	7.021	0.000	1.004	0.975	0.000	0.003
Administrative	Prohibited			1.314	0.844	0.000	0.534
Administrative	Cooperative	0.000	0.000	0.398	0.000	0.007	0.089
Administrative	Central Rule	0.000	0.000	0.541	0.000	1.351	0.000
Administrative	Self-Rule	0.000	0.000	0.299	0.000	6.321	0.007
Administrative	Market	0.000	0.000	0.996	0.975	5.629	0.003
Prohibited	Cooperative	1.153	0.000	8.544	0.064	0.000	0.338
Prohibited	Central Rule	4.052	0.000	7.025	0.142	1.672	0.704
Prohibited	Self-Rule	2.652	0.000	6.269	0.015	0.000	0.038
Prohibited	Market	2.915	0.000	4.855	0.118	1.872	0.938
Prohibited	Administrative			1.156	0.143	0.000	0.609
Cooperative	Prohibited	0.000	0.000	0.001	0.064	6.484	0.338
Cooperative	Central Rule	0.372	0.075	0.244	0.000	1.085	0.000
Cooperative	Self-Rule	0.240	0.099	9.202	0.000	0.000	0.004
Cooperative	Market	2.688	0.082	0.343	0.004	8.434	0.000
Cooperative	Administrative	2.338	0.163	0.238	0.000	2.212	0.156
Central Rule	Prohibited	0.000	0.000	0.005	0.142	0.000	0.704

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Table 3 *continued*

		Subnational Government Debt		GDP per Capita		Subnational Government Expenditures	
Category 1	**Category 2**	**exp(b)**	**P>|z|**	**exp(b)**	**P>|z|**	**exp(b)**	**P>|z|**
Central Rule	Cooperative	2.686	0.075	4.094	0.000	0.000	0.000
Central Rule	Self-Rule	0.644	0.605	7.674	0.000	0.000	0.000
Central Rule	Market	7.221	0.000	1.405	0.277	0.000	0.140
Central Rule	Administrative	6.279	0.000	0.973	0.925	0.000	0.000
Self-Rule	Prohibited	0.000	0.000	0.000	0.015	7.289	0.038
Self-Rule	Cooperative	4.171	0.099	0.109	0.000	1.125	0.004
Self-Rule	Central Rule	1.553	0.605	0.027	0.000	1.210	0.000
Self-Rule	Market	9.212	0.005	0.037	0.000	9.479	0.000
Self-Rule	Administrative	9.751	0.011	0.026	0.000	2.487	0.000
Market	Prohibited	0.000	0.000	0.003	0.118	0.001	0.938
Market	Cooperative	0.372	0.082	2.915	0.004	0.000	0.000
Market	Central Rule	0.139	0.000	0.712	0.277	1.281	0.140
Market	Self-Rule	0.089	0.005	6.820	0.000	0.000	0.000
Market	Administrative	0.870	0.801	0.693	0.244	0.000	0.004
Administrative	Prohibited			0.005	0.143	2.932	0.609
Administrative	Cooperative	0.428	0.163	4.208	0.000	0.000	0.056
Administrative	Central Rule	0.159	0.000	1.028	0.925	4.894	0.000
Administrative	Self-Rule	0.103	0.011	8.722	0.000	0.000	0.000
Administrative	Market	1.150	0.801	1.444	0.244	3.822	0.004

GDP = gross domestic product.

Notes:

1. exp(b) = factor change in odds (relative risk) for unit increase in x.
2. P>|z| = p-value for z-test of b = 0.
3. b = relative risk.

Table 4: Factor Change in the Odds, Specification with Subnational Government Primary Balance

		Liquid Liabilities		Financial Freedom		Subnational Government Primary Balance	
Category 1	**Category 2**	**exp(b)**	**P>|z|**	**exp(b)**	**P>|z|**	**exp(b)**	**P>|z|**
Prohibited	Cooperative	0.023	0.562	1.328	0.020	3.251	0.422
Prohibited	Central Rule	0.087	0.707	1.313	0.025	1.811	0.433
Prohibited	Self-Rule	0.011	0.491	1.288	0.038	1.981	0.690
Prohibited	Market	0.004	0.400	1.327	0.020	2.411	0.626
Prohibited	Administrative	0.008	0.461	1.303	0.029	4.542	0.144
Cooperative	Prohibited	4.316	0.562	0.753	0.020	0.000	0.422
Cooperative	Central Rule	3.787	0.036	0.989	0.251	0.559	0.876
Cooperative	Self-Rule	0.485	0.369	0.970	0.067	0.000	0.044
Cooperative	Market	0.183	0.006	1.000	0.995	0.000	0.007
Cooperative	Administrative	0.365	0.135	0.981	0.063	1.401	0.004
Central Rule	Prohibited	11.439	0.707	0.762	0.025	0.000	0.433
Central Rule	Cooperative	0.264	0.036	1.011	0.251	1.789	0.876

