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How Well Do Subnational Borrowing Regulations Work?

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Abstract

There are many positive things associated with subnational borrowing, including additional funding or promoting intergenerational equity. But it may also endanger fiscal sustainability and macro stability due to moral hazard and soft budget constraints. Thus borrowing controls are justified and also common. In this paper we review the different types of ex-ante and ex-post regulations used the international experience based on a large panel of developed and developing countries. Effectiveness or borrowing regulations in this paper is defined relative to the ability to preserve primary balances at the general government and subnational levels. There is a wide variety of both ex-ante and ex-post sub-national borrowing regulations that countries implement. Each has both advantages and disadvantages, with different suitability countries' circumstances. For example, depth of financial markets is important when choosing market-based regulations. 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" (borrowing is only for capital investment purposes) and limits on debt and borrowing appear effective at all levels of government. However, we find that none of the broad types of sub-national borrowing regulations seem to have a distinct significant direct effect on the narrow definition of fiscal sustainability at the subnational level.

Keywords: Decentralization, Subnational Borrowing, Borrowing Rules and Regulations
JEL classification: H70, H74, H63, H81

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I. Introduction[1]

The development literature widely acknowledges the importance of infrastructure for economic growth, quality of life and poverty reduction.[2] And with deep decentralization trends throughout all regions of the world, and with subnational governments on average being in charge of approximately two-thirds of total public infrastructure spending, there has been a natural increase in importance of subnational borrowing for financing this infrastructure.[3]

Even though there are some countries around the world that prohibit outright any borrowing by subnational governments,[4] most other countries allow subnational borrowing because in their view the efficiency and equity benefits of borrowing outweigh the associated macroeconomic risks.[5] But on the whole, factors such as the lack of institutional capacity and the history of sub-national government defaults in other decentralized systems give central governments substantial arguments to regulate sub-national government autonomy by introducing effective borrowing controls. The challenge is to simultaneously achieve the goals of providing borrowing autonomy and at the same time to preserve fiscal discipline by preventing the insolvency of sub-national governments and assuring national fiscal sustainability.[6]

One key aspect of the process is the presence of "moral hazard." Subnational governments have less incentive than central governments to be concerned with the macroeconomic impact of their policies because they do not bear –or at least they perceive so-- the full cost of their actions. In short, subnational governments are not concerned—or as 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), there is also consensus that decentralization can

[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] That is the case in a good list of developing countries. Among developed countries, Denmark is among the few that have an outright prohibition.
[5] The advocates of sub-national borrowing typically emphasize four potential benefits: (i) expansion of the sub-national fiscal space for the infrastructure financing; (ii) efficient and inter-generationally equitable outcomes from infrastructure financing through borrowing; (iii) increased fiscal transparency of the sub-national 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 Russia, Argentina, Brazil, and East Asia, have brought up the importance of fiscal sustainability as an important component of macroeconomic stability. The more recent experience of peripheral European countries during the great recession that started in 2008 has made the link between fiscal sustainability and macroeconomic stability much more salient.

pose significant risks to fiscal sustainability and that a disciplined subnational borrowing process is much needed (Ter-Minassian, 1997b).[8]

Due to the potential long-term consequences of sub-national borrowing on fiscal sustainability and macroeconomic stability, most countries manage and supervise sub-national borrowing and debt by implementing ex-ante and/or ex-post borrowing regulations. The ex-ante regulations can consist of more or less direct control by the central government, of fiscal rules predetermined in the constitution or organic laws, or of a reliance on the financial markets and its mechanism to control borrowing. On the other hand, ex-post regulations consist of sanctions for non-compliance to the rules and for imprudent behavior. There is also consensus that both ex-ante and ex-post regulations should be used simultaneously, and should consider both the borrowers and the lenders (Webb 2004). One view in the literatures is that in regulating subnational borrowing it should be enough to rely on financial markets and the rules it imposes on debtors and creditors. Other legal rules are seen as unnecessary because market conditions already impose effective sanctions through higher interest rates and denying any lending. However, the history of sub-national borrowing in some decentralizing countries suggests that exclusive reliance on the financial markets in maintaining sub-national fiscal discipline may not be enough (Ter-Minassian and Craig, 1997). The necessary conditions of developed financial markets, availability of financial information, and no expectation of bailouts by the central government are generally not met, and defaults can have very long term negative consequences.[9]

A commonly accepted definition of fiscal sustainability states that the fiscal balance and the underlying trends are such that in a steady state the ratio of outstanding debt and debt servicing to GDP is not increasing over time (World Bank, 2010b). In a similar way, the IMF (2001) defines 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 paper we will define fiscal policy to be sustainable if the present value of future primary surpluses equals the current level of debt.

In this paper we research the following interrelated questions. First, what factors are important in choosing particular types of subnational borrowing regulations? Second, what is the impact of regulated subnational borrowing on fiscal sustainability? Third, does this impact differ when with subnational governments have adequate revenue autonomy? And fourth, does any particular borrowing regulatory framework perform in a superior manner in maintaining fiscal sustainability?

[8] The empirical literature on this issue is inconclusive (Martinez-Vazquez et al. 2015), but this is not surprising given that the outcomes are very much dependent on the decentralization system design and actual operation.
[9] As an example, in the 1840s eight American states defaulted on their debts and these same states still continued paying a premium on their debt in the 1990s (English, 1996).

Despite the importance of these issues, little systematic empirical work has been done so far on the effect of sub-national borrowing on fiscal sustainability. The existing literature does not offer a definitive answer on whether borrowing at the sub-national level should be allowed, and if so, how it should be regulated. The few cross-country empirical studies that evaluate these effects use either only some aggregate measure of borrowing autonomy that does not take into account different types of regulations, monitoring and enforcement, or focus only on the effect of the fiscal rules. Moreover, most of these past studies suffer from important econometric issues, including not addressing the potential reverse causality between fiscal sustainability and chosen types of borrowing regulations, not modeling a dynamic process in fiscal sustainability, or just focusing on the subnational rather than the general government fiscal performance.

For the empirical analysis we use unbalanced panel data for 57 industrialized, developing, and transition countries between 1990 and 2008. Two alternative dependent variables are used; namely, the primary balance[10] at the general government[11] level and at the sub-national level.[12] The main variables of interest are four broad types of sub-national borrowing regulations, first categorized by Ter-Minassian and Craig (1997); namely, market-based, rule-based[13], cooperative, and administrative regulation. The results obtained from using these types of sub-national borrowing regulations are compared with those obtained from prohibiting borrowing at the sub-national level altogether.

Advancing our main results, first, concerning the selection of rules, we find that 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 those countries with a history of subnational government bailouts primary balances on average are lower at both the sub-national and the general government levels than in other countries.

On the effectiveness of borrowing regulations, we find that the "golden rule" (borrowing is only for capital investment purposes) and limits on debt and borrowing positively affect the primary balance at all levels of government. However, on the question of which regulations are most

[10] That is, Revenues – (Expenditures - Interest Payments).
[11] The general government sector consists of 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: p.33).
[12] The sub-national government represents all levels of government below the central government level.
[13] With a distinction made between centrally-imposed and self-imposed rules.

effective, we find that none of the broad types of sub-national borrowing regulations 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 on in shaping up the different regulations. This negative result shifts the focus to what the impact may be of the different regulations on the overall fiscal balance of the country through the impact of the different fiscal behavior of subnational governments. And here is a salient result. We find that cooperative type of sub-national borrowing regulations seems to have a positive effect on improving general government fiscal performance even in the case of high levels of sub-national debt and high dependence on subnational governments on intergovernmental transfers.

The rest of the paper is organized as follows. Section two reviews the literature on the effect of subnational borrowing and regulations on fiscal sustainability. Here, we will see, there are no consistent results or policy recommendations. In section three we review the spectrum of ex-ante and ex-post sub-national borrowing regulations. It appears that countries choose types of ex-ante and ex-post regulations depending on their political and economic characteristics, which as they change over time, they tend to affect the preferred type of regulation. Section four presents our empirical methodology and discusses the results. Finally, section six concludes.

II. Literature review

Fiscal decentralization, fiscal sustainability and macroeconomic stability

A couple of decades ago some researchers focused on the serious macroeconomic problems that can arise as governments give greater responsibilities to the sub-national governments (Hunter and Shah, 1996; Prud'homme, 1995; Ter-Minassian, 1997a and 1997b; and Fornasari et al., 2000). However, the effects of fiscal decentralization on macroeconomic stability are far from settled in the empirical literature. More recently, a number of papers have found either no effect or positive of decentralization on fiscal performance and macroeconomic stability (Schaltegger and Feld, 2009; Freitag and Vatter, 2008; Shah, 2005; Shome, 2002; and Stein, 1999). There is also evidence that the effects of decentralization on macroeconomic stability depends on the level of economic development and what that may represent in terms of institutions. For example some papers find that fiscal decentralization is more likely to generate instability in developing countries (Fukasaku and De Mello, 1998; and De Mello, 2000). Other papers find more stable outcomes for developed countries (Neyapti, 2010; Baskaran, 2009; and Martinez-Vazquez and McNab, 2006).

Moral hazard and adverse selection

Conceptually, the need for sub-national borrowing controls results from the presence of a common pool problem and the implied soft budget constraint. The common pool problem arises

from the separation of costs and benefits of public spending. If a certain capital investment predominantly benefits one jurisdiction but it is financed through a common pool, this jurisdiction would pay 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 out of a common pool (Rodden, 2002; Purfield, 2004; Ahmad, et al., 2005; and Hillman, 2009). This all raises the presence of moral hazard with subnational borrowing activities.[14] 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 et al. 2002; Goodspeed, 2002). However, for a variety of reasons it is difficult to achieve such a commitment to a no-bailout policy (Wildasin, 1997; Persson and Tabellini; 1996; Noel, 2000; and Bordignon et al., 2001).

Supply and demand for borrowing

Financial institutions represent the supply-side of subnational borrowing. This borrowing takes place through either loans from financial and other credit institutions, or through the capital market through the issuance of securities and bonds. Both loans and bonds have different strength and weaknesses involving costs, maturities, transparency and so on, 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 important criteria for lenders in making investment decisions. The creditworthiness of subnational governments is the main demand-side requirement for subnational borrowing. Basically, creditworthiness refers to the borrower's ability and willingness to repay the debt and can be influenced by economic and financial factors, and also by political and institutional factors (Peterson, 1998; Spahn, 1999).[15] 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 an established reputation, another form of signaling is collateral (Diamond, 1989). But collateral cannot always be used in subnational borrowing transactions.

