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## State and Local Debt Burdens in the 1980s: A Study in Contrast

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State and local governments have coped with major changes in their fiscal environment during the 1980s. The impact of tax and expenditure limitations (Joyce and Mullins, 1991), declining federal aid (Nathan and Lago, 1988), and changes in federal tax policy (Courant and Rubinfeld, 1987) all changed the calculus facing state and local fiscal decision makers. While the effects on their tax and expenditure structures have been studied, the impact on state and local government debt policy and management has received scant attention.

In fact, the 1980s were a volatile time for state and local debt policy. Early in the decade, state and local governments faced unusually high interest rates and federal tax changes that reduced the market for tax-exempt debt. These factors encouraged the development of an array of new financing mechanisms; including zero coupon bonds, variable rate bonds, and tender option (put) bonds (Petersen, 1982; Hamilton, 1983). At the same time, state and local governments were under pressure to reduce traditional tax financing (especially property and income taxes) and compete with other jurisdictions for a shrinking pool of manufacturing firms. One of the principal vehicles of state and local economic development policy became the use of tax-exempt debt for private purposes. There was also an explosive growth in the use of nonguaranteed debt to fund public authorities and enterprises (Jump, 1984; Petersen, 1987; Regens and Lauth, 1992). Nonguaranteed debt went from 50 percent of total debt outstanding in 1970 to 71 percent in 1989.

The rapid growth of tax-exempt debt for private purposes led to a debate over whether the federal government should be subsidizing state and local competition (Kaufman, 1981). From a federal perspective, the proliferation of tax-exempt bonds resulted in a significant loss to the federal treasury. Not surprisingly, key components of the federal Tax Reform Act of 1986 (TRA86) were limitations on the use of tax-exempt, and particularly, private-purpose debt. TRA86 reduced the supply of private-purpose tax-exempt debt, limited arbitrage revenues, and affected the demand for municipal bonds, particularly among institutional investors (Petersen, 1987).

This article examines the level and the determinants of the use of long-term debt by state and local governments during the 1980s. We ask three questions: Has the distribution of long-term debt by type, and the overall debt burden, changed in the last decade? What is the nature of the variation among states in these changes? Why have states chosen different levels and mixes of debt burden? We discuss the difficult question of measuring debt burden and then use these measures to demonstrate the changing composition of debt and to docu-

ment the tremendous diversity in debt practices among states. To explain this diversity, we turn to an analysis of whether institutional, fiscal, or socio-economic factors best explain this variation and finally to a conclusion about the implications of these results for state and local government fiscal policy and debt management.

### Measuring Debt Burdens

Measuring and comparing long-term debt burdens has been a centerpiece of municipal credit analysis for decades. Rating agencies, underwriters, and governments have traditionally used debt burden measures to assess the debt carrying capacity of a government and the risk associated with further borrowing (Berne and Schramm, 1986). The measurement of the repayment potential of an issuer is complex and certainly contains a subjective element; however, the assessment of debt burdens is clearly a key component of credit ratings (Standard & Poors, 1989; Moody's, 1989).<sup>1</sup> Despite the long history associated with the use of indexes of debt burden, controversy still exists over measurement and comparison. The basic concept of a debt burden is generally accepted and may be described as a simple ratio:

$$\text{Debt Burden (DB)} = \frac{\text{Debt}}{\text{Debt Carrying Capacity}}$$

The debate over measuring this ratio centers around three issues. What to include in the numerator, i.e., what should be included as government debt? What is the denominator, i.e., all of the income and wealth of the community or only that part which the government can reach? Should debt burden be measured as a stock concept or a flow concept?

### What Is Government Debt?

Traditionally, debt burdens have focused on debt backed by the full-faith and credit of the general purpose government. This would include general obligation bonds and revenue debt backed by government guarantees of repayment. However, the 1980s witnessed the rapid expansion of new debt instruments and an increasing use of public authorities to issue debt. How should these new forms of debt be treated in analysis of debt burdens? A portion of the revenue bonds may be backed by constitutional guarantees and, thus, fall under the category of guaranteed debt. What about debt backed by partial guarantees, such as moral-obligation bonds? The U.S. Bureau of the Census in its classification of debt includes in full-faith and credit debt only those issues where the full taxing power of the general purpose government is guaranteed for repayment.<sup>2</sup> Moral-obligation bonds, which

# The *most rapid growth in the 1980s was in debt not backed by the full-faith and credit of the general purpose government.*

are contingent on legislative appropriation (for any shortfall in project revenue), are classified as nonguaranteed debt. We use the census definition of full-faith and credit debt for this analysis and refer to this as general obligation or "GO" debt.<sup>3</sup>

The most rapid growth in the 1980s was in debt not backed by the full-faith and credit of the general purpose government. Nonguaranteed debt can be divided into two categories, depending on its end use. Debt can be issued by general government or government authorities to support public purposes, usually capital acquisition. Public nonguaranteed debt includes debt backed exclusively by project revenue (revenue bonds), special revenue sources (special revenue bonds), and general appropriation. This later category may include various forms of capital leases between governments (lease-purchase debt) and business and government (certificates of participation, COP); however, classification of leases is controversial. The Census Bureau, for example, includes COPs as nonguaranteed debt and lease-purchase agreements as debt only if a government entity issues debt as part of the lease. Other forms of leases are included in capital or operating expenditures but not recorded as debt. We refer to this category as public nonguaranteed debt or simply revenue bonds.

The second category of nonguaranteed debt includes debt issued principally to support private enterprises. Private-purpose nonguaranteed debt includes, but is not limited to, industrial development bonds (IDBs) and pollution control bonds to support private businesses, hospital bonds to support private hospitals, and mortgage revenue bonds which help finance housing programs (Petersen, 1987). Although this form of tax-exempt debt is now capped, and its value to investors reduced by federal tax reform, it still represents a significant share of state and local debt. For those organizations that collect government debt information, this form of debt is often the most difficult to document because the issuing government may not have adequate records. The Bureau of the Census has systematically collected information on this form of debt only since the early 1980s. We refer to this category as private nonguaranteed debt.

