

Debt Burdens of California State and Local Governments: Past, Present, and Future*

As requested and supported by the

California Debt and Investment Advisory Commission (CDIAC)
State Treasurer Bill Lockyer, Chair

Submitted by

Robert W. Wassmer, Ph.D.
(Investigator)
Chairperson and Professor
Department of Public Policy and Administration
California State University, Sacramento

Ronald C. Fisher, Ph.D.
(Investigator)
Professor
Department of Economics
Michigan State University

With the Research Assistance of

Hassan Enayati and Michelle Maxfield
Doctoral Students in Economics
Michigan State University

July 2011
(Final Draft)

*Though the funding necessary to conduct the background research for this report was provided by the CDIAC, the views offered here are only the authors' and do not necessarily represent CDIAC opinion. Terri Sexton (Professor of Economics at Sacramento State), and Mark Campbell, Brian Covi, and Douglas Skarr (Analysts at CDIAC), offered helpful comments that made this document better. Any errors that remain are the authors' own.

Table of Contents

<u>Summary</u>	p. 7
General Objective and Results	p. 7
Measuring and Evaluating Debt	p. 9
Unfunded Public Pension Costs	p. 11
Comparability Analysis	p. 12
Recent Developments	p. 13
<u>Preface</u>	p. 16
<u>I. An Overview of State and Local Debt</u>	p. 18
Types and Purposes of Debt	p. 21
Magnitude of State and Local Debt	p. 27
Unfunded Public Pension Costs	p. 34
California Debt Issues	p. 39
What Remains	p. 47
<u>II. Methods for Policymakers to Evaluate Debt</u>	p. 49
<i>Affordability</i> : Demands on Economic and Fiscal Resources	p. 49
<i>Optimality</i> : Optimal Investment in Public Services and Facilities	p. 53
<i>Comparability</i> : Comparison to Other Similar Governments	p. 55
<u>III. California Compared to Other Selected States</u>	p. 57
School District Debt	p. 65
<u>IV. Regression Analysis of Subnational Debt</u>	p. 70
Previous Research on Differences in Subnational Debt Activity within a State	p. 71
A Regression Model of Determinants of State Debt	p. 76

Regression Results	p. 79
Interpretation of Regression Results	p. 82
Summary of Debt Conclusions from Regression Findings	p. 90
<u>V. A Descriptive and Regression Examination of Recent State and Local Bond Activity</u>	p. 93
Recent Traditional State and Local Bond Issues	p. 93
Per Capita Comparisons	p. 94
A Comparison of Long-Term Bond and Build America Bond Issues	p. 94
A Regression Examination	p. 104
Summary of Bond Conclusions from Descriptive and Regression Findings	p. 115
<u>VI. What Does this All Mean for California’s Debt Load?</u>	p. 117
<i>Compared to the previous research, what has this research contributed to our knowledge of debt burdens?</i>	p.117
<i>How should the state legislature and local governing boards evaluate the rising debt loads?</i>	p.118
<i>Under what circumstances should California governments determine they are issuing “too much,” “too little,” or the “right amount” of debt?</i>	p. 120
<i>How are California state and local debt burdens likely to change in the future?</i>	p. 120
<i>How should government debt managers discuss debt loads with their governing boards?</i>	p. 121
<i>Is it practical to evaluate debt loads in the context of an entity’s operating budget?</i>	p. 121
<i>What are the likely impacts of such a requirement and what would be the technical and practical difficulties and costs associated with implementing such a requirement?</i>	p. 122
<i>Should the legislature consider providing more oversight of local debt loads? Should it</i>	

require greater reporting of debt loads to state and local officials?

p. 123

What important questions remain regarding debt burdens? Provide suggestions for further research.

