

Options for Federal Support of State and Local Finance in an Era of Persistent Deficits

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Abstract:

The United States' federal government subsidizes state and local public finance, most notably through grants. Given projected US deficits however, alternatives are valuable to explore. Additionally a broader range of policy instruments may grant more precise remedy for the difficulties state and local governments face. Herein four policies are considered: beginning with a default option--federal deficit financed grants, federal placement, federal underwriting, and Federal Reserve System interventions are compared. Options are explored in a general framework from the perspective of citizen-taxpayer, local and federal government objective functions. Policy recommendations are for interventions to specify terms of entry and exit (as with automatic stabilizers), and for initiation of simulation exercises to determine the potential of the two policy options identified herein to be most sound.

Key Words:

Fiscal federalism, Public Finance, Taxes, Municipal Finance, Fiscal Policy, Monetary Policy

JEL Codes: H74, H63, E63

1.0 Introduction:

When it comes to public borrowing, the whole is worth more than the sum of its parts. The credit facility of the United States is greater than that of her states. Reasons for this are several, and stem from the powers granted to the federal government in the Constitution. The advantage has compounded over time so as to lead to a significant comparative advantage. Factors behind this evolution include the earned reputation of the United States in credit markets, the opportunity to coordinate long and short term tax and finance policy, broadly, the superior tax administration of the federal government's Internal Revenue Service, and the added robustness of the combined pool of states' citizens' tax capacity. Additionally the regular volume in Treasury debt facilitates a liquid market, one which is managed actively by both Treasury and the Federal Reserve through Open Market Operations (OMOs). These together empower the nation relative to the states from which it is comprised.

The US federal government has used its powers to assist in financing state and local governments, for example through apportionment of federally administered tax collection ahead of the sixteenth amendment (1909) of the US Constitution and the modern revenue sharing policies embodied most commonly in block and matching grants.¹ Focusing more directly on infrastructure, the US federal government grants tax-exempt status to many state and municipal debentures (most recently through the Build America Bond program), and invests directly in key infrastructure, development and technology programs across the fifty states. These in turn enhance local tax capacity. Most recently in the context of the Great Recession, under the American Recovery and Reinvestment Act of 2009 (ARRA) the federal government has awarded

¹ The Nixon Administration's State and Local Fiscal Assistance Act of 1972 is a famous recent example.

over 218.7 billion federal dollars of assistance through July 2010, of which 3.5 billion dollars took the form of loans (1.61 percent) and more than 98 percent represented direct deficit financed aid from the federal government.² Since the passage of the ARRA however the outlook for these federal supports has dimmed considerably. The Obama Administration's National Commission on Fiscal Responsibility and Reform has as its working premise that the current long term fiscal policies are unsustainable (Conrad, 2010).³

It is difficult for one to give that which is not theirs to offer. This paper focuses on public finance and the latent capacity of the Federal government to facilitate a market for state and local debt in lieu of deficit financed grants. I present four scenarios, moving generally from most to least expensive and least to most radical as follows:

- 1- The federal government borrows to facilitate grants to states--deficit financed grants.
- 2- The federal government borrows and actively purchases state and local debt--loans.
- 3- The federal government offers insurance and/or underwriting services to states and municipalities buttressed by a trust fund which is at least initially implicitly financed in part by federal borrowing.
- 4- The Federal Reserve System actively manages a portfolio of state and local debt either through the existing market desk at the New York Fed or broadly, through its regional and affiliate banks.

Of course state and local entities currently take advantage of capital markets, and the federal government currently subsidizes a proportion of these through the granting of Tax exempt status. While the Supreme Court of the United States has State and local issuance is

² See: www.recovery.gov for updated allocations of ARRA related funds.

³ See: <http://www.fiscalcommission.gov/> for updates on Fiscal Commission recommendations.

limited to capital investments, and tax exempt status is capped further under the Tax Reform Act of 1986 (TRA '86). This acknowledged it is possible to consider reforms proposed herein either within the context of TRA '86 or more broadly. For the reader who wishes to confine themselves to the more narrow scope convertibility of current grants (-1-) to the other three fiscal federalist approaches, the policy space considered in this paper is then limited to current transfers which focus on capital development. This is not as limiting as it might first appear, for grants included in ARRA, as well as more generally currently fund a good deal of infrastructure development, including categories traditionally financed by local governments such as school and transportation construction projects. This paper continues as follows: Section 2 provides the reader further context for each policy option, Section 3 develops a formal model to consider incentives in the federalist context, Section 4 offers an interpretation of the model in the context of the four policy options, and Section 5 offers concluding policy recommendations.

2.0 Fundamental Consideration and Historical Precedent for Each Intervention Option

Each of the four policy options presents challenges but none are entirely without precedent or analogue in modern finance. The contribution of this paper is the explicit emphasis on use of federal access to credit markets—that is to say, the expectation that on the margin each of the interventions itself must be financed by Treasury, or monetized to some greater or lesser degree through the Federal Reserve System. Again, for example the Federal Government has engaged in straightforward revenue sharing exercises in the past. However, until recently Debt to Gross Domestic Product ratios were not as big a concern as they now

appear to be (Conrad, 2010), whereas I am explicitly consider distributing borrowed funds by the federal government.⁴ The general intuition to guide the reader is an exploration of the limits to giving away what must be borrowed in the first place. Section 3 offers a formal model that describes a general limit to the usefulness of this policy, and all of the variants just described.