Which forms of nonguaranteed debt should be included in measures of state and local debt burdens? Public nonguaranteed debt represents a limited liability on the part of the government and, arguably, should be considered. If project revenues fall short of what is required to make debt payments, the general purpose government does not have to fill in the difference. However, default of revenue bonds issued by a public authority could affect the credit standing of the general purpose government. The best recent example is the Washington Public Power Supply System (WPPSS) that defaulted on over two billion dollars of revenue debt in 1983. Some evidence exists that the state of Washington and some public utilities paid an interest penalty for their association with WPPSS, at least in the short run (Jones, 1984).

Nonguaranteed debt for private purposes, in contrast, usually involves little risk for the issuing government. The sole guarantee of repayment is the private enterprise that is benefiting from the project. Yet in some sense, private-purpose debt is part of the government debt structure. First, the tax exemption feature carries with it a required state certification that this project is in the public interest, and, second, all such debt ultimately is a claim on the resource base of the state.

We will present debt burdens for all three forms of debt, using information published by the Bureau of the Census. Because of classification changes, public and private-purpose nonguaranteed debt before and after 1988 are not strictly comparable.<sup>4</sup> To our knowledge, a disaggregated analysis of all three debt types on a state cross-sectional basis has not been carried out before.

Debt burden analysis typically involves examination for a single government unit, e.g., a city or a state. However, this unit may share its tax base with other governments. For this reason, the debt burden of a government should somehow take account of debt issued by all dependent authorities or enterprises as well as debt issued by other governments that overlay its tax base (overlapping debt). For a comparative study, such as this analysis of interstate debt-burden differentials, the use of an overlapping debt concept is essential. To focus separately on state or local debt would give a distorted picture of debt burdens because states vary in the degree to which they have decentralized government responsibilities to local governments. The assignment problem is handled here by measuring the aggregate debt burden of the state and the local governments within a state.

## Measuring Capacity for Repayment

The denominator of the debt burden ratio is the resources available to the government to repay the principal and interest due on its debt. There is general agreement that the measure used should reflect the tax or revenue raising capacity of the community, but there is less agreement on how this might be measured. At one extreme, the argument is that the right measure is the revenue raising capacity of the actual tax system in operation in the community. This reasoning would lead many local governments, for example, to argue for assessed value of taxable property as a reasonable indicator of taxable capacity.

Others disagree, noting that "actual" capacity measures can fluctuate between communities because of assessment practices or the level of tax effort exerted by the community. A government with a high tax effort may have more resources to pay off present debt, but less capacity to finance future debt issues.

Other issues are unresolved in the measurement of debt repayment capacity. One is whether federal grants to state and local governments should be factored into the measurement of a state's ability to cover its debt service obligations. Some argue that it is a recurrent source of revenue and although it has undergone long-term decline, it is still of immense importance to state and local government finance. The burden on state residents is in fact lowered by federal assistance. The counter argument is that the measurement of the ability of a state to carry debt should not be contingent on the amount of subsidy that the federal government provides.

**Table 1**  
**State and Local Government Debt Burdens**  
**and the Composition of Debt:**  
**Regions and Selected States, 1982 and 1989**

	Total Debt Burden	Percent of Total Debt			
		Full-Faith and Credit	Total Non-Guaranteed	Public Non-Guaranteed	Private Purpose Non-Guaranteed
<b>1982</b>					
United States	16.0	39.9	60.1	43.5	16.6
Northwest	18.1	42.6	57.4	36.2	21.1
Connecticut	15.2	53.0	47.0	13.1	33.8
New York	22.8	37.7	62.3	48.3	13.9
Midwest	14.5	36.3	63.7	46.0	17.7
Indiana	8.0	22.2	77.8	68.3	9.5
Minnesota	20.8	45.1	54.9	29.5	25.4
South	17.1	38.1	61.9	40.1	21.7
Kentucky	24.3	13.9	86.1	57.4	28.7
Texas	15.4	45.4	54.6	49.2	5.4
West	28.6	36.1	63.9	40.7	23.2
Alaska	108.7	30.4	69.6	45.0	24.5
Oregon	32.3	81.0	19.0	10.4	8.6
Utah	28.5	19.7	80.3	53.0	27.2
<b>1989</b>					
United States	19.2	28.7	71.3	36.8	34.5
Northwest	19.1	32.5	67.5	25.5	42.0
Connecticut	16.5	44.0	56.0	12.1	43.9
New York	23.4	30.9	69.1	39.8	29.3
Midwest	17.2	25.3	74.7	30.9	43.7
Indiana	11.5	15.8	84.2	55.0	29.2
Minnesota	24.5	33.8	66.2	23.1	43.1
South	21.4	25.2	74.8	34.2	40.6
Kentucky	27.3	6.1	93.9	40.0	53.9
Texas	24.3	34.7	65.3	37.7	27.6
West	31.6	30.2	69.8	31.6	38.1
Alaska	103.8	30.1	69.9	16.3	53.6
Oregon	24.3	74.4	25.6	13.8	11.7
Utah	47.1	12.8	87.2	65.4	21.9

Note: Due to changes in the definition of public nonguaranteed and private-purpose nonguaranteed debt since 1987, figures for 1982 and 1989 are not strictly comparable. Regional distribution is based on an unweighted average of percent distribution for each state in the region. Total debt burden equals total debt outstanding as a percent of personal income.