p. 124

References

p. 125

Figures

Figure 1: Categories of Long-Term State and Local Debt	p. 24
Figure 2: United States State and Local Bonds Issued by Type	p. 25
Figure 3: United States Shares of State and Local Bonds Issued by Type	p. 26
Figure 4: United States Real (2009 Dollars) Per Capita State and Local Debt by Type	p. 29
Figure 5: United States State and Local Debt as a Percentage of GSP by Type	p. 30
Figure 6: United States State and Local Debt as a Percentage of Annual Revenue	p. 31
Figure 7: United States Share of Long-Term State and Local Debt by Government Type	p. 33
Figure 8: United States Interest on State and Local debt as a Percentage of Annual Revenue	p. 35
Figure 9: Debt Per Capita for California and Comparable States	p. 62
Figure 10: Debt as a Percentage of General Revenue for California and Comparable States	p. 63
Figure 11: Share of California Long-Term Debt by Type of Government	p. 66
Figure 12: Real Non-Taxable State-Local Bond Issues, by Length and Year	p. 97
Figure 13: Per Capita Build America Bond Issues by State, 2009 – 2010	p. 98
Figure 14: Per Capita Non-Taxable, Long-Term Bond Issues, 2008 – 2010	p. 99
Figure 15: Non-Taxable Bond Issue Volume, 2008 – 2010, Relative to Historic Debt	p. 102
Figure 16: Build America Bond Issue Volume, 2009 – 2010, Relative to Historic Debt	p. 103
Figure 17: California Non-Taxable and Build America Bonds Compared	p. 106

Tables

Table 1: United States Total State and Local Government Debt Outstanding	p. 20
Table 2: State Pension Funding Estimates for all United States (2009 real trillions of dollars)	p. 38
Table 3: California Debt Issues Per \$1,000 Gross State Product by Category and Years 1992-2009	p. 41
Table 4: California Debt Issues Per Capita (2009 Real Dollars) by Category and Years 1992-2009	p. 42
Table 5: California Debt Issues Percent of Total by Category and Years 1992-2009	p. 43
Table 6: Comparison of Debt in California and Selected States in 2007	p. 59
Table 7: Comparison of Debt in California and All Other States in 2007	p. 61
Table 8: Change in State and Local Debt Amounts from 1992 to 2007	p. 64
Table 9: Comparison of School District Debt in California and Selected States in 2007	p. 67
Table 10: Debt Regressions Variable Description, Source, and Descriptive Statistics	p. 80
Table 11: Debt First Differenced Regression Results (2002-1997, 2007-2002)	p. 81
Table 12: Debt Fixed Effects Regression Results (1997, 2002, 2007)	pp. 83-84
Table 13: Debt Fixed Effects Regression Results (2002, 2007)	pp. 85-86
Table 14: Per Capita Build America Bonds Issues, 2009 – 2010	p. 95
Table 15: Per Capita* Real Non-Taxable, Long-Term Bond Issues, by Year and State	p. 96
Table 16: Non-Taxable Bond Issue Volume, 2008 – 2010, Relative to Historic Debt	p. 101
Table 17: Build America Bond Issue Volume Relative to Historic Debt	p. 105
Table 18: Bond Regressions Variable Description, Source, and Descriptive Statistics	p. 109
Table 19: Bond Regression Results (2008 to 2010, or 2009 to 2010)	p. 111
Table 20: Bond Regression Results with CA Dummy (2008 to 2010, or 2009 to 2010)	p. 112
Table 21: Statistically Significant Elasticities from Table 19	p. 113

SUMMARY

General Objective and Results

The purpose of this commissioned report is to advise policy makers on how to evaluate the overall level of outstanding public debt (from here on just referred to as debt) in California. It does this by examining how various measures of the debt of California's state and local governments changed between 1992 and 2007, and then compares these changes to changes to similar measures in the national average, and to changes in specific other states. It also examines the issue of new subnational debt by state for the recent period between 2008 and 2010. We summarize the results of our analysis next.