[14] 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: p.577).

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

How to regulate sub-national borrowing and its effects

Imposing borrowing controls at the sub-national level may be needed to preserve macroeconomic stability as well as to safeguard sub-national public finances. There are different ways in which central governments can contribute to prudent borrowing and these alternatives have been much debated issue (Peterson and Hammam, 1998). The literature on sub-national borrowing emphasizes the ability of higher levels of government to provide an implicit guarantee on the sub-national government debt as one of the main problems with borrowing at the sub-national level, being a classical 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 can do the job. A fundamental decision that the central government has to make is whether to provide a sovereign guarantee or not.

Much of the recent literature is based on the initial classification of types sub-national borrowing regulations into four broad categories by Ter-Minassian and Craig (1997). In this seminal piece, these authors conclude on the basis of several case studies that sole reliance on market based regulations is not likely to be effective and that a rule-based approach is generally preferable to administrative control. But as Balassone et al. (2002) find from the experiences of five EMU countries,[16] the effectiveness of fiscal rules can be compromised if it is only central governments – and not all government levels—that are held accountable. But there has been far from a priori agreement on what type of regulation should be most effective. For example, also based on several case studies, Rodden and Eskeland (2003) conclude that effective control of sub-national borrowing requires either strong hierarchical oversight or strong market mechanisms. On the other hand, based on the experience of the European countries, Rattsø (2002) observes that not particular type of regulation has worked better than the others. A similar conclusion is reached by Kennedy and Robbins (2003) on the basis of several case studies from the industrial world.

Unfortunately, we do not find either 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 a number of country idiosyncrasies (Plekhanov and Singh, 2007).

Evidence from single country studies

Loooking first at single country empirical studies, and starting with the rich experience of the Unitsed States, an early study by Abrams and Dougan (1986) concluded that restrictions on borrowing and spending had not been significant in explaining budget outcomes at the state level. A number of later empirical studies reached much less definite conclusions. Alt and Lowry (1994) emphasize the key importance of balanced budget state laws. These findings are confirmed by Poterba (1994, 1995), who also empasized the role of constitutional limitations on

[16] Austria, Belgium, Germany, Italy and Spain

borrowing and indebtedness. For the United States, most authors conclude 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 are obtained by Kenyon (1991) on the effects of caps on federal and local tax-exempt bond issues in the United States. Also Clingermayer and Wood (1995) provide weak evidence that tax and expenditure limitations may increase state indebtedness.

The empirical results from European countries are even less conclusive. Derycke and Gilbert (1985) provide support for the hypothesis that central government macroeconomic policies do affect local government borrowing decisions in France. However, Dufrénot et al. (2010) find that the "golden rule" is not effective in regulating French regions' borrowing. On the other hand, Cabasés et al. (2007) provide support to the effectiveness of institutional borrowing restrictions in introducing financial discipline in the borrowing policies adopted by local governments in Spain. Furthermore, Claeys et al. (2008) conclude that in Germany the application of fiscal rules is not strict because the central government cannot make the lower tiers stabilize debt.

In Latin America, Martell (2008) finds that in Brazil, while the constraints imposed by the fiscal arrangements have been effective in controlling expenditures and that long-term discipline is maintained through rule-based, not market-based control. Braun (2006) finds 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.

Evidence from cross-country studies

Using cross-country data between 1985 and 1987, Von Hagen and Eichengreen (1996) find that that the introduction of sub-national borrowing constraints in the European Union increased sub-national indebtedness. This result perhaps should be taken with caution given that their analysis controlled only for GDP and it was is based on a relatively small sample of 36 observations. Fornasari, et al. (2000) based on a panel of 31 developed and developing countries find that constraining sub-national borrowing[17] does not seem to have any consistent effect on sub-national fiscal deficits. On the other hand, Alesina et al. (1999) find a negative correlation fiscal rules limiting debt levels and fiscal deficits in Latin American countries.

Rodden (2002) uses panel data on 33 countries and concludes that the largest deficits are run by sub-national governments that rely heavily on federal transfers and at the same time are free to borrow. Hence, the study provides support to the conjecture that the sub-national 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) find that higher expenditure

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

decentralization is associated with smaller overall deficits, especially when the states have wide-ranging autonomy over taxation.

In contrast, in a more recent study, the same authors Rodden and Wibbels (2010) find that when sub-national 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) by observing separately the four broad regulations defined by Ter-Minassian and Craig (1997) analyze their effects on sub-national fiscal balance. These authors find that no single framework seems to be superior under all circumstances and that appropriateness of any given regulation depends on the vertical fiscal imbalance, bailout expectations and the quality of reporting. Because of the similarities with the analysis carried out in this paper, there are two limitations in this study we must notice. First, there is potential misspecification problem due to the lack of an assumption of dynamics of sub-national budget balance, causing the effect of it past value(s) to be included in the error term and potentially resulting in endogeneity and autocorrelation. Second, the study restricts the analysis to the effects of regulations on only sub-national fiscal balances when actually central and general government budget balance may be more affected. In a similar vein, using a sample of seventeen OECD countries, Thornton and Mati (2008) find that changes in fiscal balances of the sub-national and central governments are highly positively correlated, especially when fiscal relations are managed by rules. Similar to Plekhanov and Singh (2007), this study also suffers from various methodological issues. Not only are the dynamics in the fiscal balance not taken into account, but endogeneity in sub-national borrowing regulations is not addressed.

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

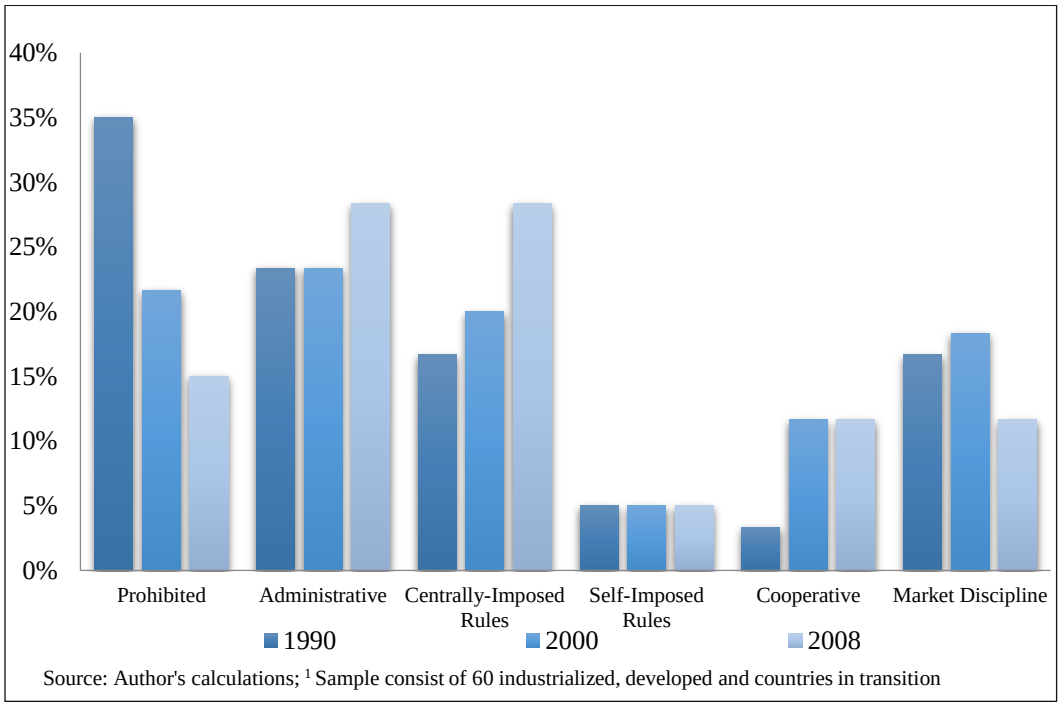
Summarizing, the literature does not offer a definite answer on whether borrowing at the sub-national level should be allowed, and if so, how it should be regulated. One issue, however, that many of the reviewed studies point out as very important is the distinction between borrowing for capital investments (the "golden rule") and for covering operating expenses. Thus there is consensus that the primary objective of sub-national borrowing should be to increase infrastructure service delivery (Freire and Petersen, 2004; Leigland, 1997; Peterson and Hammam, 1998). Sub-national borrowing is argued to contribute to more efficient infrastructure service delivery and improved local governance, in terms of transparency, accountability, and financial management (Freire and Petersen, 2004). However, overall the previous empirical

literature is inconclusive on whether subnational governments should be allowed to borrow in the private capital markets, and if so, how their borrowing should be regulated.

III. Subnational borrowing regulations in the international experience

Giving more responsibilities to sub-national governments may endanger their fiscal sustainability and macroeconomic stability, suggesting that to maintain sustainability borrowing controls at the sub-national level are required. The literature on sub-national borrowing emphasizes higher government levels' provision of an implicit guarantee to sub-national government debt as one of the main problems with borrowing at the sub-national level, causing a classical moral hazard situation. There are different ways in which a national government can contribute to prudent borrowing and these alternatives have been much debated.

Figure 1.Broad Types of Ex-ante Sub-national Borrowing Regulations (relative frequency in the sample)



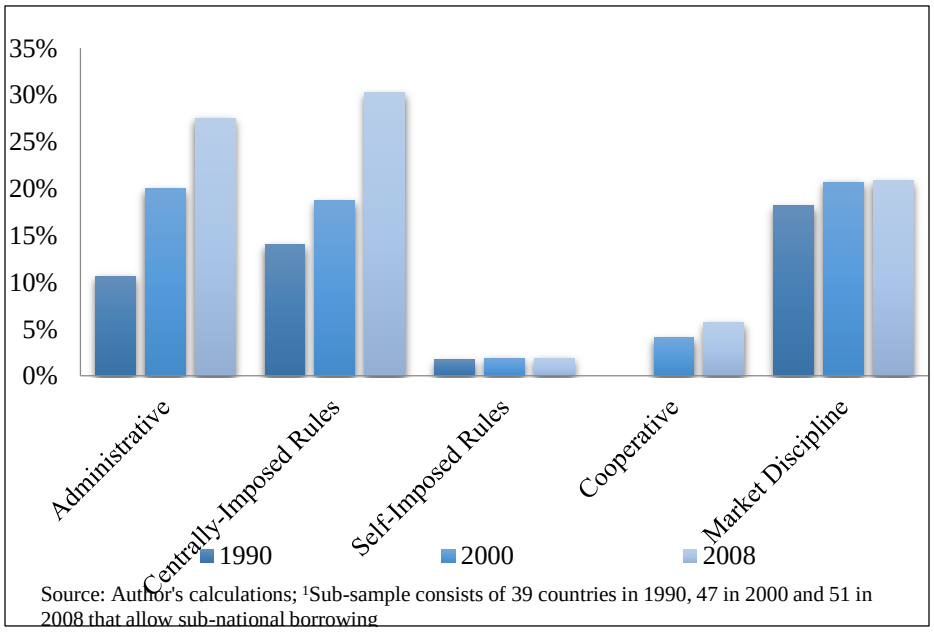
Source: Author's calculations; [1] Sample consist of 60 industrialized, developed and countries in transition

As Figure 1 presents, most of the countries that introduced borrowing at the sub-national level after 1990, preferred centrally-imposed rules or direct control by the central government as the dominant type of regulation. Furthermore, there has been a relative decrease in sole reliance on financial markets in regulating sub-national borrowing, which may be explained by experience gained from recent crises in which sub-national borrowing played major role. Moreover, in the last two decades, there has been an increased trend of imposing legal sanctions for non-compliance, mostly in case when sub-national borrowing is dominantly regulated by centrally imposed rules (Figure 2). This trend of imposing legal sanctions for non-compliance is mostly due to those countries that have introduced borrowing at the sub-national level during this

period, rather than to the changes in those that have already been present in the sub-national capital market (Figure 3).