Another issue is whether the taxable capacity or revenue raising capacity of a government should be adjusted to account for the other claims on that government's resources. For example, suppose two states have the same level of debt and the same revenue raising capacity, but state A is beset by serious social problems and a deficient infrastructure whereas state B is not. Do the two states have the same debt repayment capacity?

To avoid these difficult issues, many analysts and agencies have turned to measurement of the underlying capacity to finance debt. The most common measures are full-market property value and personal income. Property values reflect the base of the property tax but may not accurately measure other potential tax bases. Personal income is a more comprehensive measure of the fiscal capacity of a community because all taxes and charges must be paid for by either

income or accumulated wealth. However, personal income does not capture many forms of imputed income and the ability of a community to "export" its taxes onto nonresidents. To correct for this problem, the Advisory Commission on Intergovernmental Relations (ACIR) calculates an estimate of tax capacity for a "representative tax system" (RTS). Included in the tax capacity estimates are business taxes such as severance taxes that may be exported. We examined debt burdens using both personal income and ACIR tax capacity estimates for debt capacity.<sup>5</sup>

### A Stock or a Flow Measurement?

Should debt burdens be measured in terms of the total amount of debt that the population must repay, or in terms of the annual claim on available resources? The numerators in the debt burden measure are almost always the former, some measure of the total amount of debt outstanding. The denominators, however, are almost always annual measures, i.e., this year's level of personal income or the yield potential of the tax system based on this year's tax base. The disadvantage of mixing the stock and flow concepts is that one may end up measuring the future debt commitment at one point in time against the current income measure, which may not reflect the future earning power of the community. The property value indicator of repayment capacity is consistent with a stock measure of debt, but it also may fluctuate over time.

The flow concept would measure the numerator as the amount of principal and interest repayment required to service the debt in the year in question. When measured against personal income or the yield of a representative tax system, it would give a good indicator of the claim of debt on available resources. The problem with this measure is that it does not give an idea of how many years into the future this high or low claim is likely to last.

The availability of data, and the conceptual strength of the measures, make the use of the flow concept for measuring the debt capacity more acceptable. To compare flow capacity measures to total debt outstanding requires the assumption that the current performance of the economic base, relative to the other states being compared, will not change dramatically in the future. This is a reasonable assumption in the time frame that we are examining. The stock concept for measuring debt and the flow concept for measuring capacity, specifically personal income, is used as the measure of debt burden in this article.

## State and Local Government Debt Burdens

We used census debt data and these definitions of debt and debt burdens, to profile the growth in state and local government debt in the 1980s. The results show that some major changes in debt structure and in the level of debt burden have occurred.

### Patterns of Growth

First, it appears that the level of debt burden increased in the 1980s. Total guaranteed and nonguaranteed debt increased

**Table 2****Annual Percent Change in Total State and Local Government Debt Relative to Personal Income by Type of Debt: Regions and Selected States, 1982-87, 1987-90, and 1982-90**

Region and State	Total Long-Term Debt			Full-Faith and Credit Debt			Nonguaranteed Debt		
	1982-87	1987-90	1982-90	1982-87	1987-90	1982-90	1982-87	1987-90	1982-90
United States	4.80	-3.73	1.52	-2.17	-2.77	-2.40	8.57	-4.11	3.63
Northeast	1.67	-1.92	0.31	-3.93	0.14	-2.43	4.99	-2.88	1.97
Connecticut	2.12	-0.39	1.17	-4.63	7.91	-0.11	8.05	-6.17	2.48
New York	4.66	-6.73	0.23	-1.08	-4.64	-2.43	7.46	-7.55	1.57
Midwest	3.25	-3.95	0.49	-3.82	-2.03	-3.16	6.20	-4.55	2.03
Indiana	6.08	1.48	4.33	-2.91	8.71	1.30	8.17	0.17	5.10
Minnesota	5.26	-8.45	-0.11	-3.20	-0.61	-2.24	10.60	-12.19	1.43
South	5.84	-4.75	1.74	-2.81	-4.14	-3.31	9.87	-4.94	4.06
Kentucky	4.17	-6.91	-0.13	-9.55	-8.09	-9.01	5.81	-6.83	0.88
Texas	9.73	-3.45	4.59	3.77	-3.42	1.01	13.84	-3.47	7.01
West	3.52	-6.54	-0.37	0.54	-9.18	-3.22	5.00	-5.44	0.95
Arkansas	1.62	-9.72	-2.79	3.85	-15.72	-3.98	0.59	-6.93	-2.30
Oregon	-1.76	-12.09	-5.77	-3.44	-12.93	-7.11	4.33	-9.74	-1.19
Utah	12.20	-6.70	4.70	3.45	-7.60	-0.84	13.98	-6.56	5.80

Note: Regional growth rates are based on an unweighted average of growth rates for each state in the region.

from the equivalent of 16 percent of personal income in 1982 to 19 percent in 1989. Much of this increase was due to the heavy use of nonguaranteed debt in general and private-purpose bonds in particular. Nonguaranteed debt increased from 60 percent of total debt outstanding in 1982 to over 70 percent in 1989 (Table 1). The pattern, however, was not one of consistent increase throughout the decade.

The overall growth in total state and local debt relative to personal income was quite strong (5 percent per year) during the 1982-1987 period (Table 2) but was made up of a rapid rise in nonguaranteed debt (9 percent per year), which more than offset a decline in full-faith and credit debt. Not surprisingly, the primary source of growth was private-purpose nonguaranteed debt that grew nearly 16 percent per year relative to personal income.

The expansion in debt burden has been choked off since 1987, primarily because of a 4 percent per year drop in the outstanding amount of nonguaranteed debt. The Census Bureau changed its classification of public and private-purpose nonguaranteed debt in 1988, hence we are not able to identify the exact source of the decline. It is likely that the sharp drop since 1987 is primarily in private-purpose bonds as a result of federal tax reform. The burden of full-faith and credit debt continued to decline in the late 1980s.