For multiple reasons it is appropriate for interstate comparisons to examine aggregate state and local government debt (state government and local government debt in a state added together), rather than the debt incurred by state governments alone. Here, the distinction between state or local debt is based upon the level of government offering it. States differ dramatically in the degree to which the state or its local governments take responsibility for generating revenue, providing public services, and issuing debt. Examining only the state government component of the state and local fiscal system offers misleading comparisons across the states. Some state government authorities incur debt on behalf of their local governments. In other states, local governments are responsible for incurring debt directly. In every state, state governments generate revenue they then distribute to local governments in the form of intergovernmental grants that differ widely in magnitude. In some states, local governments can only incur debt after approval of the state government. Clearly, there are legal, economic, and political links between the fiscal behavior of a state government and its local governments that

differ in every state. For this reason, when making our interstate comparisons of debt issuance we consider the combined state and local government sector as a single entity.

Since 1992, compared to total gross state product (GSP) and in per capita terms after correcting for inflation, state and local debt throughout the United States has increased. The bulk of the increase in state and local debt since 1992 was in long-term debt for traditional public purposes, and particularly long-term debt held by school districts. Nationwide, long-term school district debt increased from 6% of total state and local long-term debt in 1992 to 13% in 2007.

Despite the increase in the relative magnitude of state and local debt since 1992, interest paid on that debt by state and local governments in aggregate decreased relative to annual revenue, declining from 5.5% of revenue in 1992, to 4.5% in 1997, 4.8% in 2002, and 3.5% in 2007. This resulted from a combination of changes in debt relative to revenue and changes in the interest rates that state and local governments face.

The issuance of subnational (state and local) debt in California between 1992 and 2007 roughly parallels the national situation. Comparing California to the national average and to four other large, highly urbanized states (Florida, Illinois, New York, and Texas) and one other state (Arizona) that borders California, the debt of state and local governments in California in 2007 are not substantially different relative to the size of its GSP or subnational government spending than in these other states. What California has done differently is issue relatively less public debt for private purposes.

A substantial portion of the increase in long-term debt in California since 1992 has arisen from greater borrowing by school districts. Between 1992 and 2007, the debt of California's school districts increased from 1.4% to 15.1% of the state's total long-term subnational debt. The state government's share of long-term debt remained at about 34% of the total, whereas the

shares for other types of local governments – counties, municipalities, and special districts – declined. Over this 15-year period, the issue of long-term school district debt as likely replaced (at least partially) the issue of long-term debt by other local governments.

For all state and local governments in 2007, interest paid on debt took 3.2% of total subnational revenue in California, whereas it took a larger 3.5% nationally. Interest payments made by California’s subnational governments as a percentage of their revenue is nearly the same percentage as observed for Arizona and Florida, and relatively less than observed for Illinois, New York, and Texas. Annual interest payments made by California’s school districts as a percentage of their annual revenue measure 2.6%. Nationally the percentage is higher at 2.8%.

Measuring and Evaluating Debt

Measuring the magnitude of debt that a state or local government has incurred traditionally involves comparing aggregate debt (a “stock”) or components of that total debt (such as long-term debt) to various annual measures of fiscal and economic capacity (which are “flows”). In this report we present three measures of relative state and local debt burden: (1) real debt per person (that is, debt adjusted for inflation divided by population), (2) debt as a percentage of gross domestic product for the jurisdiction, and (3) debt as a percentage of the appropriate annual government revenue. We also examine the annual cost to the government from outstanding debt (that is the annual interest payments on the debt as a percentage of annual revenue).

In 2008, outstanding state and local government debt in California was \$345 billion or about \$9,310 per capita. This amounted to 18.5% of California’s gross state product (GSP) and about 96% of that year’s revenue for all California’s subnational governments. State government

issues accounted for about 36% of that debt. In 2008, annual interest payments on the outstanding debt required 3.8% of total state and local revenue in California.

Data suggest that the amount and pattern of state and local government debt in California is not substantially different from the aggregate observed for all states. In 2008, state and local governments in the United States had accumulated a total outstanding debt of nearly \$2.6 trillion or about \$8,560 per person in 2009 dollars¹. This debt was almost 18% of total GSP and 96% of annual revenue. State governments account for about 39% of the total subnational government debt in the United States. In 2008, annual interest payments on the outstanding debt required 3.8% of total state and local revenue.