Most countries manage and supervise sub-national borrowing and debt by implementing ex-ante and/or ex-post borrowing regulations. Ex-ante regulations can consist of more or less direct control by the central government, of fiscal rules determined in the constitution or organic laws, or of reliance on the financial markets and their mechanisms. On the other hand, ex-post regulations consist of sanctions for non-compliance to the rules or for imprudent behavior. Webb (2004) contends that both ex-ante and ex-post regulations should be practiced simultaneously, and should consider both the borrowers and the lenders. Reliance on only ex-ante controls gives both the borrowers and the lenders incentive for irresponsible behavior since it bears no consequences. On the other hand, reliance on only ex-post regulations may give space to large sub-national governments to over-borrow and build up debts so large that the central government cannot enforce them to bear the consequences, given their importance in the national economy.

Figure 2. Sanctions for Non-compliance by Type of Ex-post Sub-national Borrowing Regulations (relative frequency in the sub-sample)



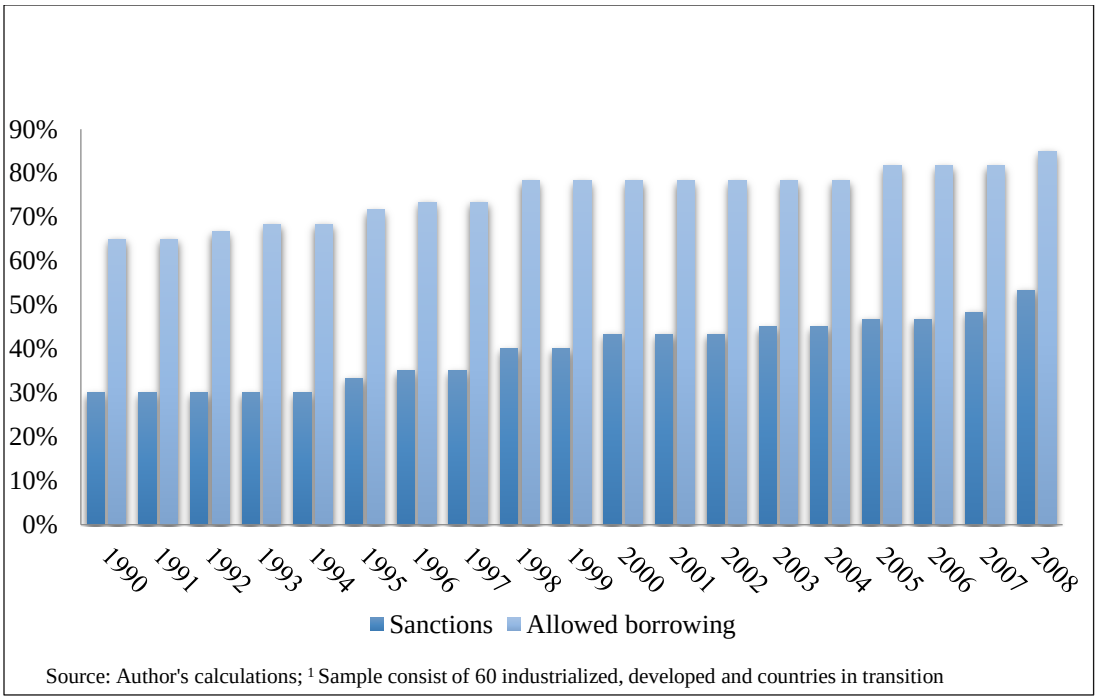
Source: Author's calculations; [1]Sub-sample consists of 39 countries in 1990, 47 in 2000 and 51 in 2008 that allow sub-national borrowing

In this section we review the four main institutional settings that have been used to regulate the operations of sub-national credit markets. They represent the ex-ante regulations and sanctions for non-compliance, as an ex-post regulation of sub-national borrowing. The ex-ante regulations reviewed in this chapter include four broad types defined by Ter-Minassian and Craig (1997), namely, market discipline, fiscal rules, administrative and cooperative regulation.

The ex-ante regulations

Ex-ante regulations consist of ex-ante control and monitoring of sub-national borrowing and fiscal performance. These regulations specify the purpose, types, and procedures of sub-national borrowing. Liu and Waibel (2006) summarize the key elements of ex-ante regulations commonly used in practice. The first is allowing borrowing only for financing long-term capital investments, which is also known as the "golden rule". The second type of the ex-ante regulations set limits on key fiscal variables, such as the primary and/or fiscal deficit, debt service ratio, etc. Finally, some frameworks include requirements for the sub-national governments to establish a medium-term fiscal framework and a transparent budgetary process. To improve fiscal transparency, more and more countries have introduced credit rating systems for sub-national governments, as an element of the regulatory framework for sub-national borrowing.

Figure 3. Allowing Borrowing at the Sub-national Level and Imposing Legal Sanctions for Non-compliance (relative frequency in the sample)



Source: Author's calculations; [1] Sample consist of 60 industrialized, developed and countries in transition

Market discipline

In some countries, the government relies solely on the capital markets to regulate sub-national borrowing. Market discipline means that the financial markets are capable of sending appropriate signals to prevent a borrower from entering the "unsustainable area", and borrowing is limited by lenders' willingness to invest. Credit agencies, such as Standard and Poor's, Moody's, and Fitch, provide both the lenders and the borrowers in the market with information about the risk of

default. There are, however, certain conditions that need to be satisfied for the private financial markets to be an effective control instrument for sub-national borrowing. These include: (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 chance or 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).

In this sort of setting, sub-national governments generally have direct access to the financial markets to meet their borrowing requirements. Also, they independently decide how much and from whom to borrow, and on what to spend the borrowed money. For example, 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. Local borrowing requires prior provincial approval and is severely limited. Similarly to Canadian Provinces, Finish and Swedish municipalities 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, 1996b, 2009).

Market discipline is only effective if the capital market is free and open. Restricted access to foreign capital markets limits the available options and creates a suboptimal financial sector portfolio (Giugale et al., 2000). There has been an increasing trend of allowing sub-national borrowing in foreign capital markets over the last two decades, but mostly only with an approval by the central government authority (Figure 4). Furthermore, 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 the sub-national governments, often requires significant effort. Moreover, not all the sub-national governments follow a standardized accounting plan, hold uniform registers of their assets and liabilities, or publish information on debt and capacity to pay. In addition, hidden extra-budgetary funds weaken transparency. Additionally, moral hazard undermines the effectiveness of market discipline in checking sub-national governments' excessive indebtedness. Bailouts encourage the expectation of future rescues and moral hazard type behavior of both the borrowers and the lenders. Finally, market signals, such as interest rates, can affect borrowers' financial behavior in choosing more solvent fiscal policies. However, the borrowers must be sensitive to the market signals for market discipline to be effective, that is, the decisions about borrowing should change depending on the interest rate.

However, in many parts of the world, capital markets at the local level are inadequately developed to be able to provide efficient discipline to sub-national governments. In such circumstances, credit rating agencies at the sub-national level are becoming increasingly

important to evaluate the performance of intergovernmental systems. In this same context, some sub-national governments have adopted fiscal responsibility rules (that are self-imposed) trying to improve their credit ratings in the market. 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, recently have sought to follow this approach, at least partially, with the introduction of Fiscal Responsibility Laws (Webb, 2004).

As mentioned above, the Canadian government relies solely on market discipline in controlling sub-national indebtedness. Credit rating companies evaluate sub-national creditworthiness. However, even Canada's fully-developed financial markets have not been fully able to control excessive indebtedness of the sub-national governments. In fact, in the mid-1990s, sub-national debt reached 23 percent of GDP (Bird and Tassonyi, 2001), (prompting) the provinces to adopt fiscal adjustments programs. Brazil and Argentina, without meeting all necessary market conditions, did in fact rely on some sort of market discipline approach in the 1980s, which had very unfortunate consequences. In Brazil, sub-national debt jumped from 1 percent of GDP in the early 1970s, to 20 percent in the mid-1990s, with five large federal bailout interventions (three for states and two for municipalities) (Bevilaqua, 2002).

Market based sub-national borrowing regulations can take different forms. Dillinger (2003) compares the United States' and the European model for market based mechanism and concludes that while the United States' model relies primarily on municipal bonds, the European model relies dominantly on specialized banks to finance sub-national borrowing. However, municipal bonds are becoming more and more popular in Europe recently. The largest owners of municipal bonds in the United States are individual investors, mutual and money market funds, and the commercial banks. After being issued, municipal bonds can be sold in the secondary market, and are considered relatively safe from default, despite some opposite examples in the recent period. Some of the specialized banks in Europe are owned by the municipalities (e.g. Finland and Sweden), while others are founded by the national governments and have later been privatized (e.g. Dexia in France).