We disaggregated the data to determine any underlying regional patterns. In all cases, regional differences appeared to be less important than interstate differences within the region. Some examples of the regional patterns and intraregional variations in total debt burden and in debt composition will give the flavor of this result.

- ◆ Total debt burden grew faster than the national average in the South, but slower in the other three regions (Northeast, Midwest, and West).<sup>6</sup> All regions but the West experienced some growth in total debt burdens in the 1980s.
- ◆ The slow growth in overall debt burden in the Northeast was the result of substantial increases in Massachusetts, Pennsylvania, Connecticut, and New Hampshire, and little growth or decline in the rest of the states in the region.

- ◆ Debt burdens in the Midwest region generally grew below the national average during the 1980s. These regional trends mask some significant differences between states. In Indiana and North Dakota, debt burdens grew by over 4 percent per year since 1982, while Nebraska and Kansas experienced declines of over 2 percent per year.
- ◆ Six out of the sixteen southern states had growth in debt burdens over 2 percent per year. The 4 percent growth in North Carolina was driven by local nonguaranteed debt while state full-faith and credit debt actually dropped by over 13 percent per year. In contrast, Louisiana experienced a growth in state debt burdens of 9 percent per year but little growth at the local level.
- ◆ The West was also a region of significant diversity. Overall, debt burdens declined slightly during the 1980s because of drops in both full-faith and credit debt and nonguaranteed debt since 1987. Four states had growth in overall debt burdens of over 3 percent per year, while three states had declining debt burdens of 3 percent or more per year.

### Ranking States by Debt Burden

The results presented in the previous section indicated a tremendous diversity in debt trends and debt composition among state and local governments. As illustrated by the debt indexes shown in Table 3, states with high debt burdens were spread throughout the country. The Northeast region fell at about the national average in terms of total debt burdens (Table 3), and no state in the region ranked in the top ten in overall debt burdens. The highest overall debt burdens in 1989 were in New York and Rhode Island, 22 percent above the national average. Comparisons by level of government show that northeastern states had much more centralized debt issuance than in other regions. Two-thirds of overall debt and 75 percent of nonguaranteed debt were issued by state governments, compared to 40 percent nationally (Table 3). Not surprisingly, centralization of borrowing was a function of

**Table 3**  
**State and Local Government Debt Burdens Relative to the U.S. Average in 1989: State Index by Region**

Region and State	Total	State Government as Percent of Total			
		Full-Faith and Credit	Public Non-Guaranteed	Private Purpose Non-Guaranteed	
Northeast	99	111	70	121	65.1
ME	92	108	71	100	63.6
NH	93	108	29	148	78.3
VT	90	89	59	126	74.5
MA	94	129	50	112	70.8
RI	122	99	59	209	84.6
CT	86	132	28	109	77.1
NY	122	131	132	103	52.2
NJ	90	84	111	71	58.7
PA	106	119	90	111	25.8
Midwest	89	73	76	117	41.0
OH	64	71	51	74	50.0
IN	60	33	89	50	38.0
IL	74	105	39	86	48.6
MI	68	77	61	68	41.6
WI	74	133	50	49	52.5
MN	127	150	80	159	20.7
IA	64	45	52	92	32.6
MO	64	48	48	95	50.2
ND	120	77	52	227	48.8
SD	134	27	79	283	80.0
NE	134	49	258	71	23.3
KS	90	67	51	151	5.0
South	111	95	102	134	36.2
DE	168	121	67	313	76.4
MD	84	133	31	98	39.9
VA	69	65	48	83	39.2
WV	134	59	77	256	44.0
NC	83	66	110	66	20.1
SC	108	90	160	66	40.7
GA	91	75	134	59	17.9
FL	122	64	182	106	18.8
KY	142	30	155	222	39.4
TN	87	103	77	85	21.5
AL	97	118	65	114	41.5
MS	88	100	37	132	27.6
AR	83	42	61	139	38.1
LA	201	235	171	203	58.2
OK	97	51	134	95	44.7
TX	126	153	130	101	11.0
West	164	165	134	195	40.9
MT	123	69	70	226	54.0
ID	55	38	40	86	62.1
WY	184	70	41	433	39.7
CO	110	110	107	113	18.8
NM	139	75	96	238	37.8
AZ	164	141	194	151	12.6
UT	245	109	435	155	17.4
NV	116	168	90	99	34.0
WA	149	166	244	34	24.5
OR	127	328	48	43	66.2
CA	79	44	102	82	32.4
AK	540	566	239	838	53.5
HI	107	262	55	35	79.2

Note: State and local debt burdens (debts outstanding as a percent of personal income) by state relative to U.S. average which is set equal to 100. Regional index is an unweighted average of indexes for each state in the region.

geographic size, with the smaller New England states the most centralized.

Debt burdens in the Midwest were lower, on average, than in any other region, 10 percent below the national average. Seven of the twelve states were in the bottom ten in terms of overall debt burdens, primarily because of below average use of full-faith and credit debt. In contrast, three states were in the top 15 either due to high use of full-faith and credit debt (Minnesota), public nonguaranteed debt (Nebraska) or private nonguaranteed debt (South Dakota). In general, debt issuance was decentralized in the Midwest region. Only 16 percent of full-faith and credit debt was issued by state governments overall and half of the state governments in the region issued no debt of this type (Indiana, Iowa, North Dakota, South Dakota, Nebraska, and Kansas).

Southern states were more diverse in their use of debt. Three of the sixteen states were in the top ten in terms of debt burdens (Delaware, Kentucky, and Louisiana) while one state was in the bottom ten (Virginia). Generally, debt issuance was quite decentralized with 40 percent or less of all types of debt issued by the state. Texas and Florida were ranked among the top ten states with respect to local government debt.