Conceptually, an assessment of subnational debt can occur by examining “affordability,” “optimality,” or “comparability.” Affordability involves comparing debt levels to the magnitude of the economy or to the size of the government budget, either currently or to a forecast of the future. Optimality recognizes the tie between debt and investment in public capital. The issue is whether government is investing in the quantity and quality of public capital desired by residents and financing the appropriate share of that cost with debt. This requires evaluating the uses of debt. Comparability involves evaluating debt by comparing to other “similar” governments, allowing for important differences in circumstances.

For the comparability approach, we offer a statistical “regression analysis” of the levels of state and local debt issued by the 50 states between 1992 and 2007. Such an analysis allows one to quantify the factors that have influenced differences in debt across the states over the period observed, and to determine if state-specific trends beyond these expected causal factors have caused California’s debt load to be above or below that observed in other states. This

¹Throughout this report we translate historic dollar values into 2009 equivalent dollars so they are more easily comparable to current dollars. We could not translate into 2010 equivalent dollars because the deflator to do this was not yet available.

regression-based comparison offers one way of determining whether California is out of line compared to other states regarding its degree of state and local debt activity. We model differences in debt levels across states (similar to earlier research) as caused by demographic, political, economic, institutional, and time invariant state-specific factors

Unfunded Public Pension Costs

In addition to subnational government debt incurred through the issuance of bonds, the concept of state and local “debt” should perhaps include other future financial liabilities of state and local governments. In particular, future pension costs and post-retirement health care costs of past employees are liabilities that represent deferred compensation to employees. Depending on contractual and other legal aspects, as well as the governments’ practices of funding this deferred compensation, these liabilities may also represent a claim on future public receipts and assets.

Depending on the estimation method, in 2008 state pension programs exhibited unfunded liabilities in the range of \$1,060 to \$3,270 billion (see Novy-Marx and Rauh, 2009). In comparison, state and local government outstanding financial market debt in fiscal year 2008 was \$2,580 billion. Comparison of these different financial liabilities is difficult, not only because of the legal distinctions, but also because of the variability in pension liability estimates by time and evaluation method. Nonetheless, a reasonable approximation is that the unfunded future pension liabilities of state and local governments range from 50% to 100% of their traditional financial market debt. Given this magnitude, it is imperative to consider a state’s future pension liabilities when considering whether its traditional debt load is “sustainable” and/or “affordable.”

Comparability Analysis

We use a regression analysis that models various forms of subnational debt (that is traditional debt excluding unfunded pension liabilities) in a state as being determined by demographic, political, economic, institutional, and time invariant state-specific factors. In general, this analysis supports the conclusions previously described from a more informal look at the same data.

- ***Around half of the variance in long-term total debt per capita, public debt less private debt per capita, and school district debt across the states between 1997 and 2007 is explainable through the causal factors used in previous studies.*** This falls to about one-eighth for private purpose debt per capita.
(This is based upon the R-squared values from the first-differenced regressions in Tables 11.)
- Relative to 1997 and controlling for causal and state specific factors expected to cause differences in debt issue, ***across all three forms of non-school district debt there was an increase in the amount issued in 2002, and a further increase in 2007.***
(This is based upon the time dummy values from the fixed effects regressions in Table 12.)
- ***The most persistent influence on total real long-term state debt per capita of all types is the percentage of a state's population that attends K-12 public school.*** A one thousand dollar increase in this value raises long-term debt per capita by between \$141 and \$117.
(This is based upon the first-differenced regression results in Tables 11 and fixed-effects results in Table 12.)
- After controlling for differences in debt issued five years earlier, and demographic, political, economic, and institutional differences, between 1997 and 2007 ***California's total real long-term public debt is greater than 20 other states and only less than four other states. For the remaining 26 states, its outstanding debt per capita in this category is similar.***
(This is based upon the fixed-effects regression results in Table 12.)
- After controlling for differences in debt issued five years earlier, demographic, political, economic, and institutional differences between 1997 and 2007 ***California's real long-term public debt for private purposes is less than 21 other states and only greater than one other state. For the remaining 28 states, its outstanding debt per capita in this category is similar.***
(This is based upon the fixed-effects regression results in Table 12.)