Beginning with policy option -1- the transfer is obvious; the federal government borrows and distributes proceeds to state and municipal governments. The benefit of this sort of approach is that it is simple and that the Federal government can direct the use of funds with less immediate concern for local political and economic circumstance, as the grants are essentially gifts to local government recipients. However there are limits to the usefulness of this approach which derive firstly from the limits of the federal government to finance grants to the states--especially in an era of large and persistent federal deficits, the context for this article. Even ahead of any limit it may make sense to consider alternate structures, both to better leverage the value of contributions, and to incent local government to care about the productivity of engaged public activities. An additional concern with grants is uncertainty regarding their size or emphasis. Anticipation of federal funding may accelerate or delay a state or local government's efforts, and thereby lead to economic disruptions.⁵ For this reason the next three proposed policies are developed.

⁴ Specifically within the Nixon era in which the 1972 act was passed balanced budgets were more the norm, whereas by the time the program was curtailed in 1986, large and persistent federal deficits were a popular concern. "Passed after contentious debate, the State and Local Assistance Act of 1972 initially delivered \$4 billion per year in matching funds to states and municipalities. The program... distributed some \$83 billion dollars before it was killed by Ronald Reagan in 1986..." (Various, 2002-2003).

⁵ For example Steinhauer notes, "California and other states are clearly holding out hope that President-elect [Barack Obama](#) will pump some federal money into the stalled infrastructure projects, and some may even be delaying work until they have a chance to make the case for federal spending."

Under policy option -2- the federal government actively purchases state and local debt. This approach has the benefit of reducing finance costs for both the federal government and the state or local issuer. The federal government has recently begun exploring ways to reduce the total cost of issuance. First, the federal government gains inasmuch as it books an asset on the general ledger, allowing a reduced net debt position relative to policy option -1-. Second liquidity in local debt markets improves. Third and stemming from the two benefits just mentioned, the federal government, in providing liquidity to more fragile markets improves their robustness directly as a participant, and indirectly by means of reputation. The net impact of borrowing from the public to purchase local bonds, fosters convergence in spreads between federal and local bond terms, which can be useful whenever the impact on federal finance terms is negligible. Taking policy option -1- as a baseline it is possible to show that changes to federal terms for any fixed expenditure for a grant (ϵ_{grant}) are greater than or equal to the impact of that same expenditure on local debt (ϵ_{bonds}), since a pure default would simply convert the expenditure under policy option -2- into a grant of the type considered under policy option-1-. Since the likelihood of default is less than one, the impact on federal credit ratings should be lower than under policy option -1-. Additionally, in as much as federal purchase displaces private purchase, the quantity of outstanding tax preferred investments will decline—expanding federal tax capacity. Indeed should public purchase crowd out purchasers in lower tax brackets, the “targeting efficiency” of the muni bond tax expenditure improves as muni rates fall. Table 1 illustrates this point.

<Table 1 here>

The recent introduction of the Build America Bonds (BAB) Program by US Treasury improves targeting efficiency by replacing tax free status with subsidies linked to a single tax bracket, (currently the maximum rate) reducing local financing costs whenever the tax rate of the marginal purchaser would else be lower than the assigned subsidy rate (Kruger 2009), but this policy increases the cost of the tax exemption for federal government when this same marginal purchaser would otherwise have had a lower federal tax rate. What’s more, municipalities that charge capital income taxes gain when local tax payers are displaced/replaced by non payers like the Federal Government. Thus tax expenditures associated with municipal debt subsidies can decline at both the national and local level, and targeting efficiency thereby improves—reducing tax displacement costs of issuance. Accordingly, policy option -2- should improve future revenues, and federal credit ratings relative to policy option -1-. Generally then:

$$1. \quad C_{bonds}(\varepsilon) \leq C_{grant}(\varepsilon)$$

Where ε denotes a level of supported state and local expenditures.

Policy option -3- derives from the observation that it is possible to facilitate an active market without the need for direct purchase. Herein the federal government plays the role of underwriter, or insurer of last resort. The experiences of 2007-2008 reveal the potential for limits to private underwriting and bond insurance programs in this area. During that period, bond insurers’ own credit ratings came under attack as an unrelated product line, mortgage securitization, appeared underpriced relative to risk. Feedback effects reduced the creditworthiness of the state and municipals, fostering illiquidity and a curtailment of issuance, even though there was no direct impact on the credibility of the local governments themselves.⁶ The spread between federal and other public issuance grew demonstrably during this period as a

⁶ See for example “Splitting headaches,” *The Economist* Feb 21st 2008 | NEW YORK

result, hampering state and local governments' ability to plan and invest, in ways that may amplify regional economic dislocations. For example recently California, Virginia, and Kansas reported canceling projects that were midstream in reaction to the thin and dear market for their debt (Steinhauer, 2008). As far as precedent goes, in considering the dilemma of issuance in depressions, Shultz, 1935, describes a motive for states to underwrite local bonds, in analogue to the federal role described here.