The heaviest use of public debt was among western states with debt burdens 64 percent above the national average in 1989. Six of the thirteen states were in the top ten overall in 1989 (Alaska, Utah, Wyoming, Arizona, Washington, and New Mexico), with most of these states in the top ten for both GO and nonguaranteed debt. Alaska has consistently had the highest debt burdens in the country for the last decade, over five times the national average. In contrast, California and Idaho ranked among the bottom ten in debt burdens. Debt issuance was decentralized with 41 percent of overall debt issued by the state governments.

## The Determinants of Debt Burden Variations

These results suggest that regional averages do not give the right flavor of interstate variations in the debt claim on total resources. It is not uncommon to find neighboring states with significant differences in debt burdens, the type of debt used, and the level of decentralization of debt management. Using a one-way analysis of variance, we tested whether the variation between regions was more important than the variation among regions in (a) debt burden, and (b) the composition of debt. The results did not show a significant regional effect.<sup>7</sup>

What these results told us was that the determinants of interstate variations in debt burden were more state than region specific. We developed an *a priori* model of debt burden determination and then tested it on cross-section data for state and local governments for the 1988-1990 period.

### The Determinants

The dependent variable we proposed to explain was the level of debt outstanding as a percent of personal income. The burden was measured for the aggregate of a state and its

local governments. The dependent variable was specified as all four of the debt burden measures considered above: total debt, the sum of general obligation and public-purpose nonguaranteed debt, general obligation debt, public-purpose nonguaranteed debt.

Borrowing to some extent from the literature on the demand for local public services (Bahl, Johnson, and Wasylenko, 1980; Inman, 1979), we considered four hypotheses about why some states chose a higher debt burden than others.<sup>8</sup> We expected that debt burdens would (a) rise with the demand for services, (b) be higher in states with "big government" tendencies, (c) be a function of the mix of debt instruments used, and (d) change little over time relative to other states and be related most closely to historic levels of debt. The independent variables were estimated for 1988 to 1990 unless otherwise indicated.

*Service Demand.* The first hypothesis was that higher debt burdens were associated with a growth in demand for those government services that required heavy capital expenditures. Most prominent among these services are highways, schools and colleges, utilities, parks, and hospitals. The demand for services is also impacted by the budget constraint, the amount of revenues that the state and local governments can raise to cover the costs of the capital financing.

We included three sets of indicators to capture the demand side effects. Population size (in millions) and population density (hundreds of persons per square mile) reflect the general demand for services brought on by larger populations and by greater rates of urbanization. The growth rate in population over the past five years reflects the pressure to increase infrastructure spending. We expected that population growth and urbanization would increase the rate of capital spending and therefore the debt burden. The effect of population was less clear because the higher demand for services in larger states might be dominated by the economies of size associated with providing services with heavy fixed costs.

To measure the budget constraint, we included real per capita personal income in the state, and the per capita level of federal grants received. We expected that states with a higher per capita income (in thousands) would demand more public services and debt (U.S. Bureau of Economic Analysis, 1991) and would raise a higher level of taxes to support this debt. States with higher levels of federal grants, *cet. par.*, should be able to afford greater levels of capital services.

A series of variables were used to proxy the demand for certain services that were more heavily capital intensive, and each should have been positively associated with the level of debt burden. We expected that states with high per capita enrollment in public schools and colleges would have a higher demand for debt to finance educational facilities (U.S. Department of Education, 1991). Because highway expenditures are a significant part of debt issues, we expected debt burdens to go up with highway utilization, thousands of vehicle miles per person (U.S. Department of Transportation, 1988, 1989 and 1990). Another major category of state capital expenditures is for state parks and recreational facilities. We proxied state park demand with state park acres per square mile of state land in 1989 (National Association of State Park Directors, 1990). We expected these demand factors to exert a positive influence on both the total and the GO debt burden.

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## The other side of this story is that states with a less expansive view of the role of government should choose lower debt burdens.

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Public nonguaranteed debt is likely to be influenced by demand for services provided by public authorities such as utilities. We tested the relationship between per capita energy consumption (billions of BTU per capita) and state and local debt burdens (U.S. Department of Energy, 1991). Heavy debt financing also characterizes public water systems. Using information on per capita domestic water consumption (thousands of gallons per day per person in 1985), we expected that higher water consumption was also associated with higher debt burdens (U.S. Geologic Survey, 1985).<sup>9</sup>

*Expansionary Government.* The second hypothesis was that governments that have a tradition of spending at a high level—providing a broad array of public services—would be more willing to take on a higher level of debt burden. We expected a positive relationship between the per capita level of state and local government current expenditures in a given year and the level of debt burden.

The other side of this story is that states with a less expansive view of the role of government should choose lower debt burdens. We hypothesized that such states were more likely to have strict tax, expenditure and debt limits. A negative relationship was expected between the level of total and GO debt burden and the existence of such limitations. We also expected to find that fiscal limits promoted the use of nonguaranteed debt in that they played to a basic belief that services ought to be supported by beneficiaries.

We constructed several variables to measure the level of state debt limits. Using Hackbart and Leigland's (1990) excellent review of state debt management in 1988, we constructed a 6-point scale to measure state GO debt limitations. A score of 1 denoted states with only simple majority legislative approval of borrowing while a score of 6 indicated states where GO debt was limited to casual deficits or financial emergencies.<sup>10</sup> Using information from NASBO (1987), we were able to identify those states in 1987 that had restrictions on other forms of debt, such as revenue bond limitations. We also considered the relationship between debt burdens and state tax and expenditure limitations (Advisory Commission on Intergovernmental Relations, 1988 and 1991).<sup>11</sup> The hypothesis we investigated was that nonguaranteed debt may be used by some governments as a way to avoid the constraints imposed by a tax and expenditure limitation (TEL).