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Table 4 *continued*

		Liquid Liabilities		Financial Freedom		Subnational Government Primary Balance	
Category 1	**Category 2**	**exp(b)**	**P>|z|**	**exp(b)**	**P>|z|**	**exp(b)**	**P>|z|**
Central Rule	Self-Rule	0.128	0.010	0.981	0.234	0.000	0.062
Central Rule	Market	0.048	0.000	1.011	0.189	0.000	0.016
Central Rule	Administrative	0.096	0.000	0.992	0.355	2.501	0.002
Self-Rule	Prohibited	9.347	0.491	0.777	0.038	0.000	0.690
Self-Rule	Cooperative	2.063	0.369	1.031	0.067	1.641	0.044
Self-Rule	Central Rule	7.811	0.010	1.020	0.234	9.180	0.062
Self-Rule	Market	0.377	0.197	1.031	0.062	12.202	0.674
Self-Rule	Administrative	0.753	0.738	1.012	0.480	2.301	0.000
Market	Prohibited	6.825	0.400	0.753	0.020	0.000	0.626
Market	Cooperative	5.467	0.006	1.000	0.995	1.350	0.007
Market	Central Rule	20.704	0.000	0.989	0.189	7.253	0.016
Market	Self-Rule	2.651	0.197	0.970	0.062	0.082	0.674
Market	Administrative	1.995	0.254	0.982	0.037	1.881	0.000
Administrative	Prohibited	8.691	0.461	0.768	0.029	0.000	0.144
Administrative	Cooperative	2.740	0.135	1.019	0.063	0.000	0.004
Administrative	Central Rule	10.376	0.000	1.008	0.355	0.000	0.002
Administrative	Self-Rule	1.328	0.738	0.988	0.480	0.000	0.000
Administrative	Market	0.501	0.254	1.019	0.037	0.000	0.000
Prohibited	Cooperative	1.623	0.005	0.000	0.000	0.313	0.028
Prohibited	Central Rule	1.733	0.011	0.000	0.000	0.366	0.056
Prohibited	Self-Rule	8.733	0.012	0.000	0.000	0.274	0.017
Prohibited	Market	5.933	0.007	0.000	0.000	0.364	0.055
Prohibited	Administrative	1.473	0.011	0.000	0.000	0.341	0.040
Cooperative	Prohibited	0.000	0.005	2.697	0.000	3.191	0.028
Cooperative	Central Rule	0.001	0.000	1.340	0.393	1.169	0.079
Cooperative	Self-Rule	0.001	0.003	0.355	0.085	0.875	0.357
Cooperative	Market	0.037	0.057	0.270	0.000	1.161	0.097
Cooperative	Administrative	0.001	0.000	3.235	0.007	1.087	0.375
Central Rule	Prohibited	0.000	0.011	2.017	0.000	2.730	0.056
Central Rule	Cooperative	9.496	0.000	0.746	0.393	0.855	0.079
Central Rule	Self-Rule	0.504	0.776	0.265	0.029	0.749	0.049
Central Rule	Market	4.231	0.018	0.202	0.000	0.993	0.934
Central Rule	Administrative	0.847	0.914	2.414	0.032	0.930	0.376
Self-Rule	Prohibited	0.000	0.012	7.597	0.000	3.646	0.017
Self-Rule	Cooperative	11.649	0.003	2.819	0.085	1.143	0.357
Self-Rule	Central Rule	1.984	0.776	3.777	0.029	1.336	0.049
Self-Rule	Market	7.899	0.085	0.761	0.652	1.327	0.052
Self-Rule	Administrative	1.679	0.844	9.119	0.001	1.242	0.153
Market	Prohibited	0.000	0.007	9.977	0.000	2.748	0.055
Market	Cooperative	7.271	0.057	3.703	0.000	0.861	0.097
Market	Central Rule	0.029	0.018	4.963	0.000	1.007	0.934

