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The Evolving Role of Subnational Borrowing in Financing Decentralized Government

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Abstract

Should subnational borrowing have a role in financing fiscal decentralization? Subnational debt received relatively little attention in the classic discussion of federalism by Oates (1972) although he indicates some ways in which subnational borrowing is sensible. I discuss what role (if any) subnational borrowing can play in macroeconomic stabilization as well state and local borrowing for capital projects. I also summarize recent discussions that center on the problems associated with subnational borrowing and potential solutions. What institutions, rules of the game, or rules of behavior are needed for successful subnational borrowing? Are there alternatives to subnational borrowing that can work better? I end by discussing the changing capital needs of subnational governments.

Keywords: decentralization, subnational borrowing, intergovernmental relations

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I. Introduction

How should subnational governments be financed and what is the role of subnational debt? This question lies at the heart of the proper design of decentralized government, yet in practice fiscal decentralization has proven to be a challenge. Why so? Is it because theories and practices have not kept up with realities on the ground or are the challenges of a more fundamental nature?

I begin by tracing the reasoning of Oates (1972) with respect to subnational debt in his pioneering exploration of fiscal federalism. Oates viewed the role of subnational governments through the lens of his decentralization theorem, which says that absent externalities and economies of scale in population, the most efficient level of government to provide a good commonly consumed by only a subset of the national population is the one that corresponds to that subset – that is, a subnational government. The degree of efficiency gain depends on how different are demands between subnational governments for such a good, but if there are differences there will be an efficiency gain relative to a common consumption level for all.

Of course, there are a number of assumptions that underly the decentralization theorem. The presence of externalities violates one assumption of the decentralization theorem; Oates (1972, chapter 3) argues for the use of matching grants to internalize such externalities. Moreover, much of the discussion in Oates (1972) presumes the financing mechanism of subnational governments to be benefit taxation; the taxation of privately owned property (or land) is often taken to be such a tax, following Tiebout (1956) and Hamilton (1975).

It is only in the penultimate chapter that Oates (1972, chapter 4) turns to non-benefit taxation and the role of subnational debt. I discuss the role of subnational debt in this paper. The issue of subnational debt was not a primary focus for Oates (1972), and arguably our subsequent knowledge on this topic is relatively narrow. Despite leaving a discussion of subnational debt for the end, Oates (1972) makes two important points. The first is that in his view, subnational borrowing should not be used as a tool for macroeconomic stabilization. The second is that subnational borrowing should be used to finance capital projects rather than current spending needs. As will become clear, Jorge Martinez-Vazquez has been involved in studying both issues as well as expanding our knowledge to other issues surrounding capital financing and implementing solutions in developing as well as developed countries.

In this paper I discuss our evolving knowledge about the role of subnational debt in the financing of decentralized government. I begin my discussion by delving further into the

thinking of Oates concerning subnational borrowing in the following section. I then discuss in section III subnational borrowing and macroeconomic stabilization, describing some recent empirical work. In section IV I turn to a discussion of state and local borrowing for capital projects, particularly in the US. I discuss recent findings on the problems associated with subnational borrowing and potential solutions in section V. In section VI I discuss whether alternatives to subnational borrowing can work and the problems such alternatives may entail. In section VII I discuss the changing capital needs of subnational governments. I conclude in Section VIII.

II. The role of borrowing by subnational governments according to Oates (1972)

Oates (1972) considers two areas in which subnational debt and borrowing could be relevant. The first is the issuance of debt in a recessionary environment for stabilization purposes and the second is the issuance of debt to finance capital projects. In both cases he also discusses the incidence of debt and its potential capitalization into property values which alters its incidence characteristics.

With respect to stabilization, Oates (1972, pp. 4-6) considers this to be best left to the central level of government. Subnational governments (as opposed to the central government) will have difficulty stabilizing their economies for several reasons. The first relates to control of the money supply: if subnational governments were given the power to print money, the likely result would be over-production of money since the costs of resulting inflation are spread across other states. This negative externality would likely lead to too much money and inflation in the economy. The second reason relates to the fact that the fiscal multiplier is likely smaller for subnational governments because subnational economies are relatively small and open, and residents purchase many goods from outside the subnational jurisdiction. A higher propensity to import or “leakage” would lead to a smaller fiscal multiplier. The third reason is that if shocks are quickly translated to other states, stabilization policies have positive externalities, and it is likely that subnational governments will not take these beneficial externalities into account and will under-utilize such policies.