*Debt Mix.* A third hypothesis was that the level of debt burden was related to the mix of debt chosen. One scenario was that GO and revenue debt were perfect substitutes in which case there was no relationship between the mix of public-purpose debt and total debt burden. Another view was that the availability of revenue debt and private-purpose debt allowed state and local governments to supplement what they raised from GO bonds. In this case, the more they made use



**Table 4**  
**Analysis of State and Local Government Debt Burdens by Type of Debt, 1988-90**

	Total Debt	Total Government Debt	Full-Faith and Credit Debt	Public Non-Guaranteed
Intercept	-0.1895* (-2.041)	-0.0298 (-0.495)	0.0329 (1.140)	0.1634* (3.635)
1977 debt burden	0.1470* (3.313)	0.0984* (3.414)	0.3412* (10.656)	0.1009* (2.230)
Private purpose debt as percent of total	-0.0124 (-0.378)	-0.2396* (-11.270)	-0.0525* (-4.918)	-0.1442* (-6.168)
Current expenditure burden	0.7452* (2.962)	0.2079 (1.273)	0.2232* (2.909)	0.0086 (0.046)
State general obligation debt limit	-0.0058** (-1.857)	-0.0034** (-1.682)	-0.0008 (-0.773)	
State revenue debt limit	-0.0586* (-5.413)	-0.0433* (-6.157)	-0.0120* (-3.365)	-0.0200* (-2.389)
State tax expenditure limit	0.0135 (1.193)	0.0117 (1.588)	0.0166* (5.112)	
Population	-0.1067 (-1.188)	-0.0592 (-1.014)	-0.0957* (-3.207)	0.0405 (0.595)
Population growth	0.3792* (3.764)	0.1960* (2.996)	0.0207 (0.687)	0.0542 (0.727)
Population density	0.0145* (4.727)	0.0097* (4.869)	-0.0016 (-1.645)	0.0059* (2.692)
Real per capita income	-0.0062** (-1.700)	-0.0044** (-1.869)	0.0015 (1.412)	-0.0110* (-4.528)
Per capita college students	1.7699* (2.827)	1.1781* (2.898)		0.7623** (1.671)
Per capita school enrollment	1.0446* (2.878)	0.9673* (4.104)	-0.1229 (-1.176)	
Per capita energy consumption	0.1778* (3.927)	0.0615* (2.092)		0.0025 (0.071)
Per capita water consumption	0.1661 (1.182)	0.1353 (1.482)		0.3074* (3.565)
Per capita vehicle miles			-0.0018 (-1.163)	
Adjusted R <sup>2</sup>	.495	.698	.724	.404

Note: Ordinary Least Squares regression with a sample size of 147. Dependent variable is debt outstanding divided by personal income. Each cell reports regression coefficients and t-statistics (in parentheses).

\* Statistically significant from zero at the 5 percent level.

\*\* Statistically significant from zero at the 10 percent level.

of revenue bonds and the private-purpose issues, the greater would be the overall debt burden. The variables used to measure the mix of debt were public nonguaranteed debt as a percentage of total debt, and private non-guaranteed debt as a percentage of total debt.

*Historic Debt.* The fourth hypothesis was that once a state had reached a high level of debt, it did not choose to reduce its debt to a significantly lower level relative to other states. One reason is that debt is retired slowly, hence it takes a long time for debt burden to change by large amounts. Another is that once states get accustomed to carrying large debt burdens, they have less pressure from voters to ratchet down to lower levels.<sup>12</sup>

Another way to think about this issue is that if the historic level of debt was controlled for in this analysis, then the model would be focusing on explaining changes in the overall level of debt burden. It is less interesting to find that Massachusetts has a higher debt burden than Georgia because it always has had a higher debt burden, than to understand why Massachusetts' debt burden has grown at a faster rate than Georgia's in recent years.

We used three measures of historic debt burden, all measured for the year 1977. They were total debt, GO debt, and

total nonguaranteed debt, each expressed as a percentage of personal income.

### Statistical Results

The estimates of the determinants of interstate variations in debt burdens were made from a pooled cross-section, time series of data for the years 1988-1990.<sup>13</sup> The method of analysis was linear least squares regression.<sup>14</sup> From this analysis, we were able to assess the independent association of each factor with debt burdens and the amount of variation in debt burdens "explained" by these factors. To make the problem of interpretation more manageable, we dropped several of the explanatory variables from each specification because they were highly correlated with each other.<sup>15</sup>

The results of the analysis demonstrated a systematic pattern in interstate variations in the level of debt burden (Table 4). About 50 percent of the variation in total public and private-purpose debt and 70 percent of the variation in total government (public-purpose) debt could be explained, and most of the explanatory variables had the expected sign and were statistically significant.

The specific demand factors (public school and college enrollments, per capita water consumption and energy use) generally raised the level of debt burden. A significantly higher level of consumption of energy or water, or greater enrollments, tended to make overall debt burdens significantly higher. This was true for total debt and for total government debt. These indicators of service use appeared to be more closely related to the interstate variation in government nonguaranteed debt (revenue debt) than that in general obligation debt. The coefficients on the school enrollment and highway usage variables in the GO equation were actually negative, although neither was statistically significant from zero at the 10 percent level.

The results for the population density and the population growth rate variables were significant and positive for most categories of debt burden. Greater levels of population density tended to increase debt burdens, and higher rates of population growth were associated with a greater debt claim on personal income. Based on these estimates, a state with population density of 100 persons per mile above the national average, *cet. par.*, would be expected to have a debt burden that claimed a 1.4 percent higher share of personal income; and an average population growth rate that had been 1 percent higher over the past five years meant a debt burden that would be a .37 percent greater share of income.