The most obvious benefit of this approach is that underwriting can be less costly than direct purchase, in degree to which the bonds sell to private investors at market. Given the precondition that the federal government must borrow in order to assist state and local governments, and setting the magnitude of underwriting as fixed to the level of purchase in policy option -2-, it is clear that in terms of costs C , and net liability NL :

$$2. \quad C_3(\varepsilon) \leq C_2(\varepsilon) \leq C_1(\varepsilon)$$

Notice too that fees collected for underwriting services can be held in trust to further protect the federal governments credit rating, such that

$$3. \quad NL_{policyoption-3-} < NL_{policyoption-2-}$$

Even when an issue critically defaults and the federal government fails to sell a single bond.

Underwriting fees and/or limits to participation may be seen as egregious at first glance but they act not only to improve the federal government's capacity to underwrite but also to avoid persistent crowding out of private underwriters. Indeed reliance on the federal government can be managed via changes in policy that concern underwriting, with the intuitive goal being to accommodate underwriting more or less as last resort. Using an explicit series of absolute and relative credit rating triggers in this regard has the added benefit of encouraging

private underwriters to manage risks derived from other lines of business.⁷ The private firms incentive is now to keep order across lines of business, least one lose the ability to underwrite local government issues until such a time as they are once again competitive. Policy option -3- can improve the market for local issuance, and help state and local governments manage underwriting fees, while preserving a private market as primary for this purpose.

Preserving a private market for underwriting is non-trivial for at least a couple of reasons. First it is critical for managing federal costs and liability accruing from this policy over time. Second, it may be critical for state and local finance at particular times. To see the first point consider equations (2), and (3.) above. Each relies on the idea that the magnitude of underwriting is kept within the level of federal purchases of policy option -2-, otherwise there is no guarantee that these conditions hold. To see the second point consider that while empirically, the federal government has enjoyed better credit facility than more local forms, there is no guarantee that this will always be the case. Reputation is based on performance and thus subject to change over time. It is therefore theoretically possible for any subset of local governments to enjoy a better credit rating than the federal government over some periods of time. Absent a private market, state and local government's access to credit may be hampered by the federal government's rating at some point during an era of persistent deficits in much the same way as it was by private underwriter ratings over the 2007-08 period. Thus preservation of the private market is in local governments' own best interest, and federal underwriting fees should be set accordingly to be greater than zero. Further they must be high enough to make the federal government non-competitive under normal circumstances, such that the state truly prefers the federal government's role be limited to one of last resort. In sum both the limited

⁷ By "triggers" I mean automatic stabilization type mechanisms which guarantee a ceiling on underwriting fees.

entry and pre-announced exit terms are vital to maintaining a role for the private sector, which is important for managing moral hazard concerns, a consideration I turn to next.

Moving to historic precedent there is one final motive for underwriting fees. Underwriting fees on the part of the federal government may arguably be warranted at systemically higher levels if state and local governments perceive the costs of default as lower when issues are underwritten by the federal government—a moral hazard. Indeed there are a couple of precedents here worth noting. First, in 1966 the Canadian federal government embarked on a program of purchasing non-marketable provincial debt (at Canada’s prevailing federal rates of return) as a public pension fund asset. The finance conduit and implicit interest rate subsidy together may have encouraged provinces to take on more debt than they could handle. Though none defaulted, in the late 1970s Ontario declared that it would not repay outstanding obligations. <CITE> A second precedent that warrants considerable attention is the U.S. federal government’s experience with Government Sponsored Enterprises (GSEs) devoted to mortgage facilitation over the period from 1969 to 2008. During this period GSEs were sold to the private sector and expanded their role in the home mortgage market. For most of this period two GSEs in this area, Freddie Mac and Fannie May expanded to dominate the “conforming” market, in the early 21st century they began participating in mortgage backed security markets and in 2007-2008, they were expanded in order to improve liquidity and thereby absorb and contain problems in the market for Mortgage Backed Securities (MBS)⁸.

Policy option -4- is very different than the previous three in several ways, though just as in policy options -2- and -3- the Federal Reserve System books holdings of state and municipal

⁸ The expansion was recommended by many including Paul Samuelson (see: NYT op ed, Nov 19, 2007), and was proposed as legislation even earlier (see: Andrews 2007, and Hossain 2007 for justifications in the realm of political economy).

debt as an asset on its balance sheet. The most obvious way in which policy option -4- differs is that in this case some fraction of the purchases by the Federal reserve are essentially monetized. There are several dynamics of policy option -4- that warrant some degree of attention, I organize them by first considering the case of any one representative local government in the midst of a financial crisis and then moving to the less dramatic example of a continuous means by which to manage regional economic differences, moving finally to the somewhat tangent topic of use for sanitization of Open Market Operations in Treasuries.

As described under policy option -3- it is theoretically possible for the credit of a local government to be better than that of a national one over some period of time. A case where state and local reputations are better than that of the federal government is likely to exist in times when federal administration of persistent deficits is somewhat aggravated. In such a time the Federal Reserve would likely be active in the market for Treasuries, and an overall financial crisis might be part of these circumstances. If that be the case, both private and federal underwriting facilities may be hampered from serving to make market in state and local issues. The Federal Reserve System might find it valuable to participate in state and local debt markets, as in policy option -4-. Considering a single local government with a mandate to finance expenditure (say a referendum is passed to issue school construction bonds, for example) and hold this local government's inherent credit as stable. Under a broad financial and macroeconomic crisis this government may find itself caught in a temporary squeeze which impacts its ability to invest in public goods capacity and to stimulate the economy, both deemed valuable. Federal Reserve participation at auction would reduce the average yield required on these bonds. As with policy option -2, to the extent a Fed purchase displaces alternative private placement, it increases the tax capacity of the Federal government, with resulting positive

feedback for creditworthiness. Whatever the effects magnitude, it is reinforcing inasmuch as it reduces the period for which the federal government's underwriting facility is non-competitive.

