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Are state governments revenue maximizers? Evidence from the sales tax

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Abstract

Analyses of interjurisdictional competition have extensively proved the presence of competition between local governments and the constraining effect of federalism or fiscal decentralization on government size. Few papers have applied local-level theories to the state level, despite the applicability of such theories to larger subnational governments. We apply a Leviathan model of government to state level sales taxes to determine whether states set sales tax rates according to the revenue maximizing rate. We find that states consistently set sales tax rates lower than the rate a Leviathan government would implement.

1. Introduction

At any level of government, capturing consumer preferences for public goods is often a difficult, complex process that has become a subject of much analysis in the public choice literature. In his work on government structure and liberty, *The Spirit of Laws*, Baron de Montesquieu (1777) writes "regard should be had both to the necessities of the state and to those of the subject. The real wants of the people ought never to give way to the imaginary wants of the state." His words are particularly important for those who espouse the benefits of federalism and fiscal decentralization. A more equal distribution of government power through a system of subnational governments (federalism) and granting low-tier governments more spending autonomy (fiscal decentralization) is often believed to be a good way of providing local public goods and limiting the government's ability to extract rents from its constituents. Both federalism and fiscal decentralization have been studied extensively since Tiebout's (1956) seminal work on local public expenditures.

There are many models of government structure and each varies in its assumptions about governmental objectives (Goel and Nelson, 1998; Marlow, 1991). In this analysis we draw on Brennan and Buchanan's (1977) Leviathan model of government in which the government's goal is to maximize its size and will do so in the absence of constitutional constraints or intergovernmental competition. The Leviathan model purports that a Leviathan government will set tax rates that maximize tax revenues. Similar to Tiebout's (1956) conclusions, competition among governments limits the ability of the Leviathan government to extract resources from its tax base into the public sector. One of the most extensive analyses of the Leviathan government and fiscal decentralization is Crowley and Sobel's (2011) paper on government constraints at the local level within Pennsylvania. The authors develop a "Leviathan ratio" which compares average tax rates to revenue-maximizing rates. It is a way to measure the consequence of jurisdictional competition and offers a unique perspective on whether fiscal decentralization can constrain Leviathan governments.

In this paper we extend the work of Crowley and Sobel (2011) by calculating the revenue maximizing sales tax rate and Leviathan ratio for the state sales tax. We do so in order to estimate how close state governments are to being revenue maximizers. Our results have implications of interest to both public economists and policymakers. For example, if we find considerable divergence across states and regions in terms of the "Leviathan ratio" that suggests that state sales tax rates might be influenced by factors such as interjurisdictional competition. In addition, from a normative public finance perspective that should be of interest to policymakers, a Leviathan ratio less than one implies additional state tax capacity.

2. Literature Review

The way a government can be modeled ranges from the benevolent dictator model of government which aims to maximize social welfare, to the Leviathan model of government (Brennan and Buchanan, 1977). A Leviathan government will choose to set tax rates at the peak of the Laffer curve only to be limited by constitutional constraints or interjurisdictional competition. Because consumers are mobile across jurisdictions, a Leviathan government is faced with a serious restriction on its ability to exploit taxes. In other words, fiscal decentralization and federalism should constrain a Leviathan government through increased

competition. Fiscal decentralization forces governments to engage in tax competition, inhibiting a Leviathan governments monopoly on taxation while also matching government spending with the preferences of the people (Rodden, 2003).

Much attention has been given to decentralization as a policy instrument to restrict central governments from taking advantage of its constituents. The concept of transparency aims to enhance the information available to voters concerning government activities so they may be better equipped to vote against poor performance or rent-seeking (Stansel, 2006). Some cross-national studies show evidence that a trend toward fiscal decentralization is connected with transitions to democracy and that average state and local expenditure as a share of the total government sector has increased over time (Panizza, 1999; Bardhan and Mookherjee, 2006; Goldfrank, 2007). Rodden (2004) summarizes the various ways of measuring and defining decentralization. Fiscal decentralization encompasses the balance of expenditures and revenues between governments in which local governments are given more autonomy while simultaneously depressing the central governments ability to control local-level decisions.The most common way of measuring fiscal decentralization is the ratio of local government expenditures to total state-local expenditures.

Analyses of federalism and fiscal decentralization are born primarily from Tiebout's (1956) theory of public expenditure choices and interjurisdictional competition. Oates (1985) goes a step further in developing connections between fiscal decentralization and the Leviathan hypothesis. Historically, local governments grow under fiscal decentralization because citizens wish to grant the public sector with more responsibilities. As a result, over time and across states, the state-local sector has tended to be larger in conjunction with more fiscal decentralization. Work done by Oates (1985) finds little support for fiscal decentralization constraining Leviathan.