States with larger populations and higher per capita personal incomes did not incur greater debt burdens. In fact, when all else was accounted for, these states had significantly lower debt burdens. The results for population size suggested weak economies of size with respect to capital intensive services such as highways and utilities. As we discuss later, the negative relationship between income and debt burdens suggested that borrowing was not constrained by capacity to finance debt.

The argument for the expansionary government effect also appeared to hold up. A higher level of current expenditures, *ceteris paribus*, was associated with a higher total debt burden.<sup>16</sup> The bond limit variables also had the expected effect of dampening the total level of debt burden. An increase in the stringency of the state GO debt limit from category 4 to category 5, for example, was associated with a .6 percentage point reduction in total debt burdens. The existence of a state revenue debt limitation was especially powerful with a 6 percentage point drop in total debt burdens.

Our results are generally consistent with past empirical research on public debt that has focused on the impact of debt limits (Bunch, 1991; Farnham, 1985; MacManus, 1981). Generally, these studies have found that state-imposed limitations on state or local general obligation debt has reduced issuance of both GO and nonguaranteed debt and may have led to the proliferation of public authorities. Our results suggest that the stringency of a state's debt limit appears to negatively affect the level of total debt and public nonguaranteed debt. There may exist a general antidebt climate in some states that discourages all forms of debt.

We also found a positive relationship between state tax and expenditure limitations and the level of total government and GO debt burdens. The results for full-faith and credit debt run counter to the view that TELs discourage GO debt issuance because debt payments will come from general taxes,

*The stringency of a state's debt limit appears to negatively affect the level of total debt and public nonguaranteed debt. There may exist a general antidebt climate in some states that discourages all forms of debt.*

and lead to substitution of nonguaranteed debt.<sup>17</sup> This suggests that the reaction of state and local governments to TELs, at least in terms of debt policy, is a more complicated one.

The results on the relationship between the mix of debt and the level of debt burden do not show that states that resort to more use of nonguaranteed debt systematically carry a higher debt burden. In fact, our analysis suggests that GO and nonguaranteed debt are substitutes. In addition, state and local governments within a state appear to substitute private-purpose nonguaranteed debt for government debt.

Finally, there is the question of the influence of historic debt levels. Our results here show clear support for this argument. Current levels of debt burden are significantly influenced by debt decisions that were made far in the past. The lagged variable is significant for every measure of debt burden, and is especially important for full-faith and credit debt.

## Conclusions

Much has been written about the explosion of state and local government debt in the 1980s, and the extent to which this was attributable to the usage of nontraditional forms, *i.e.*, nonguaranteed public and private debt. The level of state and local debt rose from 16 percent of personal income in 1982 to over 19 percent in 1989. However, since 1987, there has been a pullback, especially in the issuance of private-purpose debt, as a result of tax reform, new limits on certain types of debt, and fiscal limits in states.

This study examined the interstate variation in this trend in an effort to identify the determinants of debt burden variations among the states. The results showed that changes in the level of debt burden in the 1980s can be partially attributable to increases in the demand for capital intensive services, and the preference of a state for a generally larger role for its governments.

Although results have to be thought of as tentative, at best, because of limitations in the data, the possible policy implications are important. First, if public-purpose and private-purpose bonds are substitutes, as is suggested by these results, then the capping of private-purpose bonds will not significantly reduce the level of tax-exempt debt chosen by state and local governments. Instead, governments are likely to issue more GO and public nonguaranteed debt to ultimately support private purposes.

Second, demand factors and institutional constraints rather than capacity to finance seem to have driven the level of debt

burdens. Poorer states, we found, tend to have a larger debt burden than richer states after all other factors are taken into account. These results imply that federal aid, especially for capital projects, will be used primarily as a substitute for borrowing and may not lead to a significant increase in infrastructure spending. Our findings highlight the need for states to rethink debt policy in terms of their fiscal capacity. In this regard, it is important in future research to establish whether poorer states are avoiding present fiscal constraints by offloading high-debt burdens onto future generations. Closely related, debt limits appear to be associated with significantly lower levels of debt burden, but that tax and expenditure limitations have the opposite effect.

This area begs for more research. Problems exist with the conceptual measurement of debt burden and with the data collected to make this measurement. No formal model exists of the political process that leads to the debt versus tax decision, and careful case-study work is needed on the relationship between the level of debt chosen and the types of debt instruments used.