Moreover, Oates notes that local debt will largely be external debt (held by those outside the community) while he supposes that national debt will be more likely to be internal debt. Repayment of local debt will thus involve a greater transfer of resources outside of the issuing jurisdiction than national debt. Oates recognizes however that even though it is external in nature, the incidence of local debt will be borne by residents at the time of the issuance of the debt to the extent that it is capitalized into property values. The issue of capitalization is of course an important intellectual building block which Oates (1969) used in his seminal paper testing the Tiebout hypothesis.

Taking as given the argument that local debt will not fruitfully be used for stabilization then leaves the reason for local debt to be funding government capital projects. The reasoning at the time was that debt finance would place the fiscal burden in part on future residents, connecting the recipients of future benefits of the capital project to its costs. Oates (1972, pp. 155-156), relying in part on earlier work, invokes a sort of local version of the Modigliani-Miller theorem to argue that tax finance can also place the appropriate fiscal burden on future residents through the capitalization of the tax costs and future benefits. That is, capitalization would result in an incidence of tax finance that also places the fiscal burden in part on future residents, connecting the recipients of future benefits of the capital project to its costs, just as was reasoned to be the case for bond finance. This somewhat extraordinary proposition, like its Modigliani-Miller counterpart, relies on strong assumptions. Two assumptions are important for the capitalization of locally issued debt. First, sufficient mobility is required to induce capitalization and, second, costless access to capital markets at the same rate of interest for all economic agents is necessary. The first assumption, Oates argues, is likely for local jurisdictions but less so for larger geographic areas like states. The second assumption is likely violated as presumably governments can borrow at lower costs than individuals. Moreover, financing capital projects by tax may result in big swings in tax rates rather than the more efficient stable tax rates over time.

For these reasons, Oates concludes, borrowing is the only practical solution for large capital projects and debt finance will be a sound method to finance capital projects. Thus, an efficient level of public sector capital formation will require debt finance. In all of this of course is the presumption that the government issuing bonds will be responsible for paying off the debt, and in fact will do so. I will return to this issue later in the paper.

III. Borrowing for Macroeconomic Stabilization and Subnational Debt

Despite the traditional reluctance to use subnational debt for stabilization purposes, subnational governments are often intricately involved in both national and regional stabilization policies. Part of the reason for the traditional argument is the expected smaller fiscal multiplier from subnational stabilization measures.

An empirical literature developed on the potential stabilization role of state-level governments beginning in the 1970s with Galper and Gramlich (1973). This was followed by a series of papers by Gramlich (1978, 1979, 1987) that in part estimated a state's import elasticity. The general finding is a small state and local government multiplier. Moreover, Gramlich (1978, 1979) estimates how stimulatory grant programs that were enacted to combat the 1977 recession fared in stimulating the economy, concluding that they were not very helpful on the macroeconomic stabilization front.

Studies from countries other than the US have focused on macroeconomic stability by examining the relationship of decentralization and debt. Some hopeful evidence on decentralization and macroeconomic stability comes from Switzerland (Schaltegger and Feld 2009); Baskaran (2010) and Martinez-Vazquez and McNab (2006) find similar results for developed countries in general. This optimistic view likely depends on several factors, including the degree to which SNGs rely on own-source revenue. Lago-Peñas, Martinez-Vazquez, and Sacchi (2020) find that greater decentralization is associated with lower general government deficits when the vertical fiscal imbalance (VFI - roughly the degree to which subnational governments rely on grant rather than own-source finance) is low. They also find that borrowing rules and the strictness of other fiscal rules matter. This is consistent with other work such as Eyraud and Lusinyan (2013) who find that a higher VFI worsens the general government balance, something predicted by the soft budget constraint literature.

On the negative side, Fukasaku and De Mello (1998) and De Mello (2000) find decentralization is associated with macroeconomic instability for developing countries. Even in developed countries other studies find a pessimistic relationship between decentralization and government debt. These include Pettersson-Lidbom (2010), Baskaran (2012), Sorribas-Navarro (2011), and Buettner and Wildasin (2006).