Conclusions as to whether the Leviathan hypothesis holds empirically are far from unanimous. Studies that support the hypothesis by Rodden (2003), Fiva (2006), and Stansel (2006) take different approaches yet all arrive at similar results. The size of the public sector is expected to vary inversely with the degree of fiscal decentralization in which the government may find it difficult to act in the best interest of all constituents thus fiscal competition may constrain government. However, this relationship only holds for certain types and funding of decentralization. Tax revenue decentralization is associated with a smaller public sector (in accordance with fiscal competition theories) while expenditure decentralization is associated with a larger public sector which may be due to vertical fiscal imbalance (Fiva, 2006). Rodden (2003) distinguishes between decentralization funded by intergovernmental grants opposed to local resources and notes that decentralization funded by grants may actually increase government spending and size – a result in direct contradiction to the Leviathan hypothesis. There may be a moral hazard problem related to an increased dependence on intergovernmental grants, which encourages local governments to borrow rather than alternate spending behavior when faced with fiscal shortages. The results seems to indicate that it is through decentralization funded by autonomous local taxation that is more likely to decrease government size.

In a similar manner, Crowley and Sobel (2011) analyze whether fiscal decentralization can limit the revenue-maximizing behavior of a Leviathan government by first developing their own unique measure of the level of decentralization inspired by the Leviathan hypothesis. They begin with a theoretical model to determine the revenue-maximizing tax rate

which is a function of the tax rate and the tax base. They then compare the current tax rate to the Leviathan rate and call this proportion the "Leviathan ratio" where higher values indicate less competitive behavior. Using panel data on property tax rates and tax revenue for all levels of local governments in Pennsylvania from 1995 to 2005, they estimate a number of models to examine taxes in three distinct levels of government: municipalities, school districts, and counties. Their results show that local Pennsylvania jurisdictions do set tax rates below the Leviathan revenue-maximizing levels. Municipalities are found to be more competitive with tax rates set further below county rates, which are found to be less competitive. They conclude that fiscal decentralization, measured by a larger number of governments in a given geographic area, does seem to constrain Leviathan and lead to overall lower tax rates.

3. Calculating the Sales Tax Leviathan Ratio

Crowley and Sobel (2011) develop the Leviathan ratio in accordance with the Laffer curve. Tax revenues are minimized at either very low or very high tax rates and are maximized at a rate in between. The Leviathan hypothesis predicts the tax rate that maximizes revenues is the rate a Leviathan government would set in the absence of constitutional constraints or intergovernmental competition. The Leviathan ratio compares the revenue maximizing rate to the actual tax rate as a measure of the extent a government is acting like a Leviathan. Crowley and Sobel specifically follow Garrett's (2001) model to develop the Leviathan model in which total tax revenue is given by the product of the tax rate and the level of the tax base. The tax base is a function of the tax rate in which higher rates diminish the tax base because of reduced incentive to partake in taxable activities. Empirically, the model to estimate total tax revenue for government i at time t is given by:

$$R_{it} = \alpha \tau_{it} + \beta \tau_{it}^2 + \gamma Z_t + \epsilon_{it} \tag{1}$$

where R_{it} is defined as real per capita tax revenue for state i at time t, τ_{it} is defined as the effective average tax rate for state i at time t, Z_t is time-period fixed effects, and ϵ_{it} is a panel-specific error term.[1] The tax rate that maximizes tax revenue, τ_{it}^* is given by:

$$\tau_{it}^* = -\frac{\alpha}{2\beta} \tag{2}$$

The Leviathan ratio is thus:

$$\frac{\tau_{it}}{\tau_{it}^*} \tag{3}$$

Crowley and Sobel (2011) provide a full derivation of the Leviathan ratio calculation. Theoretically, the ratio should take on values between zero and one, in which values closer to one indicate that the governments actual tax rate approaches the revenue-maximizing rate.

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[1]Equation 1 would typically be estimated without a constant because it first assumes that tax revenues are only a function of the tax base and tax rates. There should not be any tax revenue without a tax rate or tax base. However, a Hausman test indicated that we cannot reject the null that a random effects model is efficient. Therefore, our empirical estimates include a constant. The results are nearly identical if we run a fixed effects model without a constant.

Higher values for the Leviathan ratio could be indicative of a preference for more government spending and income redistribution as well as lower intergovernmental competition.