Federal Reserve participation leaves the Federal Reserve System with greater facility and a new type of asset on its balance sheet. Interestingly, the finance activity is essentially federal and roughly equivalent to the incremental monetization of Treasuries purchased by the Fed.⁹ As such the asset creates a flow of revenue in interest payments which are by and large refunded to Treasury, thus marginally further improving Treasury's revenue capacity for as long as the debt is held. Of course the debt can be resold and beyond the active management of monetization, this has the potential to benefit the Fed in at least a few ways. First, it allows the Fed to better manage cyclical regional economic differences, and second it may afford the Systems regional affiliate banks an opportunity to gain experience in limited OMOs useful for developing talent within the system, and through regional financial markets. This would likely be of value in particular for crisis management following targeted money-center financial disruptions, be they financial or physical in nature. Finally, State and Municipal debt may afford the Fed some opportunity to sanitize US Treasury based OMOs domestically without relying on stocks of other international assets.

Beginning with the first, it is useful to remember precedent; the Federal Reserve System already has differential rules for clearing house functions across its regions. For example rules on the time before funds from checks are available for use have historically differed by region to

⁹ This said broad application of policy option -4- requires a change in law to be viable as statutory restrictions currently limit the ability of the Federal Reserve to purchase state and local debt with maturities longer than six months. I am grateful to David Wilcox for bringing this constraint to my attention.

foster economic development of distant regions, specifically the west. Currently, region specific changes in policy stem from the reduced use of checks as a method of payment.¹⁰

Additionally, since the 1990-1991 recession there has been an understanding that recession troughs can be regionally unique in timing, the so called 'rolling recession.' In this regard, there is evidence that the Fed's Beige Book is both limited, and yet has the best opportunity to spot and address these differences over time (Poole, 2002). Thus participation in regional public finance may grant the Fed a potential instrument of policy that if managed correctly could improve federal response to local economic conditions.

Next, the second benefit of any such policy might be to improve the fluency of regional banks in operations traditionally reserved for the New York Desk--Open Market Operations. Facilitating these developments would likely improve the quantity and quality of information found in sources such as the Beige Book which has sometimes been criticized as being less timely that policy makers might prefer (see Fettig et al, 1999, for example). Development of this capacity would likely improve the robustness of the Federal Reserve System over unexpected targeted economic disruptions such as occurred following September 11th, 2001. A precedent for the coordinated approach to System function is found in anticipation of "Y2K" when information suggested that facility might suffer at a precise and known moment. While simulation and exercise of distributed function were found adequate in that period, more continuous activity at the regional level might better prepare the United States for unanticipated financial shocks, as a side benefit. Further discussion of the benefits herein are

¹⁰ These regulatory changes are again being rolled out in region specific ways, See for example recent FRB regulatory amendments as listed in the Federal Register, such as the press release affecting clearinghouse function for Region 4 and Region 9 of May 27, 2009.

outside the scope of this paper except to say that geographically targeted attacks might better be accommodated by geographically targeted monetary policy.

Third and finally, the coordinated purchase and resale of state and local debt allow the Fed the opportunity to continually manage assets and to sanitize transactions without resort to international assets, something that might be of use in a variety of circumstances, again more or less outside the scope of this paper, except perhaps as refer directly to the problem referenced at the end of the discussion of policy option -3-, a twin macro-and-financial crisis. In such as case it might be less than desirable to sell international assets to manage any temporary monetization, insomuch as a subset of regions were in better shape financially, the Fed might sterilize operations with sales of assets tied to these regions. This is likely to be a very rare and fleeting circumstance and so is emphasized last.

3.0 The Model

Section 3.1 is as basic outline of steps in the exercises that follow. Section 3.2 develops the model for a single local government that maps to the identical jurisdiction of a nation. Initially the nation and the local government are comprised of a single infinitely lived agent who pays all taxes and benefits from all services. Section 3.3 does away with the assumption of a unique local government. The federal nation is now comprised of a multitude of non overlapping local governments each of whom is comprised of a single infinitely lived agent. This agent is referred to separately as taxpayer and representative, but it is useful to acknowledge up front that given

the local government objective function, the single agent can fulfill both roles without loss of generality.

3.1 Basic Outline

To set up an initial environment a number of simplifying assumptions are made. In particular I presume:

- a- Infinitely lived single tax payer that finances federal and local public goods through borrowing.
- b- That the boundary of the national and the local government are identical.

In this particular environment the difference in value of financing local government through revenue sharing grants is found as change in cost of carry on full debt affected by marginal changes in interest rate. Any grant reduces the required carry of local government, calculated by taking last rates bid at market (full mark-to-market, for the marginal amount borrowed is appropriate).

Approaching a limit to the usefulness of transfers, the tax payer prefers to pay a higher rate on local debt whenever the total benefits resulting from a marginal improvement for local debt are lower than the net impact of a marginal denigration for the national debt. The taxpayer knows this because he/she pays both taxes in full over time.