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Table 4 *continued*

		Liquid Liabilities		Financial Freedom		Subnational Government Primary Balance	
Category 1	**Category 2**	**exp(b)**	**P>|z|**	**exp(b)**	**P>|z|**	**exp(b)**	**P>|z|**
Market	Self-Rule	0.015	0.085	1.314	0.652	0.754	0.052
Market	Administrative	0.025	0.041	11.980	0.000	0.936	0.450
Administrative	Prohibited	0.000	0.011	8.327	0.000	2.936	0.040
Administrative	Cooperative	11.797	0.000	0.309	0.007	0.920	0.375
Administrative	Central Rule	1.181	0.914	0.414	0.032	1.076	0.376
Administrative	Self-Rule	0.596	0.844	0.110	0.001	0.805	0.153
Administrative	Market	4.439	0.041	0.084	0.000	1.068	0.450
		Subnational Government Debt		**GDP per Capita**		**Subnational Government Expenditures**	
Category 1	**Category 2**	**exp(b)**	**P>|z|**	**exp(b)**	**P>|z|**	**exp(b)**	**P>|z|**
Prohibited	Cooperative			10.030	0.245	6.682	0.363
Prohibited	Central Rule	0.000	0.000	14.489	0.177	4.823	0.216
Prohibited	Self-Rule	0.000	0.000	8.091	0.293	4.803	0.203
Prohibited	Market	0.000	0.000	26.187	0.099	3.023	0.236
Prohibited	Administrative	0.000	0.000	26.347	0.098	1.012	0.317
Cooperative	Prohibited			0.100	0.245	0.000	0.363
Cooperative	Central Rule	0.099	0.313	1.445	0.019	7.231	0.000
Cooperative	Self-Rule	0.000	0.004	0.807	0.275	7.191	0.000
Cooperative	Market	0.029	0.106	2.611	0.000	4.521	0.000
Cooperative	Administrative	4.751	0.000	2.627	0.000	1.905	0.199
Central Rule	Prohibited			0.069	0.177	0.000	0.216
Central Rule	Cooperative	10.097	0.313	0.692	0.019	0.000	0.000
Central Rule	Self-Rule	0.003	0.014	0.558	0.004	9.950	0.665
Central Rule	Market	0.296	0.420	1.807	0.000	0.063	0.311
Central Rule	Administrative	4.801	0.000	1.818	0.000	0.000	0.000
Self-Rule	Prohibited			0.124	0.293	0.000	0.203
Self-Rule	Cooperative	3.840	0.004	1.240	0.275	0.000	0.000
Self-Rule	Central Rule	3.548	0.014	1.791	0.004	0.101	0.665
Self-Rule	Market	2.785	0.042	3.237	0.000	0.006	0.333
Self-Rule	Administrative	1.501	0.000	3.256	0.000	0.000	0.004
Market	Prohibited			0.038	0.099	0.000	0.236
Market	Cooperative	4.120	0.106	0.383	0.000	0.000	0.000
Market	Central Rule	3.379	0.420	0.553	0.000	5.984	0.311
Market	Self-Rule	0.011	0.042	0.309	0.000	9.044	0.333
Market	Administrative	1.621	0.000	1.006	0.966	0.000	0.001
Administrative	Prohibited			0.038	0.098	0.000	0.317
Administrative	Cooperative	0.000	0.000	0.381	0.000	0.007	0.099
Administrative	Central Rule	0.000	0.000	0.550	0.000	4.791	0.000
Administrative	Self-Rule	0.000	0.000	0.307	0.000	4.761	0.004
Administrative	Market	0.000	0.000	0.994	0.966	3.000	0.001

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Table 4 *continued*

		Subnational Government Debt		GDP per Capita		Subnational Government Expenditures	
Category 1	**Category 2**	**exp(b)**	**P>|z|**	**exp(b)**	**P>|z|**	**exp(b)**	**P>|z|**
Prohibited	Cooperative	1.416	0.000	0.046	0.582	0.000	0.913
Prohibited	Central Rule	5.416	0.000	0.013	0.438	1.564	0.468
Prohibited	Self-Rule	4.116	0.000	0.541	0.913	0.000	0.381
Prohibited	Market	4.016	0.000	0.019	0.478	4.234	0.550
Prohibited	Administrative			0.016	0.457	7.601	0.895
Cooperative	Prohibited	0.000	0.000	11.620	0.582	3.571	0.913
Cooperative	Central Rule	0.394	0.089	0.284	0.000	5.575	0.000
Cooperative	Self-Rule	0.297	0.162	9.691	0.000	0.000	0.006
Cooperative	Market	2.891	0.062	0.413	0.018	1.514	0.000
Cooperative	Administrative	2.169	0.206	0.340	0.003	2.711	0.141
Central Rule	Prohibited	0.000	0.000	6.006	0.438	0.000	0.468
Central Rule	Cooperative	2.536	0.089	3.516	0.000	0.000	0.000
Central Rule	Self-Rule	0.754	0.742	4.102	0.000	0.000	0.000
Central Rule	Market	7.331	0.000	1.453	0.236	0.000	0.344
Central Rule	Administrative	5.500	0.001	1.197	0.539	0.000	0.000
Self-Rule	Prohibited	0.000	0.000	1.849	0.913	1.645	0.381
Self-Rule	Cooperative	3.362	0.162	0.086	0.000	4.595	0.006
Self-Rule	Central Rule	1.326	0.742	0.024	0.000	2.570	0.000
Self-Rule	Market	9.719	0.008	0.035	0.000	6.939	0.000
Self-Rule	Administrative	7.292	0.029	0.029	0.000	1.246	0.000
Market	Prohibited	0.000	0.000	5.298	0.478	0.000	0.550
Market	Cooperative	0.346	0.062	2.419	0.018	0.000	0.000
Market	Central Rule	0.136	0.000	0.688	0.236	3.691	0.344
Market	Self-Rule	0.103	0.008	2.281	0.000	0.000	0.000
Market	Administrative	0.750	0.613	0.824	0.551	0.000	0.001
Administrative	Prohibited			6.506	0.457	0.000	0.895
Administrative	Cooperative	0.461	0.206	2.937	0.003	0.000	0.141
Administrative	Central Rule	0.182	0.001	0.836	0.539	2.054	0.000
Administrative	Self-Rule	0.137	0.029	4.342	0.000	0.000	0.000
Administrative	Market	1.333	0.613	1.214	0.551	5.573	0.001

GDP = gross domestic product.