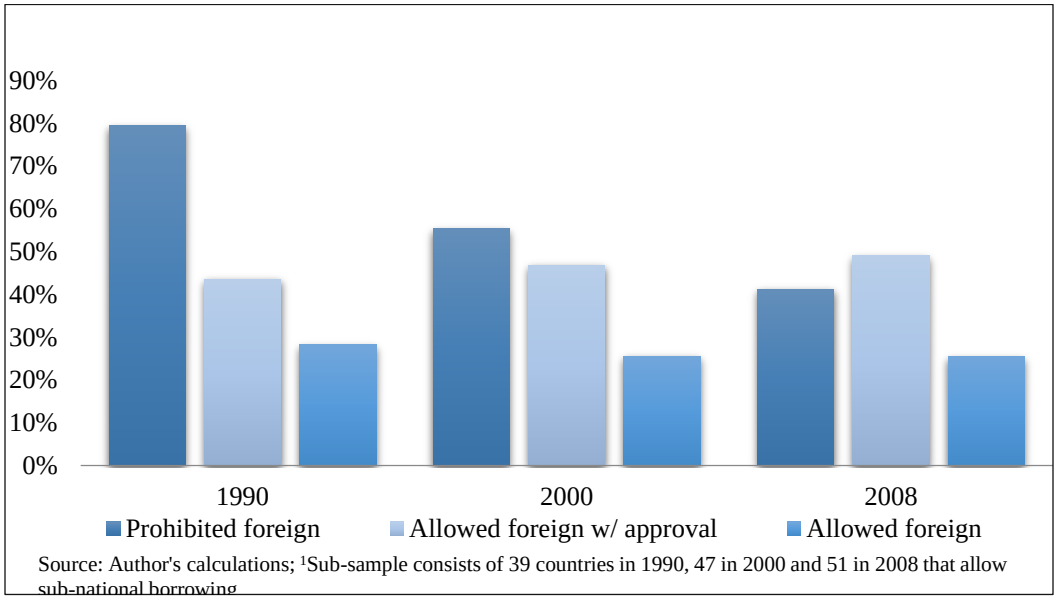
Rule-based approach

Rule-based regulations consist of fiscal rules imposed by the central government and specified in the constitution or in the organic laws. Such rules introduce a constraint on fiscal choices by sub-national governments in order to guarantee that fiscal outcomes will 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" (proceeds from borrowing must be spent exclusively on capital projects), 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 simplicity and of being easily understood by the wider public, but it may be unsuccessful in preventing excessive debt accumulation because of the off-budget items. The most frequent deficit target rules are those targeting the overall budget deficit (e.g. Austria, Belgium, Spain, and most U.S. states) or the operating deficit (e.g., Norway). However, 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 sub-national level than a deficit target and may not necessarily be able to prevent debt accumulation, since spending could be pushed below the line. Furthermore, the "golden rule", limiting the sub-national governments' borrowing to finance capital investment only, mostly satisfies the intergenerational equity justification for borrowing. However, borrowing for infrastructure does not guarantee by itself the 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. the United Kingdom, Germany, Spain, and most states in the U.S.). 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 on the debt (e.g. Colombia and Hungary in the 1990s). These rules, however, might not be as effective in controlling debt accumulation if financial conditions are manipulated.

Figure 4. Allowing Sub-national Borrowing in Foreign Capital Markets (relative frequency in the sub-sample)



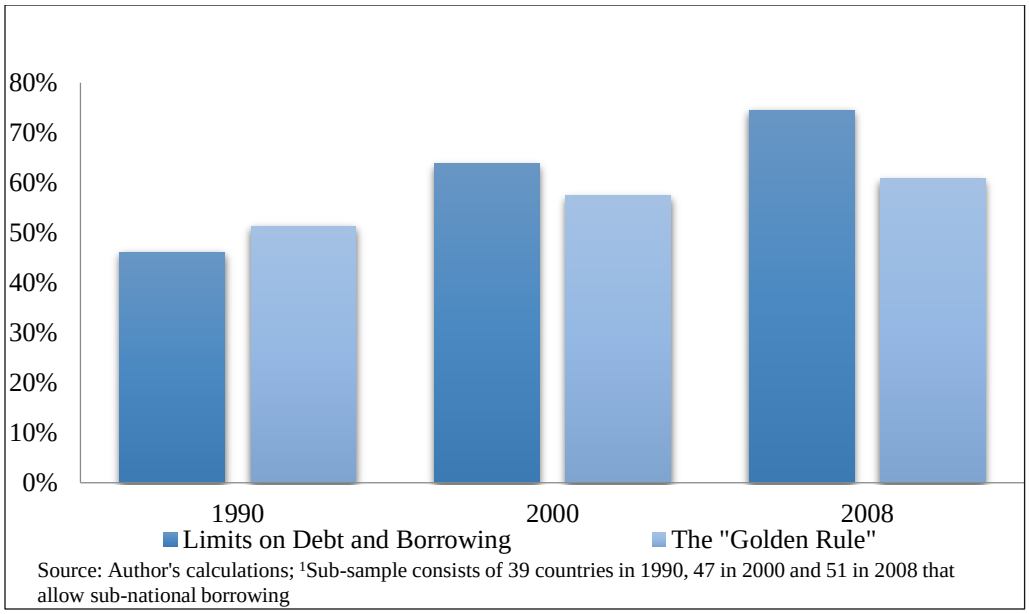
Source: Author's calculations; [1]Sub-sample consists of 39 countries in 1990, 47 in 2000 and 51 in 2008 that allow sub-national borrowing

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 not adequately enforced. Most countries using the rule-based approach use a variety of rules, some of which are redundant. 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 sub-national governments primarily depends on the ability to monitor the debt. There has been particularly increased trend to impose limits on sub-national debt and borrowing during the last two decades (Figure 9). The use of the "golden rule" has also increased, but not by as much.

All but one state in the United States (Vermont) has a balanced budget requirement. Budget rules vary significantly across the U.S. states, mostly applying only to the operating budget (general fund). In addition, as of 2008, 30 states also operate under tax or expenditure limitations (Waisanen, 2008). Several studies investigate the effectiveness of sub-national government rules in the context of the U.S. states. Most authors conclude that rules do enforce some budget discipline on the U.S. states, 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 Stabilization and Growth Pact, limiting the overall level of public debt as well as annual total budget deficits, raises the question about whether the debt limit should be shared among the levels of government. In most countries it is assumed that the central government should be responsible for the overall limit of public debt. Public debt is much lower at the sub-national compared to the central government level, being just above 8 percent of total debt in Germany to around 19 percent in Switzerland (Swianiewicz, 2004). In most European Union countries the ratio of the sub-national debt to GDP is pretty low, on average around 5 percent. The only "outliers" are the Netherlands and Spain with over 8 percent of the sub-national debt to GDP. In Belgium, only the central government is responsible for complying with the European Union fiscal rules, but with the agreements set between the central and the sub-central levels of government, the commitments for complying with these constraints is shared among all levels of government.

Figure 5. Imposing Limits on Borrowing and Debt and the "Golden Rule" (relative frequency in the sub-sample)



Source: Author's calculations; [1]Sub-sample consists of 39 countries in 1990, 47 in 2000 and 51 in 2008 that allow sub-national borrowing

Switzerland's approach to the sub-national borrowing regulation is an example of self-imposed fiscal rules. 26 Swiss cantons 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) discusses the sub-national borrowing regulation practice in the Fribourg canton where for each project that cannot be financed from the current revenues, then the borrowing for its financing requires the cantonal approval.

Administrative approach

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

Direct involvement of the federal government in micromanaging each credit operation at the sub-national government level represents one of the disadvantages of this approach, since it is the opposite of the fiscal decentralization idea. Moreover, this approach may unnecessarily increase federal bureaucracy and cause undesirable inefficiencies in the financial system, and may even be incompatible with a country's Constitution if it allows the sub-national government free access to the capital market. However, a major disadvantage of this approach 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 the case of impending defaults. On the other hand, the administrative approach has several advantages. First, the central government can control both the macroeconomic and the external debt policy. Second, the central government's control may increase the sub-national borrower's credibility, given that the foreign lenders often require a central government guarantee, and it may result in better terms and conditions received in the foreign financial markets.

Countries like Denmark, Greece, Ireland, Mexico, and the United Kingdom practice the administrative control approach in regulating sub-national borrowing. In Mexico, the 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 sterling. In Spain, for example, foreign debt and bond issuances by the sub-national governments are subject to the approval of the Ministry of Finance. During the 1980s, Australia centralized regulation of sub-national borrowing through the Loan Council, but this direct control system did not turn out to be effective, and now the sub-national governments are free to access the capital markets directly. The functions of the Loan Council were restructured in the mid1990s, and excessive indebtedness is now cooperatively controlled (Craig, 1997; Dillinger, 2003; Koutsogeorgopoulou, 2007).

Denmark provides an interesting example of the administrative approach to sub-national borrowing regulation. In general, sub-national borrowing in Denmark 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 total municipality's expenditures. The borrowing and debt ceilings are negotiated annually with local government associations. Furthermore, 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 Danish municipalities' deficits) were financed through borrowing, resulting in local debt of 4.5% of GDP in 1998 (Jorgen and Pedersen, 2002). Similarly, the United Kingdom applies an administrative approach to sub-national borrowing regulations, but in the British case the borrowing limits differ among sub-national governments (Watts, 2002). Limits are allocated to the local governments depending on their specific needs for housing, education, etc. Allocations are increased or decreased based on the efficiency and effectiveness of the local governments and can be adjusted for special needs (Dafflon, 2002b).

Cooperative approach

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

In Austria, for example, the "Consultation mechanism" between different levels of government and the Stability and Growth Pact were implemented in 1999 (Thöni, Garbislander, and Haas, 2002) to ensure lowering and maintaining the overall deficit below 3 percent of GDP. Similar arrangements exist in Spain (Laborda et al., 2006). In Belgium, sub-national borrowing is supervised by a High Finance Council (HFC), which is comprised of members nominated by the federal, regional, and community levels, and the Belgian National Bank. In Australia, a fiscal institution called the Loan Council coordinates the fiscal policies and borrowing decisions of the Australian states.

The cooperative approach combines many individual advantages of the other three approaches, which is both its main strength and its main 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 their budgetary choices. However, in order to be effective, this approach requires the central government to be strong and able to effectively guide the intergovernmental negotiations, which in many emerging markets may not be the case (Joumard and Kongsrud, 2003). The main weakness of this approach is that, 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, et al., 2005).

As already mentioned above, since the Loan Council's functions were restructured in the mid-1990s, sub-national borrowing in Australia has been cooperatively controlled. Jurisdictions are required to submit their total financial requirements for the upcoming year to the Loan Council with no requirement for submitting specific project details. Then the Loan Council evaluates these nominations with regard to the jurisdictions' fiscal position, the infrastructure needs and the macroeconomic implications of borrowing. In the event when the Loan Council has concerns about certain nominations, it has the right to request the jurisdiction to justify the nomination, and if needed, it can amend its fiscal strategy. So far, the restructured Loan Council, complemented by the financial markets and rating agencies, has been successful in controlling sub-national fiscal behavior (Craig, 1997; Koutsogeorgopoulou, 2007; Webb, 2002).