Some recent papers use a natural experiment approach. In the aftermath of the 2008 financial crisis, the 2009 American Recovery and Reinvestment Act (ARRA) stimulus bill was enacted. This bill included substantial funds for state and local governments, creating a new natural experiment to examine the state and local role in stabilization. Several papers have investigated the ARRA. Two of the more prominent are Inman (2010) and Wilson (2012). Inman finds that the ARRA funds were not distributed to achieve macroeconomic stabilization (i.e. there was a large political element). Wilson (2012) finds ARRA increased employment (his dependent variable) although the cost per job is quite high.

Also at this time, a new macroeconomic literature on the measurement of fiscal stimulus emerged. At the national level, this literature used wars as an exogenous shock to estimate a macroeconomic multiplier for the US.¹ Some of the highly cited papers in this literature include Barro and Redlick (2011), Hall (2009), and Ramey (2011). Major wars during the 20th century were WWI, WWII, and the Korean war. These wars all resulted in large changes in defense spending but not in nondefense spending. This allowed the

¹ I use the term “macroeconomic multiplier” because theory behind the multiplier could be the textbook Keynesian type, but could also be of the neoclassical variety or of the New Keynesian sort.

identification of the effect of military spending resulting from an arguably exogenous source.

Building on the identification method used in these papers, an alternative “regional multiplier” literature emerged. This literature uses the fact that military spending is greater in some states (like California) than other states (like Illinois). This allows for identification of a “regional” multiplier which is essentially the macroeconomic multiplier in one state (with large spending increases) relative to that in another state (with small spending increases). Important papers in this literature are surveyed by Chodorow-Reich (2019) and include for instance Nakamura-Steinsson (2014) and Auerbach, Gorodnichenko, and Murphy (2020).

Auerbach, Gorodnichenko, and Murphy (2020) additionally examine spillover effects of government spending from cities to nearby cities. They find significant spillover impacts of local defense spending on the GDP of other nearby cities. Carlino and Inman (2013) also examine spillovers measured in terms of employment across US regions and find significant results.

I have recently begun to examine the regional fiscal stimulus multiplier resulting from three different funding sources during a crisis: rainy day funds, grants, and subnational debt (Goodspeed 2023, 2024). I also estimate the spillover effects of the three funding sources using one of the measures of economic linkages used by Carlino and Inman (2013). Generally, I find a relatively small impact of SNG debt and rainy-day funds and a larger impact of grant funding. This is consistent with Oates’s argument of a small multiplier effect from own-source funds but is also suggestive of a larger effect when financed by the central government. The result of a larger impact from grant funds is also consistent with the well-known flypaper effect that subnational governments spend more out of grant than own-source revenues. This is not to say this is necessarily efficient – the national debt of the US increased significantly after the latest two crises (the financial crisis and the Covid epidemic) and stands at some \$35 trillion or 120 percent of GDP as of September of 2024.

IV. State and Local Debt for Capital Projects in the United States

The second area that Oates (1972) concludes is useful for state and local debt is the financing of capital projects. The idea that bond finance should be used for capital projects (investment) rather than current consumption is sometimes called the “golden rule” in local finance (not to be confused with the way the term is used in the growth literature which posits a savings rate that leads to an amount of investment that maximizes consumption per worker in the steady state). Despite the golden rule, it is important to

remember that current expenditures must be used to maintain the capital stock. Otherwise, public capital will quickly deteriorate. This important aspect was recognized and explored by Bumgarner, Martinez-Vazquez, and Sjoquist (1991).² They found that fiscally distressed governments decrease capital maintenance and replacement, shifting resources to other, perhaps more politically visible areas. So, while bond finance should finance the capital stock there must also be enough cash reserves to maintain the capital stock, particularly in difficult fiscal times. It would be prudent therefore to include spending on maintenance when evaluating capital projects.

Other sorts of criticisms have also been levied against the golden rule. First, even though it is sensible to finance capital projects via debt, this does not mean that all capital projects should be financed. Some projects may simply not pass a rigorous cost-benefit test and hence are not economically sensible. Second, overall debt must be limited to be sustainable so even some projects that pass a cost-benefit test might sensibly be ruled out due to an overall debt limitation, something that can be set via a medium-term debt anchor. Third, one should be on the watch for accounting manipulations that classify certain recurring expenditures as capital ones; an example might be the recurrent recapitalization of subnational enterprises. Finally, it should be kept in mind that debt typically finances physical rather than human capital, whereas the accumulation of human capital is sometimes the more important constraint to growth and development.