Notes:

1. exp(b) = factor change in odds (relative risk) for unit increase in x.
2. P>|z| = p-value for z-test of b = 0.
3. b = relative risk.

4.6 Results for General Government Fiscal Performance

As discussed previously, an important issue with estimating equation (1) directly is the possible reverse causality. To address this issue, the first stage in the instrumental variable regression is modified to incorporate a multinomial logit model to estimate the probabilities of choosing different types of borrowing regulations.[21] The probabilities of

[21] These results are not reported here but are available upon request.

adopting each approach estimated in the first stage are then used instead of their respective dummy variables in the second stage to estimate equation (1) using a 2SLS approach.

Table 5 presents the results for the effect of subnational borrowing and regulations on the general government primary balance. Columns 1 and 2 in Table 5 show the results obtained by applying the dynamic GMM estimator to estimate equation (1) when subnational borrowing regulations are assumed to be exogenous. Columns 3–6, on the other hand, show the results obtained when the assumed endogeneity in subnational borrowing regulations is corrected by using the previously predicted values obtained by the multinomial logit estimator. As the results suggest, after correcting for endogeneity, some coefficients change sign and/or statistical significance.

According to the results in columns 3–6 in Table 5, allowing borrowing at the subnational level, *ceteris paribus*, has a significant and positive effect on the general government primary balance. This result is consistent with expectations because it assumes no restrictions on either the amount of borrowing or its purpose. That is, once a subnational government is allowed to borrow from private financial markets, and can borrow as much as it wants and for any purpose, it may as well borrow to finance the current deficit. Once the existence of subnational borrowing regulations is accounted for, different conclusions are obtained for different types of regulations. For example, centrally imposed rules and market-based regulations seem to reduce the positive effect on the primary balance. On the other hand, cooperative types of subnational borrowing regulations seem to have a positive effect on the primary balance.

Table 5: Effect of Subnational Borrowing on General Government Primary Balance

	GMM (regulations exogenous)			**GMM** (regulations endogenous)		
	1	**2**	**3**	**4**	**5**	**6**
General government primary balance$_{-1}$	0.188	0.205	0.376***	0.215	0.215	0.204
	(0.149)	(0.147)	(0.128)	(0.147)	(0.134)	(0.142)
Subnational government debt	0.048*	0.026	0.525***	0.598***	0.202	0.493**
	(0.028)	(0.028)	(0.181)	(0.205)	(0.192)	(0.199)
Administrative	0.013***	0.017***	0.078***	0.188***	0.135***	0.171***
	(0.005)	(0.006)	(0.024)	(0.038)	(0.027)	(0.034)
Cooperative	0.056***	0.069***	–0.069**	–0.158***	–0.161***	–0.166***
	(0.011)	(0.013)	(0.029)	(0.038)	(0.035)	(0.037)
Central rules	0.020***	0.019**	0.074***	0.165***	0.175***	0.150***
	(0.008)	(0.007)	(0.023)	(0.034)	(0.032)	(0.030)
Self-rule	0.042***	0.035***	0.058	0.257**	0.291***	0.301***
	(0.012)	(0.011)	(0.076)	(0.103)	(0.094)	(0.097)
Market	0.025***	0.022**	–0.154***	–0.308***	–0.339***	–0.309***
	(0.009)	(0.008)	(0.041)	(0.062)	(0.058)	(0.057)
Subnational government debt* administrative	–0.418***	–0.423***	–1.177***	–0.173	0.196	–0.203
	(0.068)	(0.068)	(0.392)	(0.412)	(0.431)	(0.420)
Subnational government debt* cooperative	–0.400***	–0.399***	0.182	1.068***	1.251***	1.068***
	(0.064)	(0.066)	(0.274)	(0.365)	(0.362)	(0.357)
Subnational government debt* central rules	–0.290***	–0.279***	–0.415**	–0.676***	–0.355*	–0.511**
	(0.049)	(0.049)	(0.183)	(0.221)	(0.198)	(0.207)