A key role in managing sub-national borrowing in Belgium is played by the "Public Sector Borrowing requirements" in the High Finance Council (HFC). The HFC is composed of

academics, members of the National Bank of Belgium and the representatives of all levels of governments. 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 the HFC's recommendations, the agreements between the central government and the regions and the communities are formulated, covering a period of five to six years and committing the sub-national governments to meeting specific annual budgetary targets in terms of their borrowing requirements. In order to ensure that public finances are consistent with the budgetary targets, municipalities are subject to the "golden rule" under which deficits are only allowed for investment. On the recommendation of the HFC, the central government can limit the borrowing capacity of a non-compliant region or community to prevent endangering economic stability or the external balance. So far, however, the HFC has not considered it necessary to use this sanction on any of the regions or communities (OECD, 2007).

According to Liebig, et al. (2008), the sub-national borrowing regulation in South Africa is a combination of the cooperative and the marked based approach. The cooperative component originates in the South African Constitution where Article 3 requires a "co-operative government". Furthermore, different spheres of the government control each other in terms of who borrows how much. On the other hand, the South African legal setting for sub-national borrowing is also partly market-based, since the sub-national entities can generally borrow as much as they want. The municipal councils authorize borrowing issuances and there are no country-wide debt limits.

Ex-post regulation

As already pointed out, the effectiveness of ex-ante regulations is limited without an ex-post mechanism for dealing with sub-national insolvency. Even though ex-ante regulations are very important for minimizing the risk of defaults, they cannot prevent them in all cases. Sub-national insolvency may occur because of sub-national 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' expectation that in case of insolvency, they both would share the burden. Properly designed ex-post regulations enforce the hard budget constraint on sub-national governments.

Countries generally apply two main approaches in ex-post regulation of the sub-national borrowing, namely the judicial and the administrative approach. 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 sub-national governments is very limited. The

administrative approach, however, often allows political intervention of the higher levels of government in resolving the sub-national insolvency.

Depending on the factors, such as history, political and economic structure, etc. countries apply various approaches for ex-post regulation of the sub-national borrowing. For example, Hungary and Brazil apply the administrative approach, while South Africa and the United States prefer a combination of the judicial and the administrative approaches. Moreover, there is 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. 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 in line spending with revenues as well as borrowing with capacity to service debt. Even when the sub-national governments have significant autonomy in controlling expenditures and raising revenues, fiscal adjustment often requires difficult political choices of reducing spending and raising revenues. Finally, the third one includes negotiations between the debtor and creditor to restructure debt obligations. In case of the administrative approach, the higher government level tends to restructure sub-national debt into longer-term debt instruments, which was the case in Brazil in 1997. However, the debt discharge is typically limited to the judicial approach (Liu, 2008).

In summary, there is a wide variety of both ex-ante and ex-post sub-national borrowing regulations that countries implement. The regulations reflect the level of development of the financial markets, the political power of different levels of government, and macroeconomic and fiscal conditions. Each type of sub-national borrowing regulation has both advantages and disadvantages, which determine how suitable each is for a particular country's circumstances. Reliance on only ex-ante controls gives both borrowers and lenders the incentive for irresponsible behavior since they bear none of the consequences. On the other hand, reliance on only ex-post regulation may give space to large sub-national governments to over-borrow and build up such large debts that the central government cannot enforce them to bear the consequences given their importance in the national economy. Finally, as a county's circumstances change over time, the country may change its preferred mechanism to control sub-national behavior in financial markets.

IV. Empirical analysis and findings

Data on sub-national borrowing regulations

The empirical analysis is based on data for 57 developed, developing and transition countries, between 1990 and 2008. The data on the main variables of interest, sub-national borrowing regulations, are based on information directly collected from various sources, such as laws,

country reports, and individual country or regional studies.[18] This information considers whether borrowing is allowed at the sub-national 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 sub-national borrowing and improve sub-national creditworthiness. For the purpose of this study, information about sub-national borrowing regulation that has been implemented 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:

1. Prohibited: Sub-national governments are not allowed to borrow in private capital markets;
2. Administrative: Each borrowing issuance requires an approval from the central government authority;
3. Cooperative: A decision on each borrowing issuance is cooperatively made by members of a body (e.g. a council, committee) that consists of representatives of all government units;
4. 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;
5. Self-imposed rules: Sub-national borrowing is regulated by fiscal rules that sub-national governments imposed on themselves to improve their creditworthiness;
6. Market-based: Only financial markets regulate borrowing at the sub-national level.

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

1. Restricting sub-national borrowing for solely financing capital investments (i.e. the "golden rule");
2. Imposing ceilings on debt or total borrowing;
3. Ability to borrow in foreign capital markets. This indicator consists of two categories: a) not allowed to borrow in the foreign market; b) allowed to borrow with or without an 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 sub-national borrowing, then regulation was classified as marked based. Moreover, because the effectiveness of fiscal rules significantly depends on legal sanctions for non-compliance, this indicator is observed as well. Countries implement three types of legal sanctions for non-compliance, namely administrative, political and financial sanctions. However, for the purpose of this study, we do not separately identify the types of sanctions.

Table 1. Sub-National Borrowing Regulations, Sample Structure[1]

	Number of observations	% of Total	Number of Countries
Prohibited	143	18%	16

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

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[2]
The "golden rule"	356	44%	28
Limit on debt or borrowing	427	53%	37
Foreign: allowed	219	27%	13
Foreign: with approval	257	32%	23

[1] Period: 1990-2008, 57 countries, data based on an unbalanced panel
[2] Does not add up to 57 because some countries changed dominant borrowing regulation during the sample period

Table 1 presents our sample structure in terms of sub-national borrowing regulation, based on an unbalanced sample of 57 countries, during the period 1990-2008. As can be observed, there were 16 changes of dominant sub-national borrowing regulations during the observation period.[19] 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.

Empirical methodology for estimating the effect of sub-national borrowing on fiscal sustainability

Although it is a very widely used term in the assessment of fiscal policy, the meaning of fiscal sustainability is seldom explained. Here we define it in the following way - fiscal policy is called sustainable if the present value of future primary balances equals the current level of debt. If this condition is met, the government avoids excessive debt accumulation, and is able to roll over its debt and there is no risk of insolvency (Burnside, 2005).

In order to estimate the effects of sub-national borrowing and regulations on fiscal sustainability, we evaluate the relationship between sub-national outstanding debt and borrowing regulations, on the one hand, and the primary fiscal balance, on the other hand. The primary balance is observed at both general and sub-national government levels. Regardless of whether the general or sub-national government primary balance is observed, it is almost certain that the current period primary balance depends on its level(s) in the previous year(s), 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 has the following form:

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

[19] Note that 15 countries have changed regime once, and one (Bulgaria) has changed it twice. See the Appendix for more details on changes in regulations.

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 sub-national level in country i in year t. $R_{m,it}$ represents a vector of dummy variables representing six broad types of regulation of sub-national 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 sub-national borrowing, allowing borrowing in the foreign market, and the existence of sanctions for non-compliance, $(f = 1, \dots, 4)$. Furthermore, F_{it} represents a vector of measures of fiscal decentralization, including the share of intergovernmental transfers in total sub-national revenues, a dummy variable that takes the value 1 if the transfer allocation is based on a "stable" formula, the share of sub-national expenditures in total general government expenditures, and a dummy that takes a value of 1 if the sub-national 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 the central government budget balance (for the sub-national government regressions). Finally, υ_i stands for unobserved country fixed effects.

Before proceeding with the estimation we need to address several econometric problems that may arise while estimating equation (1):

1. 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 – these regressors may be correlated with the error term;
2. Time-invariant country characteristics (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}, $u_{it} = \nu_i + e_{it}$;
3. The presence of the lagged dependent variable y_{it-1} is likely to give rise to autocorrelation;

To address problem 1, 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, as discussed below. To address the problems 2, 3, and 4, we will use the GMM estimator (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

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

Because fixed country-specific effects do not vary over time, they disappear by this transformation, solving problem (2). That is,

$$\Delta u_{it} = \Delta v_i + \Delta \varepsilon_{it}$$

or

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

Next, the autocorrelation (problem 3) is addressed by "instrumenting" first-differenced lagged dependent variable with its past levels. The Blundell and Bond's (1998) methodology is applied and equation (1) is estimated using the "system" GMM estimator. In order 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).

Determinants of sub-national borrowing regulations

To evaluate the determinants of choosing a particular type of sub-national borrowing regulation, we use a multinomial logit model.

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 way:

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

The probability of choosing any of categories $m = 2, 3, \dots, 6$ is compared to the probability of choosing the reference category (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 $m = 2, 3, \dots, 6$,

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

where W_{ik} is the vector of variables representing potential determinants of sub-national 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.[20]

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

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

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

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

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

Determinant variables of sub-national borrowing regulations

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

The development of financial markets is expected to significantly affect sub-national borrowing autonomy. First, the supply of funds in the financial market affects the sub-national governments' ability to borrow, and 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 the sub-national governments. To measure the depth of financial markets, two variables are used, namely the liquid liabilities indicator and the index of financial freedom.

The liquid liabilities indicator represents the ratio of liquid liabilities to GDP, where liquid liabilities consist of currency held outside 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 a measure 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.[21] An overall score on a scale of 0 to 100 rate an economy's financial freedom through deductions from the ideal score of 100.

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

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

Sub-national governments' ability to borrow in private financial markets depends on their creditworthiness, which in turn, depends on different factors, including the sub-national governments' ability to repay debt. Sub-national governments with more own revenues are expected to have a greater ability to repay debt, everything else constant, especially if at the same time they have more tax autonomy, that is, ability to set and/or change tax rates for important tax instruments. Higher sub-national expenditures may indicate larger sub-national expenditure needs and higher demand for financing and, therefore, may positively affect the decision to allow sub-national 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 sub-national level. Moreover, as discussed above, 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 sub-national borrowing regulation. Taking into account the governments' ability to make decisions cooperatively, one would expect that countries with less fractionalized governments are more likely to have cooperatively regulated sub-national 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 sub-national borrowing regulations.