To what extent are capital projects financed by debt in the United States? Oates (1972, p. 160) mentions that in 1969 total capital outlays by all state and local governments in the US were \$28.2 billion while long-term bond issues were \$15.5 billion. Hence, in 1969 current revenues were being relied upon for a substantial fraction of investment projects, a somewhat troubling fact. It is troubling because it suggests that some beneficial capital projects are likely being passed up, and Oates cites some work of his own that indicates that states with a relatively low reliance on debt finance also have low levels of public investment. This is perhaps doubly troubling since, if subnational governments cannot use debt effectively for stabilization as Oates suggests, they do not have much control over their growth rate in a crisis and therefore their future income to pay off debt. The influence they have on their growth will come more from productive investments, and if these are underfunded there would seem to be a dismal loop of under-investment in local public capital.

Has the subnational financing of capital investment changed over time? In the US we can observe a reversal in that long term bond issues are now somewhat greater than

² The data challenges involved here should not be underestimated. Capital maintenance is not readily available, so the authors had to parse through the budgets of their sample cities.

capital outlays. Table 1 examines data from 1969 to 2021. The figures are presented in real 2021 dollars using the CPI to convert nominal to real values. The apparent financing of substantial portions of capital investment with current revenues is evident in the 1969 figures cited by Oates as well as the 1972 data. By the 1990s this trend had reversed with long-term bond issues exceeding capital outlays. In 1993 capital outlays were 253 billion while long term bond issues were 366 billion; apparently current spending was being financed in part with debt. This new trend continues in 2003. The years of 2008 and 2009 are of course an abnormal period because of the financial crisis but we see that capital outlays were in fact larger (probably due to the first fiscal stimulus bill of the Obama administration). This created a greater balance in capital outlays and long-term bond finance, but the balance is short-lived; by 2013 capital outlays are falling and bond issuance falling but not by as much. Balance is restored again in 2018 but the effects of the Covid crisis is evident by 2021 with capital outlays falling and long-terms bond issues rising. In part this is due to the federal response to Covid which provided substantial current spending support for state and local governments.

Table 1: Real (2021 dollars) US subnational capital outlays and long-term bond issues

real (2021 dollars)	1969	1972	1993	1998	2003	2008	2009	2010	2013	2018	2021
capital outlays	208	220	253	301	387	441	457	441	377	422	368
state		97	94	106	136	142	148	147	140	153	133
local		123	159	195	252	298	310	294	237	269	236
long term bond issues	114	136	366	339	508	469	469	496	429	425	461
state		52	144	138	218	190	195	229	172	160	152
local		84	221	201	290	279	274	267	257	265	309
outlays less bond issu	94	84	-113	-38	-121	-29	-11	-55	-52	-3	-93
		45	-51	-32	-82	-48	-47	-82	-33	-6	-19
		39	-62	-7	-38	19	35	27	-20	3	-73

Source: Oates (1972) for 1969; US Census Bureau; Census of Governments

In conclusion we can see that the problems encountered by Oates in 1972, the financing of capital projects with current revenues, is now quite different. Long-term bond issues have risen but perhaps by too much: long-term bond issues are now greater than capital outlays. This raises the possibility that debt financing is being used for current spending rather than capital projects, violating the golden rule that debt should not be used to finance current spending. Whether fiscally distressed jurisdictions continue to eschew maintenance expenditures is unknown, but I suspect that the political calculus is much the same as it was in 1991. We may not know until some new authors undertake the difficult data work needed to update the analysis of Bumgarner, Martinez-Vazquez, and Sjoquist (1991).

V. Major Problems with Subnational Borrowing and Potential Solutions

Probably the biggest problem with subnational borrowing involves the question of whether and who will pay back investors. What level of government will pay back the borrowed funds? Normally the issuer of the bond would be responsible for paying back the loan with interest. In the case of subnational borrowing, this simple equation becomes opaquer and more complicated. While SNGs are the borrowing entity, where does the money to pay back loans come from? It could come from local tax revenues, and thus taxpayers of the region. (These are not necessarily the residents, since nonresidents or visitors may also pay various forms of tax.) It could also come from national governments either directly or indirectly.

This raises the question of responsibility and the possibility of a soft budget constraint.³ The soft budget constraint is essentially the idea that subnational governments may anticipate that someone else will pay off the debt (typically a higher level of government). This anticipation itself can induce bad behavior – borrowing too much in anticipation of it being paid off by someone else.