Now then, because assumption -b- is simplifying to the point of being useless for representing the world in which policy is made, I now allow for multiple local governments such

that for each government $i: i \in I; j \in -i \Rightarrow -i \in I$. This allows consideration of a unique local government objective function. Consider a few possible objective functions:

- $\min (\tilde{\tau}_i)$ -minimizes taxes of local government i .
- $\min (\tilde{B}_i = (\tilde{\varepsilon}_i - \tilde{\tau}_i))$ -minimizes debt of local government i .
- $\max (\tilde{\varepsilon}_{-i} \rightarrow i)$ -maximizes transfers to local government i .

The chosen objective is found to be:

- $\min C_i(\varepsilon_i)$ -minimizes local costs of service provision,

This objective function reduces to be as enlightened as the taxpayer is but no more so.

Now notice that an opportunity exists for majority coalitions of local governments to impose taxes on minority coalitions. This suggests a rationale for federal oversight of terms for supporting local governments. Since exist current limits exist for local tax preferred issuance, a simple solution here would be to install an analogue set of limits to manage local incentives under any of the considered policy alternatives. With this outline now formed I turn next to the development of the full model.

3.2 The Model

Consider an infinitely lived taxpayer who lives in a jurisdiction with bisected authority that is fixed such that some goods are provided by a “federal” government, while others are provided by “local” government. Both levels have authority to issue debt. Debt is held by foreigners in one period increments, such that any debt unpaid in the last period is refinanced. Consider further

that the agent is taxed by each authority, but does not receive direct returns from repayment. Presume that the agent's utility is from consumption of private and public goods, and that public goods satisfy the classic conditions being non-rival and non-excludable, in such a case the agent's interest is to minimize total taxes for any level of public goods, so as to maximize the residual left over for private consumption. The taxpayer's problem is thus:

$$4. \quad \min \sum_{t=0}^{\infty} \hat{\tau}_t + \tilde{\tau}_t \mid (\hat{B}, \tilde{B})_t.$$

Where $\hat{B}, \hat{\tau}$ represent the levels of federal debt and taxation, and $\tilde{B}, \tilde{\tau}$ represent the levels of local debt and taxation respectfully. Assuming that the agent cannot evade taxation, in the naive case the distinction between the federal and the local government is not meaningful because from the foreign investor's perspective, as long as the total indebtedness of both units satisfies the natural debt limit, they are presumed to be equally risk-free. Thus there is no premium or discount on either form of debt and returns from lending are: $\hat{R} = \tilde{R} > 1$. The borrowing constraint is unified such that:

$$5. \quad \lim_{T \rightarrow \infty} R^{-T} B_{t+T} = 0$$

In such a case the agent is indifferent to the transfer of funds between levels of government, even in an extreme where the federal government is a mere shell, issuing all debt, and the local government administers all public goods. Taking either extreme, and all intermediary cases we can see that by the agent's objective function, found as 4., that the condition below is satisfied :

$$6. \quad \sum_{t=0}^{\infty} \hat{R}^{-1} \hat{\tau}_t = \sum_{t=0}^{\infty} \tilde{R}^{-1} \tilde{\tau}_t$$

Now consider two innovations in foreigners' pricing of debt, such that:

-i- "federal" debt is preferred to "local" debt, thus $\tilde{R} > \hat{R} > 1$, given $(\hat{B}, \tilde{B})_t$, and,

-ii- the interest rate is now a function of the level of debt, thus $\forall \{R, B\}, R_t = f(B)_t$, increasing in B .

Given the new lender preferences, notice our taxpayer, by 4., is no longer indifferent to the composition of government finance. By -i-, starting from $(\widehat{B}, \widetilde{B})_t$ would prefer to increase \widehat{B}_{t+1} so as to decrease \widetilde{B}_{t+1} (holding $(\widehat{B} + \widetilde{B})_{t+1} = (\widehat{B} + \widetilde{B})_t$). By -ii- there is some limit to the preference of exchange. Again, by 4. this limit is found to coincide with the tax minimization solution for period t . Each form of debt is refinanced in every period; such that evolutions in $\widehat{R}, \widetilde{R}$ impact the sum of required tax payments. Because our agent is infinitely lived, there are an infinite number of periods, such that we can appeal to the continuous case of 6., at the limit:

$$7. \quad \int_{t=0}^{\infty} \widehat{R}^{-1} \widehat{\tau}_t = \int_{t=0}^{\infty} \widetilde{R}^{-1} \widetilde{\tau}_t$$

Taking a derivative w.r.t both $\widehat{\tau}, \widetilde{\tau}$ we find that in equilibrium, for this case:

$$8. \quad \frac{1}{\widehat{R}} \left(\frac{\partial R}{\partial \widehat{\tau}} \right) = \frac{1}{\widetilde{R}} \left(\frac{\partial R}{\partial \widetilde{\tau}} \right)$$

This sets the proportional limit to optimal use of federal borrowing when local borrowing is biased to be more expensive. Notice that $\widehat{R} \leq \widetilde{R}$. Depending on the functional form of $R_t = f(B)_t$ from -ii-, and the level of B_t (that is the levels of $\widehat{B}_t, \widetilde{B}_t, \widehat{B}_t + \widetilde{B}_t$). That is, it is possible for $\widehat{R} < \widetilde{R}$ when local demand for finance is sated and fully transferred to the feds ahead of convergence in rates, otherwise, $\widehat{R} = \widetilde{R}$. This is driven in part by the assumption that the local and federal jurisdictions are identical, and assuming a rational taxpayer (that is one who observes both federal and local taxes as a function of debt levels) transfers are bound by the

convergence condition, $\widehat{R} = \widetilde{R}$. Thus there is a limit to proportion which is tied to lenders' preference for each type of debt.