- After controlling for differences in debt issued five years earlier, demographic, political, economic, and institutional differences between 1997 and 2007 ***California's real long-term public debt for public purposes alone is greater than 12 other states and only less than one other state. For the remaining 37 states, its outstanding debt per capita in this category is similar.***
(This is based upon the fixed-effects regression results in Table 12.)
- After controlling for differences in debt issued five years earlier, demographic, political, economic, and institutional differences between 1997 and 2007 ***California's real long-term public debt taken on by school districts purposes alone is greater than 7 other states and less than no other state. For the remaining 43 states, its outstanding debt per capita in this category is similar.***
(This is based upon the fixed-effects regression results in Table 13.)
- ***Regarding the question of whether the amount of unfunded pension liability in a state correlates with its amount of debt, the answer is yes and it does so positively.*** We are not certain if this relationship is causal in nature, or merely a positive correlation that indicates that states that took less care to fund their pension liabilities, also took care less care in the control of their total debt.
(This is based upon the fixed-effects regression results in Table 12.)

Recent Developments

With an increased issuance of state and local bonds, 2009 was an unusual year in California state and local debt issuance. This increase likely resulted from a combination of factors that included a slowing of gross state product during the Great Recession, a tightening of credit markets in the previous year, federal stimulus funds that encouraged the issuance of state bonds, and a backlog of transactions that never made it to market in 2008.

By sheer magnitude, California has always exhibited the largest amount of long-term bond sales among all states, and this again was true in 2008, 2009, and 2010. Therefore, the growth rate of bond sales (or the percentage change in bond sales from year-to-year) provides a more accurate measure of the relative change in borrowing. By this measure, California's state and local governments exhibited a large increase in long-term bond sales in 2009 compared to 2008. Bond sales by these governments increased from \$52.9 billion in 2008, to \$72.3 billion in 2009 (36.8%). However, this percentage increase in California's state and local bond sales

ranked only ninth among all the states. Alabama, Arkansas, Delaware, Hawaii, Iowa, Kansas, Mississippi, and New Hampshire all had greater percentage increases in bond sales in 2009 than did California. In comparison, bond sales by California's subnational governments during 2010 were lower than in 2009 – measured as a decline from \$72.3 billion in 2009, to \$61.0 billion in 2010 (-15.6%). In contrast, 29 other states increased bond sales in 2010 compared to 2009.

Examining annual bond sales in isolation can be deceiving because it does not capture the long-term nature of investment and the subsequent timing of capital projects. Therefore, we explicitly look at the issuance of new debt between 2008 and 2010 for all state and local governments by state, and for traditional long-term debt and a new form of debt through Build America Bonds. Tabular comparisons show that California's use of these two forms of debt in per capita terms between 2008 and 2010 placed it in the top 10% of all states. Only Utah and New York issued more BABs per resident than California. Only New York, Connecticut, and Massachusetts issued more traditional debt per resident. Not only were California's 2008 to 2010 issues of traditional debt and BABs high in per-capita terms, but they were also high in comparison to other states when looking at bonds issued between 2008 and 2010 compared to total state and local long-term debt in 2007. The calculated ratio values for California of 1.14 (for traditional bonds issued between 2008 and 2010 to total state and local debt in 2007) and 1.53 (for BABs issued between 2008 and 2010 to total state and local debt in 2007) placed it in the upper 22 percent and 12 percent of all 50 states in these issues.

Regression analyses of this same bond data also yield interesting findings:

- After **controlling for demographics, politics, economics, institutions, and borrowing costs** expected to influence borrowing activity across the states; **California still issued more Build America Bonds than other states. This separate California effect was not found for the recent issue of traditional long-term debt.**

(This is based upon regression findings in Table 20.)