Several case studies examining this issue are presented in Rodden, Eskeland, and Litvack (2003). While central governments in some (developed) countries seem able to credibly commit to hard budget constraints, the overall picture is one of significant soft budget constraint issues that are more prevalent and serious in developing and transition countries. It can also be a problem for developed economies - in the context of the EU, Balassone, et al. (2002) indicate that EU debt rules can be compromised if subnational governments are not held accountable.

What sort of solutions are there to this type of problem? It turns out that different countries use different sorts of mechanisms. Two important papers discussing these issues are Ter-Minassian and Craig (1997) and Martinez-Vazquez and Vulovic (2016). A seminal paper by Ter-Minassian and Craig (1997) delineates five broad types of subnational borrowing controls that countries use: (i) market discipline, (ii) fiscal rules (with a distinction made between centrally imposed and self-imposed rules), (iii) administrative regulation, (iv) cooperative regulation, and (v) prohibition. Martinez-Vazquez and Vulovic (2016) discuss and expand on these categorizations. Yilmaz and Ebel (this volume) move beyond this categorization and describe how a combination of various metrics – a multi-dimensional approach - in a country-specific institutional context is necessary to fully appreciate and implement decentralization in a country

The five mechanisms noted above are termed *ex-ante* regulations in that they are essentially the rules of the game, defined prior to any borrowing taking place. Market

³ See e.g. Goodspeed (2002) for a theoretical discussion of this problem for subnational governments.

discipline comes mainly from bond markets that function well and determine market-based interest rates on different types of bonds. Fiscal rules, such as US state balanced budget requirements, are a second method. These include ceilings on debt or total borrowing, deficit targets, maximum expenditure rules, variations on the “golden rule,” (only borrow for investment, not current consumption), and rules related to debt repayment capacity. Yilmaz and Ebel (2020) give examples of the intergovernmental fiscal rules for nine East Asian countries and as well as the role of subnational borrowing and debt in China. Administrative regulation refers to direct central government control through, for instance, setting a limit (e.g. annual) on overall subnational government debt or prohibiting external borrowing; reviewing individual borrowing operations, including approving terms and conditions; or centralizing all government borrowing with on-lending to subnational governments for specific projects. And finally cooperative regulation meaning that subnational borrowing controls are designed through a negotiation process between the central and lower levels of government.

Table 2 summarizes the findings of Ter-Minassian and Craig. Interestingly, there is substantial variation across industrial countries, but not across developing or transition countries. Developing countries primarily rely on administrative control while transition countries largely prohibit subnational borrowing. Industrial countries by contrast use a variety of methods and are evenly split among market discipline, cooperative controls, administrative controls, and rules-based controls. While there is some ambiguity in the assignment of countries,⁴ the striking feature is the variety of methods in industrial countries. This suggests that the rule of law and other desirable characteristics such as transparency and accountability are important.

Table 2 Summary of Borrowing Controls Across Countries

Type of Country	Market Discipline	Cooperative Control	Administrative Control	Rules-Based Control	Borrowing Prohibited	Total Number of Countries
Industrial Countries	25%	15%	30%	25%	5%	20
Developing Countries	0%	8%	85%	0%	23%	13
Transition Countries	5%	0%	20%	0%	75%	20

⁴ For instance, the US is categorized as using rules-based controls - reflecting the state balanced budget rules no doubt - but also uses market discipline as it has a well-developed market for municipal bonds.

Source: Author calculations based on Ter-Minassian and Craig (1997)

What explains the variety of methods used in industrial countries? While a detailed discussion of the methods used in various countries is not possible in this paper, some general remarks can be made. Market discipline requires very developed and deep subnational capital markets, something lacking in most countries. Cooperative arrangements and administrative controls are both open to manipulation, and likely soft budget constraint problems unless supported by other harder fiscal rules. These methods are thus also limited in scope to a very particular set of countries. Prohibiting subnational borrowing would seem economically undesirable and unrealistic considering rising subnational capital needs.