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Table 5 *continued*

	GMM (regulations exogenous)			GMM (regulations endogenous)		
	1	**2**	**3**	**4**	**5**	**6**
Subnational government debt* self-rule	–0.571***	–0.541***	0.000	0.000	0.000	0.000
	(0.127)	(0.126)	(0.000)	(0.000)	(0.000)	(0.000)
Subnational government debt* market	0.000	0.000	–0.695***	–0.482*	0.151	–0.404
	(0.000)	(0.000)	(0.264)	(0.289)	(0.298)	(0.282)
Sanctions	–0.006***	–0.002	0.005***	0.003**	–0.002	0.001
	(0.002)	(0.002)	(0.001)	(0.002)	(0.002)	(0.002)
Limit on debt	–0.028***	–0.024***	–0.024***	–0.029***	–0.028***	–0.025***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Subnational government debt* limit on debt	0.296***	0.268***	0.150***	0.236***	0.216***	0.201***
	(0.049)	(0.047)	(0.034)	(0.043)	(0.036)	(0.036)
Golden rule	–0.009***	–0.013***		–0.021***	–0.014***	–0.019***
	(0.003)	(0.003)		(0.004)	(0.003)	(0.004)
Subnational government debt* golden rule	0.177***	0.199***		0.192***	0.116***	0.171***
	(0.032)	(0.037)		(0.035)	(0.023)	(0.031)
Foreign	–0.008***	–0.010***		–0.008***	–0.004**	–0.007***
	(0.002)	(0.002)		(0.002)	(0.002)	(0.002)
Subnational government debt* foreign	-0.009	0.019		-0.068**	–0.095***	–0.065**
	(0.026)	(0.026)		(0.031)	(0.032)	(0.031)
Intergovernment transfer	–0.039***	–0.028***	–0.002	0.021**	-0.010	0.011
	(0.009)	(0.008)	(0.007)	(0.009)	(0.007)	(0.008)
Intergovernment transfer* administrative	0.027***	0.010	–0.098***	–0.179***	–0.112***	–0.168***
	(0.010)	(0.010)	(0.029)	(0.038)	(0.028)	(0.035)
Intergovernment transfer* cooperative	–0.025	–0.054***	0.109**	0.055	0.125**	0.104**
	(0.015)	(0.019)	(0.047)	(0.052)	(0.051)	(0.050)
Intergovernment transfer* central rules	0.026	0.024	–0.030	–0.118***	–0.068*	–0.100**
	(0.016)	(0.015)	(0.036)	(0.044)	(0.036)	(0.039)
Intergovernment transfer* self-rule	0.060*	0.048	–0.467***	–1.031***	–0.782***	–1.010***
	(0.032)	(0.031)	(0.151)	(0.216)	(0.165)	(0.199)
Intergovernment transfer* market	–0.016	-0.013	0.265***	0.454***	0.414***	0.464***
	(0.016)	(0.016)	(0.075)	(0.094)	(0.080)	(0.089)
Transfer formula	–0.032***	–0.033***	–0.022***	–0.027***	–0.018***	–0.021***
	(0.006)	(0.007)	(0.005)	(0.005)	(0.004)	(0.005)
Intergovernment transfer* transfer formula	0.074***	0.071***	0.040***	0.069***	0.059***	0.059***
	(0.014)	(0.015)	(0.010)	(0.014)	(0.011)	(0.012)
Tax autonomy	–0.012**	–0.010**	0.009*	0.018***	0.022***	0.020***
	(0.005)	(0.005)	(0.005)	(0.006)	(0.006)	(0.006)
Intergovernment transfer* tax autonomy	0.009	0.009	–0.043***	–0.057***	–0.070***	–0.062***
	(0.011)	(0.011)	(0.015)	(0.016)	(0.016)	(0.016)
Subnational government expenditures				0.001		
				(0.020)		
Urbanization	0.149	0.251**	0.239***	0.448***	0.208***	0.305***
	(0.100)	(0.104)	(0.066)	(0.093)	(0.071)	(0.081)

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Table 5 *continued*

	GMM (regulations exogenous)			GMM (regulations endogenous)		
	1	**2**	**3**	**4**	**5**	**6**
Population growth		–0.294***				–0.317***
		(0.104)				(0.099)
Age dependency	–0.128***				–0.142***	
	(0.024)				(0.024)	
Government stability	–0.001***		–0.000	–0.000	–0.000	
	(0.001)		(0.000)	(0.001)	(0.000)	
Government fractionalization	–0.001	0.001			–0.001	0.002
	(0.002)	(0.002)			(0.002)	(0.002)
Corruption	–0.000				–0.001*	
	(0.001)				(0.001)	
CBI	0.010*	0.014**	0.017***	0.029***	0.019***	0.024***
	(0.006)	(0.006)	(0.006)	(0.007)	(0.005)	(0.006)
Bailout	0.006***	0.003*	–0.016***	–0.038***	–0.029***	–0.031***
	(0.002)	(0.002)	(0.004)	(0.007)	(0.005)	(0.006)
GDP per capita	0.003**	0.005***	0.006***	0.001	0.000	0.001
	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.001)
Inflation		0.000				0.000
		(0.001)				(0.001)
SGP	–0.016***	–0.019***	–0.006**	–0.008***	–0.004	–0.007***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Corr (Y, Y_{hat}) sq.	0.649	0.644	0.798	0.799	0.801	0.801
Sargan test (p-value)	0.790	0.775	0.174	0.241	0.212	0.220
AR(2) Test (p-value)	0.926	0.950	0.755	0.671	0.736	0.641
Observations	745	745	749	749	745	745
Number of id	57	57	57	57	57	57

GDP = gross domestic product, GMM = generalized method of moments.