- State and local governments consider Build America Bonds and traditional long-term bonds as imperfect substitutes. **For every one dollar per capita use of traditional bonds issued between 2008 and 2010, the use of BABs decreased by \$0.21.**
(This is based upon regression findings in Table 19.)
- The **responsiveness of BABs to demographics, politics, economics, institutions, and borrowing costs thought to influence their issue is about twice that found for traditional long-term bonds.**
(This is based upon elasticities calculated from regression findings in Table 19.)
- Within a state, **state and local governments issued fewer bonds if they had a greater percentage of elderly, greater federal revenue sharing, and the state's fiscal condition was stronger.**
(This is based upon elasticities calculated from regression findings in Table 19.)
- A state is more **likely to have issued state and local debt the greater a state's starting debt, the more liberal its lawmakers in political ideology, the greater its gross state product per capita, if it has found it necessary to put a debt limit in place, and the greater its roads are in poor shape.**
(This is based upon elasticities calculated from regression findings in Table 19.)

PREFACE

The Legislature's budget analyst, Mac Taylor, ...estimates that California has more than \$200 billion in "liabilities that will affect the state's financial health," broken down this way: -About \$35 billion in "budget-related liabilities," including payroll deferrals, school aid deferrals and borrowing from special funds and banks. -About \$69 billion in traditional bond debt for public works that must be repaid from the state's deficit-ridden general fund. -Something in excess of \$100 billion in unfunded liabilities for public employees' pensions and post-employment healthcare, roughly \$50 billion for each... "These liabilities will continue to put pressure on the state's finances for years to come." Taylor's debt numbers are one of the reasons he tells the Legislature that even were the economy to recover, California faces many years of gaps between income and outgo.

Dan Walters' Column, *Sacramento Bee*, p. 3A, August 14, 2009

As represented above, concern over the further issuance of state and local debt in California exists. The purpose of this commissioned report is to consider how policy makers should best evaluate the noted recent growth and overall level of public debt in California. It does this by examining how the debt loads of California's state and local governments have changed since 1992. It then compares these changes within California to changes in the national average and to other states. We begin with an overview of state and local debt. In particular, we discuss trends in its occurrence over time and academic research on the issue of state and local debt.

For multiple reasons it is appropriate for our interstate comparisons to examine aggregate state and local government debt (state government and local government debt in a state added together), rather than the debt incurred by state governments alone. States differ dramatically in the degree to which the state government or its local governments take responsibility for generating revenue, providing public services, and issuing debt. Examining only the state government component of the state and local fiscal system offers misleading comparisons across the states. Some state government authorities incur debt on behalf of their local governments. In other states, local governments are responsible for incurring debt directly. In every state, state governments generate revenue they then distribute to local governments in the form of

intergovernmental grants that differ widely in magnitude. In some states, local governments can only incur debt after approval of the state government. Clearly, there are legal, economic, and political links between the fiscal behavior of a state government and its local governments that differ in every state. For this reason, when making interstate comparisons of debt issuance we consider the combined state and local government sector as a single entity.

Of course, this perspective does not mean that examining the debt behavior of a specific type of state and local government might not provide additional important information in some instances. Indeed, in this report we examine explicitly both the division of debt between the state government and the local governments in that state and the debt level of local school districts. However, such examination requires one to recognize and allow for institutional differences among the states in the relative roles of those governments.

I. AN OVERVIEW OF STATE AND LOCAL DEBT

In 2008, state and local governments in the United States had accumulated a total outstanding debt of nearly \$2.6 trillion (according to the most recent data collected by the United States Census Bureau). This amounted to about \$8,560 per person measured in 2009 dollars.² As shown in Table 1, the magnitude of this debt – like the magnitude of state and local government spending – has grown substantially in the past forty years. Until recently, however, the magnitude of state and local government debt remained relatively stable compared to the size of the economy (13% to 16% of GDP) and compared to the annual total revenue of subnational (state and local) governments (75% to 90%). However, between 2002 and 2007, state and local debt increased substantially faster than GDP and revenue. So much so, that in 2008 it represented almost 18% of GDP and 96% of annual revenue. The increase in the magnitude of debt after 2007 reflects the beginning effects of the Great Recession, and the resulting substantial decline in GDP and increased borrowing due to falling revenue (which causes the ratios to increase).