Results for the determinants of sub-national borrowing regulations

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

Given that both general and sub-national government primary balances are observed as potential determinants of sub-national 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, from the results in Table 2 we cannot make a conclusion about the probabilities of choosing among the regulation types presented in the table. Because this

analysis 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 regulation. 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 sub-national 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 sub-national level. Finally, countries with higher sub-national outstanding debt seem to be more likely to choose self-imposed fiscal rules to regulate sub-national borrowing. The results also suggest that higher-income countries tend to choose cooperative regulations and self-imposed fiscal rules over the others. Next, higher sub-national expenditures seem to lead to a higher probability of choosing administrative and cooperative regulations. Finally, countries in which sub-national governments have tax autonomy are more likely to choose more decentralized types of regulations; namely, self-imposed rules and market-based regulations.

Table 2. Factor changes in relative risk ratios of choosing particular sub-national borrowing regulation versus prohibiting sub-national borrowing (for unit increase in independent variable)

	Primary Balance = GG Primary Balance					Primary Balance = SNG Primary Balance				
	Prohibited	Cooperative	Central	Self Rule	Market	Prohibited	Cooperative	Central	Self Rule	Market
Liquid Liabilities	7.593	0.205*	0.062***	0.351	0.950	0.008	0.365	0.096***	0.753	1.995
	(6.328)	(0.671)	(0.600)	(0.849)	(0.611)	(6.486)	(0.675)	(0.586)	(0.848)	(0.606)
Financial	1.228*	0.982	0.998	1.019	0.986	1.303*	0.981	0.992	1.012	0.982*
	(0.090)	(0.010)	(0.008)	(0.016)	(0.009)	(0.121)	(0.010)	(0.008)	(0.017)	(0.009)
Primary Balance	0.000*	0.000*	13.576	42.452	0.305	4.542	1.401**	2.501**	2.301***	1.881***
	(1.955)	(0.177)	(3.383)	(7.344)	(3.544)	(9.424)	(1.537)	(2.286)	(1.237)	(1.529)
SNG debt	0.000	6.740***	8.110***	6.351***	7.021***	0.000	4.751***	4.801***	1.501***	1.621***
	(.)	(4.255)	(4.068)	(4.458)	(4.080)	(.)	(2.272)	(2.053)	(1.497)	(1.094)
GDP per capita	0.761	2.514***	1.847***	3.350***	1.004	26.347	2.627***	1.818***	3.256***	1.006
	(1.393)	(0.163)	(0.132)	(0.215)	(0.136)	(1.980)	(0.170)	(0.135)	(0.213)	(0.142)
SNG	1.032	4.923	0.000***	0.000**	0.000**	1.012	1.905	0.000***	0.000**	0.000***
	(5.309)	(2.928)	(2.910)	(4.993)	(2.891)	(5.274)	(3.043)	(0.945)	(0.309)	(0.967)
SNG Own	5.532*	0.000***	0.420	0.139	0.002***	1.473*	0.001***	0.846	1.679	0.025*
	(4.971)	(1.865)	(1.604)	(2.531)	(1.835)	(2.506)	(0.868)	(1.536)	(2.632)	(0.808)
Tax Autonomy	0.000***	3.137**	1.781	4.729*	7.402***	0.000***	3.235**	2.414*	9.119***	11.980***
	(1.663)	(0.409)	(0.385)	(0.632)	(0.386)	(1.384)	(0.439)	(0.412)	(0.663)	(0.419)
Government	0.640	1.082	0.880	1.118	0.891	0.341*	1.087	0.930	1.242	0.936
	(0.473)	(0.094)	(0.080)	(0.150)	(0.085)	(0.524)	(0.094)	(0.082)	(0.152)	(0.088)
Government	3.153	2.338	6.279***	9.751*	0.870	3.160	2.169	5.500***	7.292*	0.750
	(.)	(0.608)	(0.509)	(0.900)	(0.554)	(.)	(0.612)	(0.516)	(0.912)	(0.568)
Bailout	1.156	0.238***	0.973	0.026***	0.693	0.016	0.340**	1.197	0.029***	0.824
	(3.658)	(0.368)	(0.291)	(0.624)	(0.316)	(1.579)	(0.368)	(0.293)	(0.644)	(0.326)
Population	0.000	2.212	0.000***	2.487***	0.000**	7.601	2.711	0.000***	1.246***	0.000***
	(2.209)	(2.113)	(1.928)	(3.149)	(1.800)	(7.727)	(2.602)	(1.055)	(1.988)	(1.397)
Pseudo R-sq.	0.442					0.445				
Chi2	1212.833					1222.516				
P	0.000					0.000				

Coefficient represent factor changes in relative risk for unit increase in independent variable X = exp(b); In parentheses: exp(b)*SD(b); ***p<.01; **p<.05; *p<.10; Administrative regulation is the base category

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

Category 1	Category 2	Liquid Liabilities		Financial Freedom		GG Primary Balance		SNG Debt		GDP Per Capita		SNG Expenditures	
		exp(b)	P>|z|	exp(b)	P>|z|	exp(b)	P>|z|	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	.	.	0.303	0.392	7.081	0.591
Prohibited	Central Rule	5.984	0.371	1.231	0.022	0.000	0.011	0.000	0.000	0.412	0.524	1.382	0.390
Prohibited	Self Rule	0.171	0.538	1.205	0.042	0.000	0.012	0.000	0.000	0.227	0.291	6.482	0.398
Prohibited	Market	8.518	0.645	1.245	0.016	0.000	0.016	0.000	0.000	0.758	0.842	5.432	0.444
Prohibited	Administrative	7.593	0.650	1.228	0.023	0.000	0.014	0.000	0.000	0.761	0.844	1.032	0.534
Cooperative	Prohibited	0.012	0.482	0.800	0.014	1.790	0.030	.	.	3.304	0.392	0.000	0.591
Cooperative	Central Rule	3.335	0.050	0.984	0.104	0.000	0.005	0.083	0.275	1.361	0.044	1.951	0.000
Cooperative	Self Rule	0.585	0.494	0.964	0.025	0.000	0.089	0.000	0.001	0.750	0.150	9.161	0.000
Cooperative	Market	0.216	0.010	0.996	0.686	0.000	0.062	0.010	0.030	2.503	0.000	7.671	0.000
Cooperative	Administrative	0.205	0.018	0.982	0.073	0.000	0.032	6.740	0.000	2.514	0.000	4.923	0.089
Central Rule	Prohibited	0.004	0.371	0.813	0.022	1.930	0.011	.	.	2.427	0.524	0.000	0.390
Central Rule	Cooperative	0.300	0.050	1.016	0.104	1.080	0.005	12.043	0.275	0.735	0.044	0.000	0.000
Central Rule	Self Rule	0.175	0.028	0.979	0.196	0.320	0.875	0.001	0.004	0.551	0.004	0.469	0.880
Central Rule	Market	0.065	0.000	1.012	0.166	44.563	0.258	0.116	0.149	1.839	0.000	0.004	0.044
Central Rule	Administrative	0.062	0.000	0.998	0.821	13.577	0.441	8.110	0.000	1.847	0.000	0.000	0.000
Self Rule	Prohibited	0.020	0.538	0.830	0.042	6.040	0.012	.	.	4.403	0.291	0.000	0.398
Self Rule	Cooperative	1.709	0.494	1.038	0.025	3.370	0.089	9.843	0.001	1.333	0.150	0.000	0.000
Self Rule	Central Rule	5.700	0.028	1.021	0.196	3.127	0.875	7.326	0.004	1.814	0.004	2.131	0.880
Self Rule	Market	0.369	0.182	1.034	0.042	13.343	0.488	9.397	0.037	3.336	0.000	0.008	0.333
Self Rule	Administrative	0.351	0.217	1.019	0.243	42.452	0.610	6.351	0.000	3.350	0.000	0.000	0.007
Market	Prohibited	0.054	0.645	0.803	0.016	4.340	0.016	.	.	1.320	0.842	0.000	0.444
Market	Cooperative	4.631	0.010	1.004	0.686	2.738	0.062	4.227	0.030	0.400	0.000	0.000	0.000
Market	Central Rule	5.444	0.000	0.988	0.166	0.022	0.258	8.654	0.149	0.544	0.000	4.431	0.044
Market	Self Rule	2.709	0.182	0.968	0.042	0.007	0.488	0.011	0.037	0.300	0.000	9.426	0.333
Market	Administrative	0.950	0.933	0.986	0.121	0.305	0.737	7.021	0.000	1.004	0.975	0.000	0.003
Administrative	Prohibited	0.057	0.650	0.814	0.023	1.420	0.014	.	.	1.314	0.844	0.000	0.534
Administrative	Cooperative	4.874	0.018	1.018	0.073	7.739	0.032	0.000	0.000	0.398	0.000	0.007	0.089
Administrative	Central Rule	6.255	0.000	1.002	0.821	0.074	0.441	0.000	0.000	0.541	0.000	1.351	0.000
Administrative	Self Rule	2.852	0.217	0.981	0.243	0.024	0.610	0.000	0.000	0.299	0.000	6.321	0.007
Administrative	Market	1.053	0.933	1.014	0.121	3.282	0.737	0.000	0.000	0.996	0.975	5.629	0.003

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

Table 3. Factor Change in the Odds, Specification with General Government Primary Balance (cont'd)