This leaves fiscal rules as the best alternative in most countries and most circumstances. Yet fiscal rules can also have problems. First, they should be constructed in a clear and unambiguous manner with numerical targets and transparency to ensure targets are accurately measured. Second, they should focus on medium-term objectives such as servicing the debt with a predictable revenue stream (preferably own-source revenue). Third, unexpected shocks should be planned for through escape clauses or the build up of rainy-day funds. Fourth, public financial management systems are a key to successful implementation. This includes medium-term fiscal frameworks and fiscal risk-management systems. And fifth, subnational insolvency mechanisms should be in place in case that is needed.

Ex-post regulations, which specify consequences or penalties for noncompliance and rules concerning insolvency, also exist. These rules could be quite important, if enforced, as they may influence expectations of subnational governments concerning bad behavior. This suggests the rule of law is important in ex-post regulations as well. The ex-post consequences could be enforced by courts but also can be enforced by the central government. Ex-post regulations can be abused as well, particularly if subnational governments build up debts so large that the central government is virtually forced to intervene due to the large economic or political consequences of a default.

Do ex-ante rules work? The evidence is mixed. The most hopeful evidence derives from US states and their constitutionally mandated balanced budget rules. This literature extends back some 30 years to Poterba (1994, 1995) who finds stronger limitations lead to smaller deficits. Other optimistic evidence along these lines includes Alesina and Bayoumi (1996), Poterba and Rueben (1999), and Poterba and Von Hagen (1999) who find among other things that states with stronger rules are better at adjusting to shocks and receive higher bond ratings.

The experience of the US does not appear to be that easy to replicate, however. Recent cross-country evidence presented by Brochado and Dougherty (2024) indicates that the correlation of fiscal rule strength and the debt to own-revenue ratio is low suggesting that fiscal rules do not lead to lower debt ratios across countries.

What makes rules work in some circumstances and not others? Plekhanov and Singh (2007) find that no single type of borrowing control seems superior under all circumstances, and that appropriateness of any given regulation depends on the vertical fiscal imbalance, bailout expectations, and quality of reporting. Rodden (2002), using panel data on 33 countries, concluded that the largest deficits are run by subnational governments that rely heavily on federal transfers and are free to borrow.

Overall, the literature does not offer a definite answer on how borrowing at the subnational level should be regulated. However, as noted earlier, fiscal rules are the likely answer in most countries. Fiscal rules however, need to be constructed in a clear and unambiguous manner with numerical targets and transparency; should focus on medium-term objectives such as servicing the debt with a predictable revenue stream (preferably own-source revenue); should plan for unexpected shocks through escape clauses (and ideally the build-up of rainy-day funds); should be buttressed by good public financial management systems; and should incorporate a subnational insolvency mechanisms.

The literature does agree that borrowing should be reserved for financing long-term capital investments rather than current spending, where spending on maintenance is included in capital project evaluation. Not all capital projects should be financed, however. Projects should pass a rigorous cost-benefit test and even some projects that pass a cost-benefit test might sensibly be ruled out due to an overall debt limitation, something that can be set via a medium-term debt anchor. Accounting manipulations that classify certain recurring expenditures as capital ones should not be entered into the calculation.

VI. Borrowing and the Changing SNG capital needs

The capital needs of subnational governments have been changing over time. In addition, the capital needs of SNGs are only likely to increase, especially with new societal problems such as climate change.

One of the most striking shifts in government spending since Oates (1972) has been the changing role of government. Spending has been shifting from public goods to social insurance. On the national level in the US, federal government spending on defense (the classic public good) was 42% of all federal spending in 1972 and 13% in 2023. In contrast, spending on Social Security and Medicare (social insurance) amounted to 19.5% of the federal budget in 1972; in 2023 Social Security and health care programs were 50 percent

of all federal spending. Similarly, state and local spending on public welfare, health, and hospitals was 18.1% of state and local spending in 1972 and 27.5% of total expenditure in 2021. On the other hand, spending on education was and remains the major expenditure category of local governments.

Along with the shift in the character of spending, new societal problems have emerged. Among the most prominent has been an increase in the number and intensity of natural disasters. All of this suggests that the nature of capital spending needs has evolved to some extent. Should SNGs be responsible for protective infrastructure needs that may be necessary due to global warming?