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### Notes

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1. Early research on factors influencing bond ratings found debt ratios to be the primary determinants (Bahl, 1971; Rubinfeld, 1973). Rating agencies came under heavy criticism in the mid-1970s for the "black box" nature of this process. Since that time, rating agencies have been more open about rating decisions, and it is fair to say that significant improvements have been made in the quality of the rating process. Recent studies of bond ratings have found economic factors to be particularly important; however, debt ratios are still significant (Cluff and Farnham, 1985).
2. Until 1987, the Bureau of the Census published information separately on GO debt and guaranteed revenue debt for state governments. GO debt accounted for 82 percent of state government full-faith and credit debt in that year, while guaranteed revenue debt was only used in 13 states. It accounted for 25 percent or more of full-faith and credit debt in 7 states, with Ohio (74 percent), Oregon (91 percent), and Virginia (81 percent) particularly heavy users.
3. The Bureau of the Census calculates a measure of "net debt" which excludes all forms of "self-sustaining debt" such as sinking funds and reserve funds and most forms of nonguaranteed debt. Because this measure is only calculated for the state government level and because it ignores most nonguaranteed debt, it was not used in this article. In a sense, other forms of long-term commitments, such as unfunded pension liabilities, are a form of debt placed on future generations. We do not take this broader view of debt primarily because of data limitations.
4. The basic source for the debt data that we used is an unpublished data file provided by the Bureau of the Census. These data include a detailed breakdown of debt by type and issuing government. The definitions of the different categories were confirmed based on a number of telephone conversations with census officials, who were careful to point out potential inconsistencies in the time-series definitions. The principal inconsistency involved the definition of public nonguaranteed debt and private nonguaranteed debt. Beginning with 1988, the private-purpose category included debt (primarily for private hospitals) previously classified as public nonguaranteed. In addition, Census officials felt that state records on private-purpose debt improved with the passage of TRA86. Thus, part of the apparent growth in private-purpose debt since 1988 may be from more complete reporting.
5. We did not find major differences between relative debt burden using either personal income or the RTS tax capacity measure, so we used personal income since it is available on an annual basis. A good review of the issues surrounding the measurement of fiscal capacity is presented in U.S. Department of Treasury (1985) and Ladd and Yinger (1989).
6. We calculate unweighted regional means in this article. Because this approach gives each state an equal weight, it is more consistent with our emphasis on intraregional variation.
7. The F-statistics estimated from the ANOVA by region for the different debt burden measures and the variables measuring distribution of debt by type were not statistically significant from zero at the 5 percent level. The one factor where there appeared to be a regional effect was in centralization of debt issuance at the state government level. The ANOVA was carried out for the four major census regions; Northeast (9 states), Midwest (12 states), South (16 states), and West (13 states).
8. While the empirical literature on state and local government debt decisions is relatively sparse, a fairly large theoretical literature examines the optimal level of municipal debt and capital spending and the impact of state imposed debt limitations. This literature has produced mixed results on the "rationality" of local debt decisions and the need for debt limitations (for example, Holtz-Eakin and Rosen, 1989; Epple and Spatt, 1986).
9. Ideally, we would have made a detailed adjustment of energy and water usage to reflect the amount of utility services delivered by public vs. private utilities. Unfortunately, data were not available for this adjustment.
10. The scale is as follows: (1) simple majority legislative approval of borrowing (MD, NH, TN, and VT); (2) extraordinary legislative approval required (DE, IL, IA, MA, MN, MT); (2) voter approval required for borrowing (AK, AR, FL, MI, NM, NY, PA, OK, VA, WA); (4) flexible debt limits which are tied to growth of some other factor such as property values (CT GA, HI NV, NJ, NC, SC, SD, UT, WI, WY); (5) fixed dollar limit on debt (AL, CA, CO, ID, KS, ME, ND, OR, RI); and (6) GO debt limited to casual deficits or financial emergencies (AZ, IN, IA, KY, MS, MO, NE, OH, TX, WV). We created the scale from a more detailed breakdown of debt limits in Hackbart and Leigland (1990).
11. Most states impose some sort of restriction of local GO borrowing and some have local TELs. We also constructed variables to measure the stringency of the local GO debt limitation, the requirement of a local debt referendum, and the existence of a local TEL. These limit variables were not found to significantly affect the combined state and local debt burden so were dropped from the final model. A discussion of these variables and the empirical results are available from the authors upon request.
12. New York has long carried a heavy burden of short-term debt that must be financed every spring. This would be a major political issue in most states, but New York voters seem to have long ago discounted the effects of this practice. For a good discussion of short-term deficit borrowing in New York, see Green (1991).
13. The sample includes three years of data (1988 to 1990) for all states except Alaska, which was dropped because it was an outlier (sample size of 147). We used a pooled, time-series approach because the additional observations may make it easier to identify important factors affecting debt. The years 1988 to 1990 were selected because the definition of nonguaranteed debt by the Bureau of the Census was consistent during that time. To test whether we could pool these observations, we used an F-test of structural change in the intercept and slope coefficients of the final regression equations (Johnston, 1984). We could not reject the null hypothesis at the 5 percent level that all three years come from the same underlying population.
14. The basic method we used was ordinary least squares (OLS) regression. We checked for heteroscedasticity with a White Test and could not reject

the null hypothesis at the 10 percent level that there was no heteroscedasticity problem. We checked for multicollinearity in the final model and did not find any problem except between per capita income and the intercept, since per capita income does not fluctuate very much. We kept this variable in the model, but it is likely that its standard error is biased upward. Finally, we checked for nonlinear relationships using residual plots with key independent variables and did not find a specification problem. We also fit the model in double-log form as an alternative. The fit of this model was much poorer than for a linear specification.

15. Variables dropped from all the final models included per capita federal grants, state park land, and local debt limits and TELs. The variables for state TELs and per capita vehicle miles were dropped from some of the models. We also checked for interaction effects between the debt limit variables and other key independent variables such as population, population density, population growth, and per capita income. All of the interaction terms were statistically insignificant, except the relationship between population and state GO debt limits. The coefficient on the interaction term is negative and the coefficient on population becomes positive. Although the interpretation of this result is not straightforward, it suggests that more populated states may be less likely to use stringent debt limits. Because of the tentative nature of these results, we have not used this model in this article. However, in future research in this area such interaction effects should be carefully considered. The regression results for the full model and the interaction model are available from the authors upon request.
16. Because borrowing will lead to increase operating expenditures to finance debt service payments, we used current expenditures minus interest payments as our measure of expenditure burden.
17. Although tax limitations, especially on local property taxes, have been around for many years, the passage of Proposition 13 in California signaled a new interest in more comprehensive limitations particularly at the state level. A growing literature focuses on the impact of TELs, not only on the size of government, but on the revenue and expenditure structures of state and local governments (see Joyce and Mullins, 1991). In this literature, some research links the existence of a TEL to the shifting of debt usage from GO to nonguaranteed debt. Most of this research is descriptive in nature and focuses generally on property tax limits at the local level during the late 1970s (for example, MacManus, 1981). Sharp and Elkins (1987) find only mixed support for this hypothesis in their study of seven cities in Missouri.

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