Notes:

1. Standard errors in parentheses.
2. * significant at 10%; ** significant at 5%; *** significant at 1%.

The negative effect of rule-based regulations is expected because as soon as the rules are imposed, subnational governments may have to reduce the amount of borrowing due to requirements that subnational governments must meet considering revenues, expenditures, and deficit.[22] Therefore, subnational governments' ability to finance deficits through borrowing is reduced. The negative effect of market-based regulations is also due to similar reasons, except in this case, subnational governments have to improve their creditworthiness to be able to borrow with lower interest rates. Since the level of indebtedness contributes to a higher cost of borrowing, subnational governments may reduce the amount of borrowing, so they may not be able to cover the deficit. Finally, the cooperative type of regulations includes many components of the other three types, and if it is properly implemented, this type of regulations shows the positive characteristics of the other types. The estimated positive effect of cooperative regulations when the subnational debt is increasing provides support for this conjecture.

[22] Recall that this variable does not include the "golden rule" and limit on borrowing and debt.

The results suggest that the "golden rule" and imposed limits on subnational borrowing and debt are efficient in regulating subnational borrowing and improving the effectiveness of a broad variety of regulations. Moreover, when subnational governments have to face legal sanctions for noncompliance to imposed fiscal rules, they may have better fiscal performance. The coefficient for this variable, however, sometimes shows no effect on the primary balance, which may be explained by the noise in its measurement. In fact, legal sanctions for noncompliance can be administrative, financial, or political, and no distinction was made between them while creating this variable due to basic data limitations. Given that not all types of sanctions are equally efficient, the estimated coefficient on this variable may not be robust. Finally, the results suggest that allowing subnational governments to enter foreign financial markets may deteriorate countries' fiscal performance. A possible reason for this is that access to the foreign financial markets may increase exposure to external shocks.

A greater dependence on financing from the central government negatively affects the effectiveness of regulations based on fiscal rules (especially self-imposed rules) and administrative regulation. This negative effect of intergovernment transfers may be due to moral hazard, especially in case of the administrative regulation. Moreover, high dependence on intergovernment transfers may be reducing the effectiveness of self-imposed rules through reduced commitment to the rules. On the other hand, cooperative and market-based regulations seem to have positive effects on the primary fiscal balance in the case of a high dependence on transfers. In the case of cooperative regulations, this effect may be explained by possible higher transparency, given that representatives of all government units cooperatively make decisions on fiscal policy.

The positive effect of market-based regulations on the primary fiscal balance in the case of high financing from the central government budget may be explained in the following manner. High subnational dependence on intergovernment transfers may make creditors feel more certain that a borrower may be more likely to be bailed out in case of default, and to decide to lend more funds to the borrower. This would increase the indebtedness of the debtor and interest on debt, causing the primary balance to be higher, given that interest payments are not included in the primary balance. The results also suggest that a history of bailouts has a very significant negative effect on the general government primary balance.

In the case of high dependence on intergovernment transfers, their predictability seems to have a positive effect on the general government primary balance. The effect of predictability of transfers on the primary balance, however, is not straightforward. According to the results, only when the share of intergovernment transfers in the subnational total revenue is at least 30% does their predictability have a positive effect on the primary balance. The results also suggest that subnational tax autonomy positively affects a country's overall fiscal performance, especially when subnational governments rely less on financing from the central government budget and more on own-source revenues.

4.7 Results for Subnational Government Fiscal Performance

In the case of subnational government insolvency, a government can react in of the following three ways. First, the central government can decide to cover the subnational fiscal imbalances (i.e., a bailout). Second, it can redesign the tax and/or transfer system through which the subnational government receives a larger portion of the overall revenues collected. Third, the central government can ignore the subnational fiscal imbalances. Regardless of which option the central government chooses, the

overall national fiscal balance is likely to deteriorate. However, to obtain a better picture about which of these three scenarios is more likely to happen, equation (1) is estimated again, but this time, with the subnational primary balance as the dependent variable.

As the results in Table 6 suggest, subnational debt does not seem to affect the subnational primary balance, *ceteris paribus*. Moreover, none of the broad types of subnational borrowing regulations seems to have an effect on subnational primary balances in the case of high subnational debt. However, the "golden rule" and imposed limits on subnational borrowing and debt seem to have a positive and significant effect on the subnational primary balance.