Category 1	Category 2	SNG Own Revenues		Tax Autonomy		Government Stability		Government Fractionalization		Bailout		Population Growth	
		exp(b)	P>|z|	exp(b)	P>|z|	exp(b)	P>|z|	exp(b)	P>|z|	exp(b)	P>|z|	exp(b)	P>|z|
Prohibited	Cooperative	2.782	0.003	0.000	0.000	0.592	0.271	1.153	0.000	8.544	0.064	0.000	0.338
Prohibited	Central Rule	1.322	0.013	0.000	0.000	0.727	0.501	4.052	0.000	7.025	0.142	1.672	0.704
Prohibited	Self Rule	3.972	0.012	0.000	0.000	0.572	0.256	2.652	0.000	6.269	0.015	0.000	0.038
Prohibited	Market	3.022	0.005	0.000	0.000	0.718	0.485	2.915	0.000	4.855	0.118	1.872	0.938
Prohibited	Administrative	5.532	0.015	0.000	0.000	0.640	0.345	.	.	1.156	0.143	0.000	0.609
Cooperative	Prohibited	0.000	0.003	1.867	0.000	1.690	0.271	0.000	0.000	0.001	0.064	6.484	0.338
Cooperative	Central Rule	0.001	0.000	1.761	0.087	1.229	0.024	0.372	0.075	0.244	0.000	1.085	0.000
Cooperative	Self Rule	0.001	0.006	0.663	0.479	0.968	0.822	0.240	0.099	9.202	0.000	0.000	0.004
Cooperative	Market	0.109	0.181	0.424	0.010	1.213	0.037	2.688	0.082	0.343	0.004	8.434	0.000
Cooperative	Administrative	0.000	0.000	3.137	0.005	1.082	0.403	2.338	0.163	0.238	0.000	2.212	0.156
Central Rule	Prohibited	0.000	0.013	1.057	0.000	1.375	0.501	0.000	0.000	0.005	0.142	0.000	0.704
Central Rule	Cooperative	2.864	0.000	0.568	0.087	0.814	0.024	2.686	0.075	4.094	0.000	0.000	0.000
Central Rule	Self Rule	3.011	0.630	0.377	0.100	0.787	0.104	0.644	0.605	7.674	0.000	0.000	0.000
Central Rule	Market	2.303	0.000	0.241	0.000	0.987	0.871	7.221	0.000	1.405	0.277	0.000	0.140
Central Rule	Administrative	0.420	0.588	1.781	0.134	0.880	0.108	6.279	0.000	0.973	0.925	0.000	0.000
Self Rule	Prohibited	0.000	0.012	2.807	0.000	1.747	0.256	0.000	0.000	0.000	0.015	7.289	0.038
Self Rule	Cooperative	7.758	0.006	1.508	0.479	1.034	0.822	4.171	0.099	0.109	0.000	1.125	0.004
Self Rule	Central Rule	0.332	0.630	2.656	0.100	1.271	0.104	1.553	0.605	0.027	0.000	1.210	0.000
Self Rule	Market	6.160	0.064	0.639	0.449	1.254	0.122	9.212	0.005	0.037	0.000	9.479	0.000
Self Rule	Administrative	0.139	0.436	4.729	0.014	1.118	0.458	9.751	0.011	0.026	0.000	2.487	0.000
Market	Prohibited	0.000	0.005	4.387	0.000	1.393	0.485	0.000	0.000	0.003	0.118	0.001	0.938
Market	Cooperative	9.214	0.181	2.360	0.010	0.824	0.037	0.372	0.082	2.915	0.004	0.000	0.000
Market	Central Rule	0.004	0.000	4.157	0.000	1.013	0.871	0.139	0.000	0.712	0.277	1.281	0.140
Market	Self Rule	0.013	0.064	1.565	0.449	0.797	0.122	0.089	0.005	6.820	0.000	0.000	0.000
Market	Administrative	0.002	0.001	7.402	0.000	0.892	0.178	0.870	0.801	0.693	0.244	0.000	0.004
Administrative	Prohibited	0.000	0.015	5.927	0.000	1.563	0.345	.	.	0.005	0.143	2.932	0.609
Administrative	Cooperative	6.423	0.000	0.319	0.005	0.925	0.403	0.428	0.163	4.208	0.000	0.000	0.056
Administrative	Central Rule	2.384	0.588	0.562	0.134	1.137	0.108	0.159	0.000	1.028	0.925	4.894	0.000
Administrative	Self Rule	7.177	0.436	0.212	0.014	0.895	0.458	0.103	0.011	8.722	0.000	0.000	0.000
Administrative	Market	6.588	0.001	0.135	0.000	1.122	0.178	1.150	0.801	1.444	0.244	3.822	0.004

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

Table 4. Factor Change in the Odds, Specification with Sub-National Government Primary Balance

Category 1	Category 2	Liquid Liabilities		Financial Freedom		SNG Primary Balance		SNG Debt		GDP Per Capita		SNG Expenditures	
		exp(b)	P>|z|	exp(b)	P>|z|	exp(b)	P>|z|	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	.	.	10.030	0.245	6.682	0.363
Prohibited	Central Rule	0.087	0.707	1.313	0.025	1.811	0.433	0.000	0.000	14.489	0.177	4.823	0.216
Prohibited	Self Rule	0.011	0.491	1.288	0.038	1.981	0.690	0.000	0.000	8.091	0.293	4.803	0.203
Prohibited	Market	0.004	0.400	1.327	0.020	2.411	0.626	0.000	0.000	26.187	0.099	3.023	0.236
Prohibited	Administrative	0.008	0.461	1.303	0.029	4.542	0.144	0.000	0.000	26.347	0.098	1.012	0.317
Cooperative	Prohibited	4.316	0.562	0.753	0.020	0.000	0.422	.	.	0.100	0.245	0.000	0.363
Cooperative	Central Rule	3.787	0.036	0.989	0.251	0.559	0.876	0.099	0.313	1.445	0.019	7.231	0.000
Cooperative	Self Rule	0.485	0.369	0.970	0.067	0.000	0.044	0.000	0.004	0.807	0.275	7.191	0.000
Cooperative	Market	0.183	0.006	1.000	0.995	0.000	0.007	0.029	0.106	2.611	0.000	4.521	0.000
Cooperative	Administrative	0.365	0.135	0.981	0.063	1.401	0.004	4.751	0.000	2.627	0.000	1.905	0.199
Central Rule	Prohibited	11.439	0.707	0.762	0.025	0.000	0.433	.	.	0.069	0.177	0.000	0.216
Central Rule	Cooperative	0.264	0.036	1.011	0.251	1.789	0.876	10.097	0.313	0.692	0.019	0.000	0.000
Central Rule	Self Rule	0.128	0.010	0.981	0.234	0.000	0.062	0.003	0.014	0.558	0.004	9.950	0.665
Central Rule	Market	0.048	0.000	1.011	0.189	0.000	0.016	0.296	0.420	1.807	0.000	0.063	0.311
Central Rule	Administrative	0.096	0.000	0.992	0.355	2.501	0.002	4.801	0.000	1.818	0.000	0.000	0.000
Self Rule	Prohibited	9.347	0.491	0.777	0.038	0.000	0.690	.	.	0.124	0.293	0.000	0.203
Self Rule	Cooperative	2.063	0.369	1.031	0.067	1.641	0.044	3.840	0.004	1.240	0.275	0.000	0.000
Self Rule	Central Rule	7.811	0.010	1.020	0.234	9.180	0.062	3.548	0.014	1.791	0.004	0.101	0.665
Self Rule	Market	0.377	0.197	1.031	0.062	12.202	0.674	2.785	0.042	3.237	0.000	0.006	0.333
Self Rule	Administrative	0.753	0.738	1.012	0.480	2.301	0.000	1.501	0.000	3.256	0.000	0.000	0.004
Market	Prohibited	6.825	0.400	0.753	0.020	0.000	0.626	.	.	0.038	0.099	0.000	0.236
Market	Cooperative	5.467	0.006	1.000	0.995	1.350	0.007	4.120	0.106	0.383	0.000	0.000	0.000
Market	Central Rule	20.704	0.000	0.989	0.189	7.253	0.016	3.379	0.420	0.553	0.000	5.984	0.311
Market	Self Rule	2.651	0.197	0.970	0.062	0.082	0.674	0.011	0.042	0.309	0.000	9.044	0.333
Market	Administrative	1.995	0.254	0.982	0.037	1.881	0.000	1.621	0.000	1.006	0.966	0.000	0.001
Administrative	Prohibited	8.691	0.461	0.768	0.029	0.000	0.144	.	.	0.038	0.098	0.000	0.317
Administrative	Cooperative	2.740	0.135	1.019	0.063	0.000	0.004	0.000	0.000	0.381	0.000	0.007	0.099
Administrative	Central Rule	10.376	0.000	1.008	0.355	0.000	0.002	0.000	0.000	0.550	0.000	4.791	0.000
Administrative	Self Rule	1.328	0.738	0.988	0.480	0.000	0.000	0.000	0.000	0.307	0.000	4.761	0.004
Administrative	Market	0.501	0.254	1.019	0.037	0.000	0.000	0.000	0.000	0.994	0.966	3.000	0.001

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

Table 4. Factor Change in the Odds, Specification with Sub-National Government Primary Balance (cont'd)

Category 1	Category 2	SNG Own Revenues		Tax Autonomy		Government Stability		Government Fractionalization		Bailout		Population Growth	
		exp(b)	P>|z|	exp(b)	P>|z|	exp(b)	P>|z|	exp(b)	P>|z|	exp(b)	P>|z|	exp(b)	P>|z|
Prohibited	Cooperative	1.623	0.005	0.000	0.000	0.313	0.028	1.416	0.000	0.046	0.582	0.000	0.913
Prohibited	Central Rule	1.733	0.011	0.000	0.000	0.366	0.056	5.416	0.000	0.013	0.438	1.564	0.468
Prohibited	Self Rule	8.733	0.012	0.000	0.000	0.274	0.017	4.116	0.000	0.541	0.913	0.000	0.381
Prohibited	Market	5.933	0.007	0.000	0.000	0.364	0.055	4.016	0.000	0.019	0.478	4.234	0.550
Prohibited	Administrative	1.473	0.011	0.000	0.000	0.341	0.040	.	.	0.016	0.457	7.601	0.895
Cooperative	Prohibited	0.000	0.005	2.697	0.000	3.191	0.028	0.000	0.000	11.620	0.582	3.571	0.913
Cooperative	Central Rule	0.001	0.000	1.340	0.393	1.169	0.079	0.394	0.089	0.284	0.000	5.575	0.000
Cooperative	Self Rule	0.001	0.003	0.355	0.085	0.875	0.357	0.297	0.162	9.691	0.000	0.000	0.006
Cooperative	Market	0.037	0.057	0.270	0.000	1.161	0.097	2.891	0.062	0.413	0.018	1.514	0.000
Cooperative	Administrative	0.001	0.000	3.235	0.007	1.087	0.375	2.169	0.206	0.340	0.003	2.711	0.141
Central Rule	Prohibited	0.000	0.011	2.017	0.000	2.730	0.056	0.000	0.000	6.006	0.438	0.000	0.468
Central Rule	Cooperative	9.496	0.000	0.746	0.393	0.855	0.079	2.536	0.089	3.516	0.000	0.000	0.000
Central Rule	Self Rule	0.504	0.776	0.265	0.029	0.749	0.049	0.754	0.742	4.102	0.000	0.000	0.000
Central Rule	Market	4.231	0.018	0.202	0.000	0.993	0.934	7.331	0.000	1.453	0.236	0.000	0.344
Central Rule	Administrative	0.847	0.914	2.414	0.032	0.930	0.376	5.500	0.001	1.197	0.539	0.000	0.000
Self Rule	Prohibited	0.000	0.012	7.597	0.000	3.646	0.017	0.000	0.000	1.849	0.913	1.645	0.381
Self Rule	Cooperative	11.649	0.003	2.819	0.085	1.143	0.357	3.362	0.162	0.086	0.000	4.595	0.006
Self Rule	Central Rule	1.984	0.776	3.777	0.029	1.336	0.049	1.326	0.742	0.024	0.000	2.570	0.000
Self Rule	Market	7.899	0.085	0.761	0.652	1.327	0.052	9.719	0.008	0.035	0.000	6.939	0.000
Self Rule	Administrative	1.679	0.844	9.119	0.001	1.242	0.153	7.292	0.029	0.029	0.000	1.246	0.000
Market	Prohibited	0.000	0.007	9.977	0.000	2.748	0.055	0.000	0.000	5.298	0.478	0.000	0.550
Market	Cooperative	7.271	0.057	3.703	0.000	0.861	0.097	0.346	0.062	2.419	0.018	0.000	0.000
Market	Central Rule	0.029	0.018	4.963	0.000	1.007	0.934	0.136	0.000	0.688	0.236	3.691	0.344
Market	Self Rule	0.015	0.085	1.314	0.652	0.754	0.052	0.103	0.008	2.281	0.000	0.000	0.000
Market	Administrative	0.025	0.041	11.980	0.000	0.936	0.450	0.750	0.613	0.824	0.551	0.000	0.001
Administrative	Prohibited	0.000	0.011	8.327	0.000	2.936	0.040			6.506	0.457	0.000	0.895
Administrative	Cooperative	11.797	0.000	0.309	0.007	0.920	0.375	0.461	0.206	2.937	0.003	0.000	0.141
Administrative	Central Rule	1.181	0.914	0.414	0.032	1.076	0.376	0.182	0.001	0.836	0.539	2.054	0.000
Administrative	Self Rule	0.596	0.844	0.110	0.001	0.805	0.153	0.137	0.029	4.342	0.000	0.000	0.000
Administrative	Market	4.439	0.041	0.084	0.000	1.068	0.450	1.333	0.613	1.214	0.551	5.573	0.001