Incentives for investment in protective infrastructure for natural disasters have been explored in Haughwout and Goodspeed (2012). They find several interesting results. First, when the federal government is committed to full insurance against disasters, interregional transfers result in an externality and regions acting non-cooperatively will have incentives to under-invest in protective infrastructure in the Nash equilibrium. Might it be better to institute a second-best transfer scheme with less than first-best optimal interregional transfers? This depends on how committed the central government is to the ex-ante transfer scheme. With full commitment, the answer is yes and will lead to more ex-ante investment and less ex-post redistribution. However, with a central government that is unable to commit to the second-best transfer levels, second-best transfers will lead to further under-investment in protective infrastructure.

Goodspeed (2015) summarizes the lessons learned. The advantage of centralized disaster insurance is that the risk pool is largest, but it can also create incentives for SNGs to underinvest in protective infrastructure, both because of ex-ante competitive reasons, and ex-post spillovers and potential soft budget constraints. Charging disaster-prone regions more ex-ante is one alternative especially with mobile populations but is also susceptible to problems of underinvestment. Region-wide disaster insurance is a possibility, but similar problems of underinvestment can also occur. In short, there is no one-size-fits-all to this complex problem.

Different countries have come up with different solutions to mitigate risks. For instance, De Mello and Ter-Minassian (2024) indicate that some countries use private insurance extensively, others mandate insurance for private property owners, and others use state-contingent debt instruments. Some countries in the Caribbean have created a region-wide disaster facility with the help of the World Bank (see the discussion in the next section). The division of costs and controls between national and subnational governments also varies.

VII. Alternatives Methods of Obtaining Subnational Capital

While standard bond issuance is the traditional method of obtaining capital, other methods and alternative credit market instruments can also be used. The first is subnational government own-savings – i.e. subnational rainy-day funds. A second is grants from another entity – usually a higher level of government. And a third are alternative capital market credit instruments.

Past subnational government savings is a promising alternative method. In addition to their use by US states, Martinez-Vazquez and Timofeev (2014) note that Denmark requires subnational governments to finance capital investments with past savings, so this vehicle is used effectively in at least some countries. De Mello and Ter-Minassian (2024) suggest that rainy day funds could be used as a fiscal buffer to lessen the risks from macroeconomic volatility.

An advantage of rainy-day funds is that they promote fiscal accountability and discipline. Raised locally, these funds are more likely to be visible to voters which provides fiscal accountability and responsibility through the electoral process. Moreover, fiscal accountability is also promoted by funding pre-commitment on the part subnational governments, which could be achieved through forced rainy-day funds for capital projects, even if such funding is only partial.

A disadvantage of rainy-day funds is that some projects may be so expensive that it is difficult to have funds saved from the past in rainy day funds to cover costs. In this case the only real alternative to subnational borrowing is grants from a higher level of government. One recent example comes from the Covid pandemic which created large state and local spending needs in the US. Much of the subnational funds for relief from Covid were financed in the US with grants rather than debt issuance.

One notable problem with grants is that they may encourage overspending (indeed the flypaper effect indicates that SNGs spend more out of an additional dollar of grant funding than a dollar of their own revenues) or overborrowing. In this regard, grant funding can lead to a soft budget constraint in which a SNG with access to debt markets may borrow without intending to pay back the money, relying instead on future grant funding to pay back borrowed funds.

All this suggests that it may be useful to try to encourage subnational governments to set up rainy day funds and save for future spending projects. How can this be accomplished? First, note that current policy in the US exempts municipal bond interest income from federal tax. This encourages demand for municipal bonds and hence municipal borrowing. Rather than encouraging borrowing, why not try to encourage state

and local savings? One way to do this is to offer a federal match for subnational savings – i.e. rainy-day funds.

Some interesting alternative capital market credit instruments to standard bond issuance have also recently emerged. Among these are Sukuk certificates, CAT bonds, and Green bonds. I will briefly describe these types of alternative capital market arrangements.

Islamic law does not allow interest payments, so traditional bond finance is not allowed in such countries. Sukuk financial instruments are an alternative to raising capital that does not involve interest payments. Rather, funds are used to buy an asset, and investors are paid a return based on the value of and their share of the asset. The use of Sukuk has been popular in Islamic countries, with over \$300 billion outstanding in 2017.

A Green bond is defined in terms of the use of funds. The term is applied to bonds that are used to raise funds for investments that yield a positive environmental benefit, such as bonds for renewable energy, pollution prevention and control, sustainable water and wastewater management, and green buildings. Given the recent emphasis on climate change, such bonds have become very popular of late. Sales of green bonds amounted to \$575 billion in 2023, with one third being issued by governments. The World Bank is a major participant, issuing approximately \$41 billion of green bonds in 2022.