Table 6: Effect of Subnational Borrowing on Subnational Government Primary Balance

	GMM (regulations exogenous)			**GMM** (regulations endogenous)		
	1	**2**	**3**	**4**	**5**	**6**
Subnational government primary balance$_{-1}$	0.651***	0.717***	0.552***	0.604***	0.503***	0.588***
	(0.171)	(0.173)	(0.176)	(0.174)	(0.177)	(0.166)
CB primary balance	–0.028	–0.034	–0.060	–0.025	–0.034	–0.032
	(0.122)	(0.126)	(0.107)	(0.109)	(0.099)	(0.105)
Subnational government debt	–0.016	–0.038	0.358	0.257	0.170	0.254
	(0.039)	(0.042)	(0.240)	(0.264)	(0.233)	(0.248)
Administrative	–0.003	–0.003	0.041	0.051	0.051*	0.047
	(0.007)	(0.007)	(0.033)	(0.034)	(0.030)	(0.031)
Cooperative	0.014	0.014	–0.011	–0.008	–0.043	–0.024
	(0.012)	(0.013)	(0.041)	(0.043)	(0.043)	(0.041)
Central rules	0.002	–0.001	0.058**	0.071**	0.096***	0.069**
	(0.008)	(0.008)	(0.028)	(0.032)	(0.035)	(0.029)
Self rules	0.015	0.011	0.038	0.128	0.169	0.120
	(0.013)	(0.013)	(0.093)	(0.109)	(0.106)	(0.109)
Market	0.011	0.007	–0.126**	–0.166***	–0.199***	–0.156***
	(0.010)	(0.009)	(0.051)	(0.059)	(0.064)	(0.055)
Subnational government debt* administrative	–0.132	–0.109	–0.829	–0.297	–0.232	–0.367
	(0.086)	(0.082)	(0.542)	(0.539)	(0.499)	(0.529)
Subnational government debt* cooperative	–0.132*	–0.108	0.277	0.540	0.645*	0.489
	(0.073)	(0.069)	(0.362)	(0.386)	(0.380)	(0.376)
Subnational government debt* central rules	–0.083	–0.057	–0.312	–0.257	–0.252	–0.286
	(0.056)	(0.052)	(0.235)	(0.273)	(0.239)	(0.251)
Subnational government debt* self-rule	–0.176	–0.139	0.000	0.000	0.000	0.000
	(0.134)	(0.127)	(0.000)	(0.000)	(0.000)	(0.000)
Subnational government debt* market	0.000	0.000	–0.480	–0.243	–0.040	–0.243
	(0.000)	(0.000)	(0.350)	(0.377)	(0.346)	(0.359)
Sanctions	–0.000	0.001	0.004**	0.004*	0.001	0.003
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Limit on debt	–0.012**	–0.009*	–0.018***	–0.013***	–0.016***	–0.012***
	(0.005)	(0.005)	(0.006)	(0.005)	(0.005)	(0.004)
Subnational government debt* limit on debt	0.109**	0.086*	0.094**	0.066	0.086**	0.059*
	(0.053)	(0.047)	(0.047)	(0.041)	(0.042)	(0.035)

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Table 6 *continued*

	GMM (regulations exogenous)			GMM (regulations endogenous)		
	1	**2**	**3**	**4**	**5**	**6**
Golden rule	–0.005	–0.006*		–0.010***	–0.010***	–0.010***
	(0.003)	(0.003)		(0.004)	(0.003)	(0.003)
Subnational government debt* golden rule	0.064*	0.058		0.081**	0.073***	0.082***
	(0.035)	(0.036)		(0.032)	(0.024)	(0.028)
Foreign	–0.004	–0.004		–0.004*	–0.003	–0.003
	(0.003)	(0.003)		(0.003)	(0.002)	(0.002)
Subnational government debt* foreign	0.013	0.032		–0.032	–0.057*	–0.037
	(0.034)	(0.036)		(0.034)	(0.033)	(0.032)
Intergovernment transfer	–0.027***	–0.021**	–0.009	–0.006	–0.017**	–0.011
	(0.010)	(0.010)	(0.009)	(0.010)	(0.008)	(0.009)
Intergovernment transfer* administrative	0.031***	0.025**	–0.013	–0.009	–0.014	–0.010
	(0.011)	(0.012)	(0.050)	(0.051)	(0.043)	(0.047)
Intergovernment transfer* cooperative	0.013	0.007	–0.049	–0.098	–0.026	–0.077
	(0.018)	(0.020)	(0.091)	(0.091)	(0.091)	(0.090)
Intergovernment transfer* central rules	0.029	0.028	–0.035	–0.038	–0.029	–0.033
	(0.018)	(0.018)	(0.043)	(0.046)	(0.040)	(0.042)
Intergovernment transfer* self-rule	0.027	0.020	–0.327*	–0.441**	–0.455**	–0.428**
	(0.036)	(0.036)	(0.192)	(0.224)	(0.198)	(0.213)
Intergovernment transfer* market	0.003	0.004	0.246***	0.259***	0.286***	0.263***
	(0.019)	(0.020)	(0.086)	(0.091)	(0.086)	(0.088)
Transfer formula	–0.010	–0.008	–0.018***	–0.012**	–0.010**	–0.010**
	(0.007)	(0.007)	(0.006)	(0.005)	(0.005)	(0.005)
Intergovernment transfer* formula	0.022	0.016	0.028**	0.024*	0.028**	0.023*
	(0.015)	(0.015)	(0.013)	(0.013)	(0.013)	(0.012)
Tax autonomy	–0.007	–0.007	0.001	–0.000	0.006	0.000
	(0.006)	(0.006)	(0.007)	(0.007)	(0.007)	(0.007)
Intergovernment transfer* tax autonomy	0.015	0.017	–0.009	0.004	–0.016	0.001
	(0.015)	(0.015)	(0.023)	(0.021)	(0.023)	(0.021)
Subnational government expenditures				–0.033		
				(0.022)		
Urbanization	0.088	0.100	0.245***	0.339***	0.243***	0.271***
	(0.117)	(0.126)	(0.077)	(0.091)	(0.075)	(0.082)
Population growth		–0.113				–0.051
		(0.134)				(0.124)
Age dependency	–0.052**				–0.064**	
	(0.024)				(0.028)	
Government stability	–0.000		0.000	0.000	0.000	
	(0.001)		(0.001)	(0.001)	(0.001)	
Government fractionalization	–0.002	–0.002			–0.002	–0.001
	(0.003)	(0.003)			(0.003)	(0.003)
Corruption	–0.001				–0.001	
	(0.001)				(0.001)	