3.3 Multiple Local Governments

In this section I relax the constraint that the federal government, I , and the local government, i , map 1:1 in jurisdiction such that the environment now supports: $i \in I; j \in -i \Rightarrow -i \in I$. Assuming competing local governments that adhere to most of the specifications of the Tiebout model (1956) will work well for this exercise, but it is useful to simplify things by allowing each local government to be comprised of a single infinitely lived taxpayer with homogeneous preferences, such that all taxpayers value like bundles of local goods equally.

There are several candidates for a local government objective function and it is worthwhile to consider each of them before settling on one. In what follows three objectives are considered. Each will turn out to inform the chosen objective, which is relatively benign.

To begin, consider the local governments' objective to be,

$$9. \quad \min \tilde{\varepsilon}_i$$

This clearly should minimize $\tilde{\tau}_i$ which is of interest to the local taxpayer. However assuming the $\tilde{\varepsilon}_i$ are of value this is not ideal from the local tax payers' point of view.¹¹ Next consider the seemingly more direct:

$$10. \quad \min \tilde{\tau}_i.$$

¹¹ This is why populist appeals to cut government spending focus on cutting "the fat" or "wasteful government spending."

This in fact minimizes local taxes—a potentially important determinant elected officials’ marketability, however since the elected official does not control $\tilde{\tau}_i$, but rather controls policy for only a period of time, t , say the instrument under control is reduced to be $\tilde{\tau}_{it}$. For an infinitely-lived taxpayer this objective is too crude. Holding $\tilde{\varepsilon}_i$ fixed it is really only possible to reduce $\tilde{\tau}_{it}$ by increasing \tilde{B}_i . Since the taxpayer is obliged to pay \tilde{B}_i in any case, and is aware of this, objective function 10 should not be very saleable. This brings us next to address \tilde{B}_i :

$$11. \quad \min \tilde{B}_i = (\tilde{\varepsilon}_i - \tilde{\tau}_i)$$

Minimizing local debt minimizes the taxpayers’ future obligations, and thus is again tied to elected officials’ marketability. However, in lieu of a specific transfer mechanism between governments this amounts to either the objective $\min \tilde{\varepsilon}_i$ (9.), or increasing $\tilde{\tau}_i$ neither of which is all that appealing. This brings us to a focus on intergovernmental transfers, via an objective like:

$$12. \quad \max \hat{\varepsilon} \rightarrow \tilde{i}$$

Maximizing transfers from the Federal Government enhances local services, and is close to the ideal transfer objective:

$$13. \quad \max (\tilde{\varepsilon}_{-i} \rightarrow i)$$

Objective (13.) is as close as optimal as is possible given the bounds of jurisdiction facing the local government.¹² The difference between the two of course is proportional to the relative tax capacity $\{\tilde{\tau}_{-i}, \tilde{\tau}_i\}$ that funds the transfer referenced in (12.) The only remaining problem then is the announcement of the policy. The taxpayer may feel the proportional increment to be

¹² An empirical exception would seem to be with respect to local consumption taxes which can be set so as to export some taxes over very short time frames. Given the time frame here, I ignore this point. For more on consumption taxes in the context of the local governments’ revenue instrument portfolio see Hou and Seligman 2008, and Seligman and Hou 2005 which focus on substitution impacts on revenue and identify general limits to the use of these taxes.

relatively large or small, rationally, and there is no escaping this, still the elected official may wish to express the objective in a way that does not announce the policy directly to citizens outside of their jurisdiction since this would naturally reduce the likelihood of success in fulfilling the objective. One way to harmonize the taxpayer and local elected officials' objectives and to minimize the affront to competing local governments is with a function like:

$$14. \quad \min C_i(\tilde{\epsilon}_i)$$

This objective announces only the minimizing of the local cost of the bundle of services $\tilde{\epsilon}_i$, very polite. Indeed (14.) is the objective I will consider in what follows.

Now with objective (14.) in hand we turn to the relaxation of the geographic assumption regarding the boundary of the local and the federal government. Recall that:

$i \in I; j \in -i \Rightarrow -i \in I$, such that several local governments exist, and consider the difference between objectives (13.) and (14.). The difference between the two causes the objective of the local government to be as enlightened as the objective of the local taxpayer, and no more or less so. (Direct self interest after all is capped by the proportion of $i:I$ -- in terms of size of budgets.)