As indicated by the state share of state and local debt rising from 27.3% in 1962 to 39.4% in 2008, there has been a continuous centralization of subnational government borrowing. However, since 1992 the division of debt between state and local governments has remained relatively stable. State governments now account for about 39% of the total subnational government debt. Even though the magnitude of aggregate state and local debt may seem large at around \$8,600 per person, the annual cost of this debt to state and local government budgets is

² Throughout this report we translate historic dollar values into 2009 equivalent dollars so they are more easily comparable to current dollars. We could not translate into 2010 equivalent dollars because the deflator to do this is was yet available when written.

quite modest. In 2008, annual interest payments on the outstanding debt required only 3.8% of total state and local revenue.³

³ This percentage derived using data from the U.S. Bureau of Census, *Governmental Finances*, 2008.

Table 1: United States Total State and Local Government Debt Outstanding

Year	Real Total Debt (2009 billion dollars)*	Real Per Capita Debt (2009 dollars)*	Debt as a Percentage of GDP	Debt as a Percentage of Annual Revenue	State Share of Debt	Local Share of Debt
2008	\$2580	\$8560	17.8%	95.9%	39.4%	60.6%
2007	\$2490	\$8340	17.1%	78.6%	38.8%	61.2%
2002	\$2010	\$6980	16.1%	93.1%	38.1%	61.9%
1997	\$1590	\$5920	14.7%	75.8%	37.4%	62.6%
1992	\$1400	\$5630	15.4%	82.3%	38.2%	61.8%
1987	\$1030	\$4240	15.9%	86.1%	37.0%	63.0%
1982	\$791	\$3410	13.0%	73.9%	36.9%	63.1%
1977	\$749	\$3460	12.9%	76.9%	35.0%	65.0%
1972	\$719	\$3450	14.4%	92.1%	31.2%	68.8%
1967	\$596	\$3010	14.0%	106.6%	28.3%	71.7%
1964	\$517	\$2690	14.5%	113.2%	27.1%	72.9%
1962	\$465	\$2390	13.8%	116.3%	27.3%	72.7%

*Using the CPI Deflator available at <http://www.measuringworth.com/uscompare> .

Source: U.S. Bureau of the Census, *Governmental Finances*, various years; U.S. Department of Commerce, Bureau of Economic Analysis, National Income Accounts data, various years.

The history and relative magnitudes of state and local government debt in California are roughly similar to the national picture. In 2008, outstanding state and local government debt in California was \$345 billion or about \$9,310 per capita. This amounted to 18.5% of state GDP and about 96% of revenue collected by California's state and local governments. State government issues accounted for about 36% of that debt. In 2008, annual interest payments on the outstanding debt required 3.8% of total state and local revenue. Interestingly, this is the same percentage as for interest on aggregate subnational debt nationally relative to aggregate subnational revenue nationally.

This quick summary suggests that state and local government debt in California is not substantially different from the aggregate observed for all states. However, it does obscure important differences between types of state and local debt, the debt levels of different types of local governments, and debt levels among the various states. We discuss these distinctions in the remainder of this first section of the report.

Types and Purposes of Debt

State and local governments borrow money for three purposes: (1) to finance infrastructure – public capital projects or public facilities (such as roads and bridges, schools and other public buildings, water and sanitation facilities, parks and recreation facilities, and so on); (2) to provide cash flow for short-term spending or for special projects of a short duration; and (3) to support and subsidize private activities such as private home mortgages, student loans, and industrial or commercial development. The third category, what the Census Bureau defines as “public debt for private purposes,” is a way for state and local governments to subsidize and encourage specific types of private investment. For instance, a state government might incur debt on behalf of private developers of multifamily housing intended for low-income residents, or a local

government might incur debt and use the funds to support a private commercial development intended as part of an urban renewal project. In addition, state and local governments may borrow to pay off old debt sooner if interest rates fall (refinancing or refunding). In the case of refinancing, the aggregate level of government debt may not change – as one debt replaces another – but annual interest costs are lower.