CAT bonds are a third alternative capital market instrument. These are (high yield) state-contingent debt instruments (SCDIs). They transfer the risk of damage from a natural disaster from the issuer of the CAT bond (often an insurance company) to investors in the bonds. The issuer receives funds if the insured natural disaster (hurricane, earthquake, etc.) occurs. Usually, the payment is contingent on either the strength of the natural disaster or the amount of damage caused by it. Such bonds usually have relatively short maturities, thus limiting the risk for the buyers. Insurance companies issue the largest percent of CAT bonds (60 percent), reinsurance companies issue another 25 percent, and the remaining 15 percent are issued by state funds (Polacek, 2018).

In the US, the largest state catastrophe funds are the California Earthquake Authority (CEA) and the Florida Hurricane Catastrophe Fund (FHCF). These state funds try to ensure that a working catastrophe insurance market exists in the states and have used CAT bonds to reduce their risk of doing so. Outside of the US, two major examples are Mexico's FONDEN and the Caribbean Catastrophe Risk Insurance Facility (CCRIF). The latter was set up with the help of the World Bank. Most citizens of these (and other developing) countries are not insured in the private sector so CAT bonds are used to ensure that immediate funds are available in case of a catastrophe. They also use parametric triggers (e.g. wind speed) for a payout, obviating the need for technical expertise to assess damage.

VIII. Conclusion

Oates (1972) presents some clear if limited advice with respect to subnational borrowing: do not use borrowing for macroeconomic stabilization but do use it to finance capital projects. I have revisited this issue by raising three basic questions concerning subnational borrowing. First, should subnational borrowing have a role in financing fiscal decentralization? Second, what institutions, rules of the game, or rules of behavior are needed for successful subnational borrowing? And third, are there alternatives to subnational borrowing that can work better?

With respect to the first question, I find that Oates's advice largely still holds although the context has changed somewhat. Subnational borrowing for capital projects still seems the best use of subnational debt. Fiscal space should be left for expected maintenance costs of capital expenditures, and it is important that national governments have a no-bailout commitment so that soft-budget constraint issues are minimized. Borrowing for capital projects, which in the US was relatively small in 1969 and was not enough to cover capital projects, has become larger than capital needs indicating that some debt now seems to be used for current spending, violating the "golden rule."

Stabilization by issuing subnational debt can lead to sustainability problems and has a smaller multiplier than national debt. A better method with a larger multiplier is the use of grants for stabilization but grants themselves require a no-bailout commitment to be effective. Attempts to allow but control subnational debt have mixed results, and effective rules seem to be rather country-specific suggesting that the institutional and cultural context is important. Still, well-defined rules with a firm no-bailout commitment that also allows for an escape clause is likely the best solution in most cases.

Recent issues such as climate change suggest that subnational capital needs are likely to increase. Thus, SNGs will have more capital needs and hence more legitimate needs for borrowing so the controls on debt are even more important. The first-best way to finance current subnational spending needs remains benefit taxes, and the closest benefit tax for SNGs would still seem to be property taxation, but this is unlikely to provide sufficient revenues for capital needs. The best sorts of capital investments for SNGs would be those whose benefits do not spillover outside of the region which might include school buildings, sewers, water, and trash infrastructure. Nevertheless, capital infrastructure spending is likely to rise, and many new capital investments will involve externalities. These, such as for natural disasters will need some sort of intergovernmental finance.

Are there alternatives to subnational borrowing that can provide needed funds? Here there are three possibilities. The first is subnational government own-savings – i.e.

subnational rainy-day funds. A second is grants from another entity – usually a higher level of government. And a third are alternative capital market credit instruments, such as Sukuk certificates, Green bonds, and CAT bonds. In some cases, particularly for small countries, a cross-country risk-sharing arrangement would be a good idea.

Creating the best incentives will require making sure that local governments have “skin in the game,” and a good instrument for this would be a matching grant. One avenue is to encourage subnational rainy-day funds by encouraging SNG savings. This could be accomplished with a federal government match for such rainy-day funds. At least in theory this forces the SNG to bear some of the cost. The matching grant solution requires, however, some own-source funds to be effective; hence, it must also be combined with autonomous local tax revenue.

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