Consider again the equilibrium condition given as (8). $\frac{1}{\bar{R}} \left(\frac{\partial R}{\partial \bar{\tau}} \right) = \frac{1}{\tilde{R}} \left(\frac{\partial R}{\partial \tilde{\tau}} \right)$. Which was derived from the taxpayer's objective (4.), $\min \sum_{i=0}^{\infty} \hat{\tau}_i + \tilde{\tau}_i \mid (\hat{B}, \tilde{B})_i$, and note that in the plural case ($\sum_{i=1}^I i > 1$), each of the $\hat{\tau}_i$ is comprised of a proportion, $\{\tilde{\tau}_{-i}, \tilde{\tau}_i\}$ for each $i \subset I$. Thus if we re-express (8.) for the plural case we find:

$$(15.) \quad \frac{1}{\bar{R}} \left(\frac{\partial R}{\partial \hat{\tau}_i} \right) = \frac{1}{\tilde{R}} \left(\frac{\partial R}{\partial \tilde{\tau}_i} \right),$$

Since $\partial \hat{\tau}_i < \partial \hat{\tau}_l$, it follows that the equilibrium interest rate \hat{R} is greater than otherwise, and that the optimal difference is proportional to the ratio of $\partial \hat{\tau}_i : \partial \hat{\tau}_l$. Thus the local tax payer now has an incentive to over-displace debt from the local to the federal level. Further, the incentive is increasing as the proportion $\partial \hat{\tau}_i : \partial \hat{\tau}_l$ declines.

This is perhaps one reason that congressional representation is proportional to the number of citizens (taxpayers) to counter the natural incentives to cost-shift. This counter should be less than perfect though as coalitions can “horse-trade” or “log-roll” their way to transfers. Notice that the minimum winning coalition for a trade is marginally greater than one-half of voting representatives, and that the efficient coalition is very close to the minimum so as to reduce the proportion of $i : -i$, and thus maximize the efficiency of any single transfer. In an infinite period, with a large number of $i \subset I$, several (possibly overlapping) coalitions are likely to form over time and these will ratchet $\hat{B} \rightarrow \lim_{T \rightarrow \infty} R^{-T} B_{t+T} = 0$.

One way to see this is via the simple case where agents have homogenous preferences and information on local government finance is available. Because each taxpayer/representative can then consider the ratio of $[(\hat{\tau}_i + \tilde{\tau}_i) : \varepsilon_i]$ to the average ratio $[(\hat{\tau}_l + \tilde{\tau}_l) : \varepsilon_l]$, whenever $[(\hat{\tau}_i + \tilde{\tau}_i) : \varepsilon_i] : [(\hat{\tau}_l + \tilde{\tau}_l) : \varepsilon_l]$ is less than 1, the taxpayer/representative is aware that they pay disproportionately high taxes, relative to the services they receive. They can work either to reduce transfers to other local governments, or to increase transfers to their own. But previous winning coalitions have a tendency to be stable (conditional on the proportion of voting representatives being close to 1), and so it is easier to increase transfers to their own government through the construction of a coalition than it is to deconstruct previous expansions. Further, once a local government announces the intention to build a coalition, every

representative has an incentive to enter the coalition, so as to attempt to keep their ratio of $[(\hat{\tau}_i + \tilde{\tau}_i) : \varepsilon_i] : [(\hat{\tau}_{\bar{i}} + \tilde{\tau}_{\bar{i}}) : \varepsilon_{\bar{i}}] \geq 1$, and because entry to any single coalition is a scarce commodity (the minimum winning coalition is most efficient from their constituents point of view). There is no natural incentive by which to expect abatement of this momentum up until $\lim_{T \rightarrow \infty} R^{-T} B_{t+T} = 0$ is reached.

This strongly implies the ratio for the optimal displacement $\partial \hat{\tau}_i : \partial \tilde{\tau}_i$ is likely to be violated for all $i \in I$, and that $E(\varepsilon_i) = \varepsilon_i$ is likely greater than optimal. Thus policy option 1 is not realistic, because the augmented equilibrium (15.) is inherently unstable. I note here that policy option 1 is the current default policy of the United States.

4.0 Interpretation of the Model for each of the Policy Options

Granting the instability of (15.) federal borrowing that yields grants to local governments is not optimal. Indeed this problem motivates the paper and thus should not be surprising. Policy option 2 is arguably more stable, but naive stopping rules for purchases can pervert outcomes-- for example the federal government might employ a stopping rule like $\hat{R} = \tilde{R}_i$ conditional on facility, but this too is inefficient because each local government has incentive then to switch their objective from (14.) to (10.) (---that is: $\min \tilde{\tau}_i$), as the ballooning of local debt leads to an increase in \tilde{R}_i , which then drives further federal purchases. Thus the stopping rule must be tied to instability in the private sectors ability to facilitate \tilde{B}_i and not to \tilde{R}_i directly, as described in

Section 2, above. Additionally, one must cap lending as a proportion of debt held by any government i because, default carries the risk by which policy option 2, is transformed to option 1, the grant which has been shown to be unstable. Moral hazard carries with it the risk of a degenerative policy option 2. One traditional partial remedy here is the usual last lender contract preemptions (whereby last lenders subordinate other creditors). This may discourage use of any Federal facility, because private issuers should be wary of any future issuance, it being subordinate. In practice this may work to forestall entry in ways that are useful given the dynamics described in Section 3. Additionally however, I note here that it is also possible for the preemption clause to incentivize prepayment. This would seem to encourage private sector underwriters to stabilize operations, and issue so as to restructure (prepay) federal interventions. Said another way, the existence of superordinated debt may act as a signal of immediate latent demand for private underwriting services, which in turn facilitates the restoration of order to these markets.