Crowley and Sobel's (2011) empirical model focuses solely on effective property tax rates and revenue for municipalities, counties, and school districts within Pennsylvania for the years 1995 to 2005. By focusing on taxes within one state, certain problems concerning heterogeneity of state or national constitutional constraints on spending may be avoided, yet even local property tax laws can be set on a state-wide basis. Taking into consideration that state-level taxes may face more heterogeneity and constraints than local-level taxes, we estimate Leviathan ratios at the state level for sales taxes using a longitudinal panel of annual tax revenues and effective average tax rates for the years 1970 to 2010 for the 50 U.S. states.[2] We estimate Leviathan ratios for the sales tax as 45 states currently level a sales tax and, unlike income taxes, the federal government does not levy a tax on the same base. To estimate Equation 1, R_{it} is real total sales tax revenue per capita and τ_{it} is effective average sales rates. Data for tax revenues are obtained from the U.S. Census Bureaus State Government Tax Collection reports.[3] To calculate effective average tax rates we use annual state GDP obtained from the Bureau of Economic Analysis.

Table 1: State Sales Tax Leviathan Ratio

Variable	Coefficient	
Effective Tax Rate (α)	42,935	***
	(2,310)	
Effective Tax Rate Squared (β)	-271,618	***
	(37,715)	
Revenue-Maximizing Rate ($-\alpha/2\beta$)	0.079	
N	2050	
R-squared	0.75	

Note: Model estimated using a random effects model. Year effects included but not reported. Standard errors in parentheses. *** indicates significance at the 1% level.

Our regression results used to calculate the revenue maximizing rate are shown in Table 1.[4] Our results are reasonable, in that we find that the revenue-maximizing sales tax rate is 7.9% over this period. While states have access to other tax bases and in some states cities and counties can also have add-on sales taxes, it is important to note that our results in Table 1 are very similar when we include state fixed effects. Constitutional limits on other

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[2]For example, the effective average sales tax rate is found by taking total sales tax revenue divided by state GDP for that year.

[3]We are using "General revenue from sales taxes and gross receipts, general sales." Since all states have some form of gross receipts, our estimates below include all 50 states (even those that do not have a general sales tax).

[4]We estimate our model using a random effect model as a Hausman test indicated that we could not reject the null that the random effect model with year fixed effects was efficient. Our results using a fixed effects model are extremely similar, however.

sources of revenue or alternative entities utilizing the sales tax base are only problematic to the extent that they changed over our period of analysis.

Table 2: Average Leviathan Ratio by State

State	LR	State	LR	State	LR
Alabama	37%	Lousiana	29%	Ohio	30%
Alaska	6%	Maine	44%	Oklahoma	28%
Arizona	40%	Maryland	30%	Oregon	8%
Arkansas	42%	Massachusetts	23%	Pennsylvania	34%
California	29%	Michigan	33%	Rhode Island	39%
Colorado	22%	Minnesota	35%	South Carolina	39%
Connecticut	38%	Mississippi	55%	South Dakota	40%
Delaware	11%	Missouri	27%	Tennessee	40%
Florida	48%	Montana	17%	Texas	34%
Georgia	29%	Nebraska	31%	Utah	35%
Hawaii	58%	Nevada	51%	Vermont	38%
Idaho	35%	New Hampshire	19%	Virginia	23%
Illinois	29%	New Jersey	31%	Washington	54%
Indiana	35%	New Mexico	46%	West Virginia	54%
Iowa	31%	New York	24%	Wisconsin	34%
Kansas	31%	North Carolina	30%	Wyoming	29%
Kentucky	37%	North Dakota	38%		

Utilizing the revenue-maximizing rate from Table 1, we can then calculate the Leviathan Ratio for each state using Equation 3. Table 2 shows the average Leviathan ratio for each state over the time period. Poorer states, such as Mississippi and West Virginia, have higher Leviathan ratios. In addition, there are a number of states without an income tax such as Florida and Tennessee. Even without an income tax, however, we find that they are well below the Leviathan maximizing rate. No clear pattern emerges with respect to interjurisdictional competition, as states with many neighbors have higher and lower ratios.

4. Concluding Thoughts

State governments, even those that use the sales tax as their primary revenue source, do not appear to be acting like Leviathans. Our estimate of the revenue-maximizing sales tax rate might seem low to readers from countries with a value-added tax. However, these estimates are made in the context of a federal system of governments where the federal government already levies extensive income taxation. Were the federal government to have no direct taxing authority, as was the case under the Articles of Confederation (Beaulier et al., 2009), we suspect that the revenue-maximizing sales tax rate would be much higher. Further research could look at Leviathan ratios by state and see how interjurisdictional competition is related, possibly in a spatial econometric framework *a la* Hall and Ross (2010).

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