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

Results for general government fiscal performance

As discussed above, an important problem with estimating equation (1) directly is the possible the reverse causality problem. 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.[22] The probabilities of adopting each approach estimated in the first stage are then used instead of their respective dummy variables in the second stage to estimate equation (1) using a 2SLS approach.

Table 5 presents the results for the effect of sub-national 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 sub-national borrowing regulations are assumed to be exogenous. Columns 3-6, on the other hand, show the results obtained when the assumed endogeneity in sub-national 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 sub-national level, ceteris paribus, has a significant and positive effect on 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 the sub-national 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 we account for the existence of sub-national borrowing regulations, we obtain different conclusions for different types of regulations. For example, centrally-imposed rules and market-based regulations seem to reduce its positive effect on primary balance. On the other hand, cooperative types of sub-national borrowing regulations seems to have positive effect on the primary balance.

The negative effect of rule-based regulations is expected because as soon as the rules are imposed, the sub-national governments may have to reduce the amount of borrowing. This reduction in the amount of borrowing is the result of the requirements the sub-national governments must meet considering revenues, expenditures and deficit.[23] Therefore, sub-national governments' ability to finance deficits through borrowing is thus reduced. The negative effect of the market-based regulations is the result of the similar reason, except in this case the sub-national governments have to improve their creditworthiness in order to be able to borrow with lower interest rates. Since the level of indebtedness contributes to a higher cost of borrowing, sub-national governments may reduce the amount of borrowing, so they may less be able to

[22] These results are not reported but are available on request.
[23] Recall that this variable does not include the "golden rule" and limit on borrowing and debt.

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 sub-national debt is increasing provides support for this conjecture.

Furthermore, the results suggest that the "golden rule" and imposed limits on sub-national borrowing and debt are efficient in regulating sub-national borrowing and improving the effectiveness of a broad variety of regulations. Moreover, when sub-national governments have to face legal sanctions for non-compliance 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 non-compliance 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 sub-national 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 the 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 intergovernmental transfers may be due to moral hazard, especially in case of the administrative regulation. Moreover, high dependence on intergovernmental 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. Moreover, 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 way. High sub-national dependence on intergovernmental transfers may make creditors feel more certain that a borrower may be more likely 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 the 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.

Furthermore, in the case of high dependence on intergovernmental transfers, their predictability (i.e. transfers allocated based on a predictable formula) 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

intergovernmental transfers in the sub-national total revenue is at least 30 percent, does their predictability have a positive effect on the primary balance. The results also suggest that sub-national tax autonomy positively affects a country's overall fiscal performance, especially when the sub-national governments rely less on financing from the central government budget and more on own-source revenues.

Table 5. Effect of Sub-national Borrowing on General Government Primary Balance

	GMM (regulations exogenous)		GMM (regulations endogenous)			
	1	2	3	4	5	6
GG 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)
SNG 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 Rules	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)
SNG 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)
SNG 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)
SNG 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)
SNG debt * Self Rules	-0.571***	-0.541***	0.000	0.000	0.000	0.000
	(0.127)	(0.126)	(0.000)	(0.000)	(0.000)	(0.000)
SNG 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)
SNG 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)
SNG 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)
SNG debt * Foreign	-0.009	0.019		-0.068**	-0.095***	-0.065**
	(0.026)	(0.026)		(0.031)	(0.032)	(0.031)
IGT	-0.039***	-0.028***	-0.002	0.021**	-0.010	0.011
	(0.009)	(0.008)	(0.007)	(0.009)	(0.007)	(0.008)
IGT * 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)
IGT * 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)
IGT * 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)
IGT * Self Rules	0.060*	0.048	-0.467***	-1.031***	-0.782***	-1.010***
	(0.032)	(0.031)	(0.151)	(0.216)	(0.165)	(0.199)
IGT * 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)
IGT* 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)
IGT * 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)
SNG 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)
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

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

Results for sub-national government fiscal performance

In the case of sub-national government insolvency, the general government can react in of the following three ways. First, the central government can decide to cover the sub-national fiscal imbalances (i.e. bailout). Second, it can re-design the tax and/or transfer system through which the sub-national government would receive a larger portion of the overall revenues collected.

Finally, the central government can ignore the sub-national 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 sub-national primary balance as the dependent variable.

Table 6. Effect of Sub-national Borrowing on Sub-National Government Primary Balance

	GMM (regulations exogenous)		GMM (regulations endogenous)			
	1	2	3	4	5	6
SNG 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)
SNG 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)
SNG 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)
SNG 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)
SNG 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)
SNG debt * Self Rules	-0.176	-0.139	0.000	0.000	0.000	0.000
	(0.134)	(0.127)	(0.000)	(0.000)	(0.000)	(0.000)
SNG 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)
SNG 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)
"Golden rule"	-0.005	-0.006*		-0.010***	-0.010***	-0.010***
	(0.003)	(0.003)		(0.004)	(0.003)	(0.003)
SNG 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)
SNG debt * Foreign	0.013	0.032		-0.032	-0.057*	-0.037
	(0.034)	(0.036)		(0.034)	(0.033)	(0.032)
IGT	-0.027***	-0.021**	-0.009	-0.006	-0.017**	-0.011
	(0.010)	(0.010)	(0.009)	(0.010)	(0.008)	(0.009)
IGT * 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)
IGT * 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)
IGT * 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)
IGT * Self Rules	0.027	0.020	-0.327*	-0.441**	-0.455**	-0.428**

	(0.036)	(0.036)	(0.192)	(0.224)	(0.198)	(0.213)
IGT * 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)
IGT* 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)
IGT * 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)
SNG 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)	
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

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

As the results in Table 6 suggest, sub-national debt does not seem to affect the sub-national primary balance, ceteris paribus. Moreover, none of the broad types of sub-national borrowing regulations seems to have an effect on sub-national primary balances in the case of high sub-national debt. However, the "golden rule" and imposed limits on sub-national borrowing and debt seem to have a positive and significant effect on the sub-national primary balance. Furthermore, in the case of a high level of financing from the central government budget, market-based regulation seems to have positive effect on the sub-national 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 intergovernmental 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 sub-national level, tax autonomy has no effect on fiscal performance when there is high reliance on central government financing, suggesting that, at the margin, sub-national tax autonomy does not matter much for the fiscal performance.

V. Summary and conclusions

In this paper we have researched four basic interrelated questions on the effectiveness of using subnational borrowing rules in preserving fiscal sustainability and macroeconomic stability. For the empirical analysis we use an unbalanced panel data for 57 industrialized, developing, and transition countries between 1990 and 2008. Two alternative dependent variables are used; namely, the primary balance at the general government level and at the sub-national level. The main variables of interest are four broad types of sub-national borrowing regulations, first categorized by Ter-Minassian and Craig (1997); namely, market-based, rule-based, cooperative, and administrative regulation. The results obtained from using these types of sub-national borrowing regulations are compared with those obtained from prohibiting borrowing at the sub-national level altogether.

To evaluate the relationship between sub-national borrowing regulations and fiscal performance at the general and the sub-national government levels we use the "system" GMM estimator to evaluate how the primary balance changes as a result of changes in the level of sub-national outstanding debt, sub-national borrowing regulations, revenue and expenditure autonomy, and in control variables. We address the potential reverse causality problem between the primary balance and the types of sub-national borrowing regulations by applying the multinomial logit approach in the first state to estimate the predicted probabilities of choosing each type of regulations. This methodology allows the investigation of potential determinants of choosing each of the sub-national regulation types at the same time.

For our main results, first, concerning the selection of rules, we find that 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. On the other hand, countries with higher sub-national outstanding debt seem to be more likely to regulate the sub-national borrowing.

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 those countries with a history of subnational government bailouts

primary balances on average are lower at both the sub-national and the general government levels than in other countries.

On the effectiveness of borrowing regulations, we find that the "golden rule" (borrowing is only for capital investment purposes) and limits on debt and borrowing positively affect the primary balance at all levels of government. However, on the question of which regulations are most effective, we find that none of the broad types of sub-national borrowing regulations 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 on in shaping up the different regulations. This negative result shifts the focus to what the impact may be of the different regulations on the overall fiscal balance of the country through the impact of the different fiscal behavior of subnational governments. And here there is a more salient result.

We find that cooperative type of sub-national borrowing regulations seems to have a positive effect on improving general government fiscal performance even in the case of high levels of sub-national debt and high dependence on subnational governments on intergovernmental transfers.

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