The imposition of subordination in any direct purchase (placement, in the traditional sense) may be incompatible with policy option 3, so it is best not to presume subordination in the case that the Federal Government underwrites debt, unless the issued debt comes with unilateral call features, that some Federal issues traditionally have employed--though not since the 1980s. (One rationale for the discontinuation is found by Longstaff, 1992 who finds that Treasury tended to use call options inefficiently, that is rationally, but only after a delay which reduced the value of use. Additionally there is controversy as the pricing impact of the call feature, Jordan, Jordan and Kuipers summarize these issues and investigate mispricing phenomena associated with the call option. In general, callable debt is less valuable to the purchaser who values the fixed income aspect of the instrument.) In either case (that is with or

without subordination) policy option 3 amounts to an incremental move from placement to facilitation an intuitive jump that historically follows improvements in market volumes. It is likely that differences in market conditions should motivate decisions regarding options 2, and 3. Just as uniform pricing and other auction terms are subject to debate, so should the meaning of the differences between these policy options be subject to debate.

Lastly considering policy option 4 in which the Federal Reserve actively participates in these markets--the ramifications of analysis in Section 3 suggest similar to policy option 2 that credible limits to participation must be explicit in any engagement. By policy option 1, and 2 we saw that the local governments face incentives to over-market debt whenever citizens beyond their jurisdiction face some of the costs of repayment. Any monetization of local debt acts in precisely this way shifting costs from $i \rightarrow I$ (or more generally all parties holding currency), thus it would be inadvisable for the Federal Reserve to credit back any of the incremental interest payments to issuing governments--net distributions should instead be transferred to the Treasury. Further in the case that the regional banks were to facilitate transactions their participation should be subject to oversight, and not by any other regional bank (including New York), as one might wish to mitigate any regional incentives across regions, or regional banks. It is possible to conceive of a governance structure which called on units outside of the Federal Reserve System with a stake in actions, such as the Comptroller of Currency. It is further possible that Congress might wish for GAO to engage the process of monitoring periodically to ensure standards are consistent and that reporting and controls are administrated adequately. In any case large scale interventions by the Federal Reserve System should be limited to being of last resort, and smaller engagement, must be monitored both within and outside of the system to ensure that this engagement is not captured, or ever appear vulnerable to capture by either

political or business interests. This suggests a rationale for federal oversight of terms for supporting local governments. Since exist current limits exist for local tax preferred issuance, a simple solution here would be to install an analogue set of limits to manage local incentives under any of the considered policy alternatives—including the current default: outright grants.

5.0 Summary and Conclusions.

The Hippocratic Oath—*‘first do no harm,’* is a useful standard throughout economic policy, but perhaps more when regional and national interests are more and less congruent over time. As with other governance then, a series of checks and balances are needed to stabilize policy over time and limit the erosion of institutional memory, or corruption of stabilizing forces. Announcing conditions for exit is a critical component to any policy innovation. At the same time, as shown within Section 3, without a move away from the traditional grants mechanism, there appears to be a significant and systemic risk to overwhelming Federal debt capacity, and along with that to either the withering of local tax capacity, or an expansion of local services beyond their optimal (preferred) level, or both. Thus ‘doing nothing’ is an option that carries risks of its own. It is likely the case that resources devoted to the design of a policy option 2, and a small regionally distributed policy option 4 should be undertaken in the same way that planning for contingencies does across federal government, be it within the Department of State, Defense, FEMA, FERC, or otherwise. For the time being it is likely not advisable to implement any such program beyond simulations. Policy options 2 and 4 are quite similar except for their process of administration. Policy option 4 engages the Fed, perhaps enhancing regional

presence, and creates new conduits for information gathering on the collective economies that make up the United States. Additionally it creates a new instrument on the Fed's Balance sheet which may have limited use in OMOs, as well as facilitate use of local debt in swaps or serve other reserve purposes.

It remains the case that federal tax capacity and local service delivery hold significant comparative advantages in many instances. When coupled with the likely persistence of Federal Deficits over the foreseeable future, the motivation for innovation away from grants and revenue sharing schemes is larger than otherwise. This can be seen as a continuation of the Federal government's efforts to curtail grants during the tax reforms of the 1980s. Starting from this perspective the reductions in federal tax capacity in the first decade of the 21st century, coupled with increasing expenditure burdens in coming years suggest increased curtailment of revenue sharing should be expected. Starting sooner and at a smaller, more manageable scale is always advisable. Beginning with contingency simulations is advisable as it may help to illuminate the relative costs and benefits of particular administrative and regulatory designs.

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Table 1: Lower marginal tax rates correspond to higher financing costs for local issuers

		Interest Rates				
Taxable:		8.00%	7.00%	6.00%	5.00%	4.00%
Tax free muni rate as a function of marginal rates of last purchaser:						
Tax Rates						
35.0%		5.2%	4.6%	3.9%	3.3%	2.6%
33.0%		5.4%	4.7%	4.0%	3.4%	2.7%
28.0%		5.8%	5.0%	4.3%	3.6%	2.9%
25.0%		6.0%	5.3%	4.5%	3.8%	3.0%

Notes:

*Tax free rate = taxable rate *(1-MTR) of the last purchaser.*
 where: MTR = Marginal Tax Rate