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Table 6 *continued*

	GMM (regulations exogenous)			GMM (regulations endogenous)		
	1	**2**	**3**	**4**	**5**	**6**
CBI	0.001	0.001	0.008	0.004	0.005	0.004
	(0.007)	(0.007)	(0.008)	(0.007)	(0.006)	(0.007)
Bailout	0.002	0.000	–0.014**	–0.018***	–0.017***	–0.017***
	(0.002)	(0.002)	(0.006)	(0.006)	(0.005)	(0.006)
GDP per capita	0.001	0.001	0.003	–0.000	0.001	0.000
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Inflation		–0.000				–0.000
		(0.001)				(0.001)
SGP	–0.005	–0.005	–0.002	–0.000	–0.000	–0.001
	(0.004)	(0.005)	(0.004)	(0.004)	(0.003)	(0.003)
Corr (Y, Y_{hat})	0.841	0.856	0.861	0.864	0.841	0.856
Sargan test (p-value)	0.899	0.884	0.492	0.424	0.899	0.884
AR(2) Test (p-value)	0.438	0.413	0.278	0.256	0.438	0.413
Observations	745	745	749	749	745	745
Number of id	57	57	57	57	57	57

GDP = gross domestic product, GMM = generalized method of moments.

Notes:

1. Standard errors in parentheses.
2. * significant at 10%; ** significant at 5%; *** significant at 1%.

Furthermore, in the case of a high level of financing from the central government budget, market-based regulation seems to have a positive effect on the subnational primary balance, as opposed to self-imposed fiscal rules. These results are consistent with those obtained for the general government primary balance. Moreover, the negative effect of intergovernment transfers on fiscal performance is diminished when transfers are predictable, which is also consistent with its effect on the general government primary balance. Finally, at the subnational level, tax autonomy has no effect on fiscal performance when there is high reliance on central government financing, suggesting that, at the margin, subnational tax autonomy does not matter much for the fiscal performance.

5. CONCLUSION

First, concerning the selection of regulations for subnational government borrowing, the depth of the financial market is particularly important when choosing cooperative regulations and regulations based on centrally and self-imposed rules. Also, countries with higher primary balances (both at the general and subnational levels of government) are more likely to choose self-imposed rules and market-based regulations over the other types.

The institutional design and history of the fiscal decentralization system has some effects on fiscal sustainability. The presence of subnational tax autonomy contributes to an increase in the general government primary balance, but, at the subnational level, tax autonomy is on the margin not significantly high. In countries with a history of subnational government bailouts, primary balances, on average, are lower at both the subnational and general government levels than in other countries. On the

effectiveness of borrowing regulations, the “golden rule” and limits on debt and borrowing positively affect the primary balance at all levels of government.

However, on the question of which regulations for subnational government borrowing are most effective, none of the broad types seem to have a significant direct effect on the narrow definition of fiscal sustainability at the subnational level. This is somewhat of a surprising result, given the amount of discussion and effort that has gone into shaping different regulations. This negative result shifts the focus to what the impact may be of the different regulations on the overall fiscal balance of a country to the impact of the different fiscal behaviors of subnational governments. The cooperative type of subnational borrowing regulations seems to have a positive effect on improving general government fiscal performance, even in the case of high levels of subnational debt and high dependence on subnational governments on intergovernment transfers.

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