Different types of state and local government bonds correspond to the different reasons why state and local governments borrow. Most bonds issued carry a repayment period of more than one year and thus considered long-term. Long-term debt is the form used for financing public capital projects and financing private purpose activities. Long-term borrowing is particularly appropriate for financing capital projects because the term of the loan can be set to correspond to the expected life of the asset. In contrast, the common use of short-term debt (taken on for less than a year) is to smooth cash flows. Since 1992, long-term debt has accounted for more than 98% of outstanding state and local government debt; thus, the emphasis in this report is on long-term debt.

Long-term state and local government bonds are of two types. General obligation (GO) bonds pledge the full-faith and credit of the issuing government as security. The responsible government may use revenue from any general tax or charges to repay the debt. If existing revenue sources are not sufficient for that purpose, then the government pledges to raise taxes or charges to generate the necessary funds. Revenue bonds pledge revenues only from a particular source related to the project (such as bridge tolls, student room and board fees, and similar) to pay the interest and principal back to the bond's investors. Investors view revenue bonds as more risky investments than GO bonds and thus require higher interest rates from the borrowing governments. State and local governments also use revenue bonds when the borrowed funds

support allowed private investment (private-activity bonds). For example, a state government authority may sell revenue bonds and use the proceeds to offer home mortgage loans to lower-income families, with the bondholders repaid from the mortgage payments made by the individual homeowners (or the sale of foreclosed properties).

Figure 1 illustrates the relationship between the different types and purposes of long-term debt. State and local governments use long-term debt for public purposes (public service facilities) or private purposes where policymakers believe a public benefit exists for assisting a private activity. The United States Census Bureau uses this same distinction in its reporting of these data. In terms of type of government bond, GO bonds are for public purposes only. Revenue bonds raise funds for public or private purposes. Therefore, the type of state and local bond issued does not correspond directly to the purpose of the state and local borrowing.

Focusing on the types of state and local bonds, the distribution between GO and revenue bonds has been quite stable since 1990. In Figure 2, the annual variation in the real value of these bonds issued across the United States and the positive trend in the real dollar value of these issues is illustrated. As shown in Figure 3, over this period GO bonds consistently accounted for about one-third of new state and local bonds issued.⁴ Since 1992, long-term debt has accounted for more than 98% of total outstanding state and local debt.

⁴ A very small fraction of new bonds issued, about 1 percent, are “private placements” where the bond conditions are negotiated with the private buyer.

Figure 1: Categories of Long-Term State and Local Debt

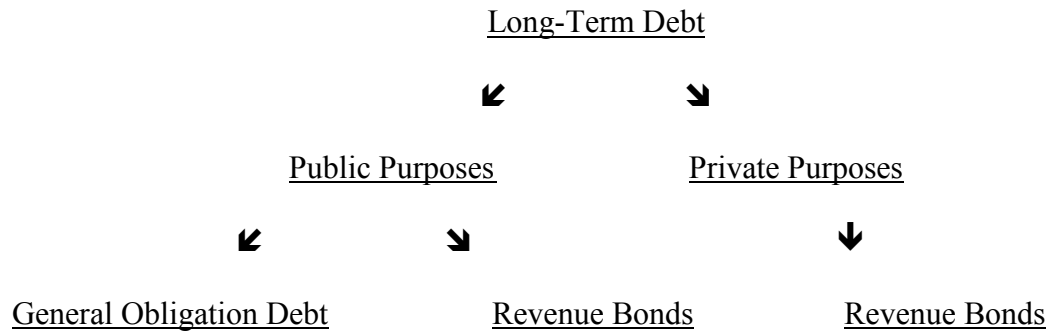


Figure 2: United States State and Local Bonds Issued by Type

Source - Securities Industry and Financial Markets Association

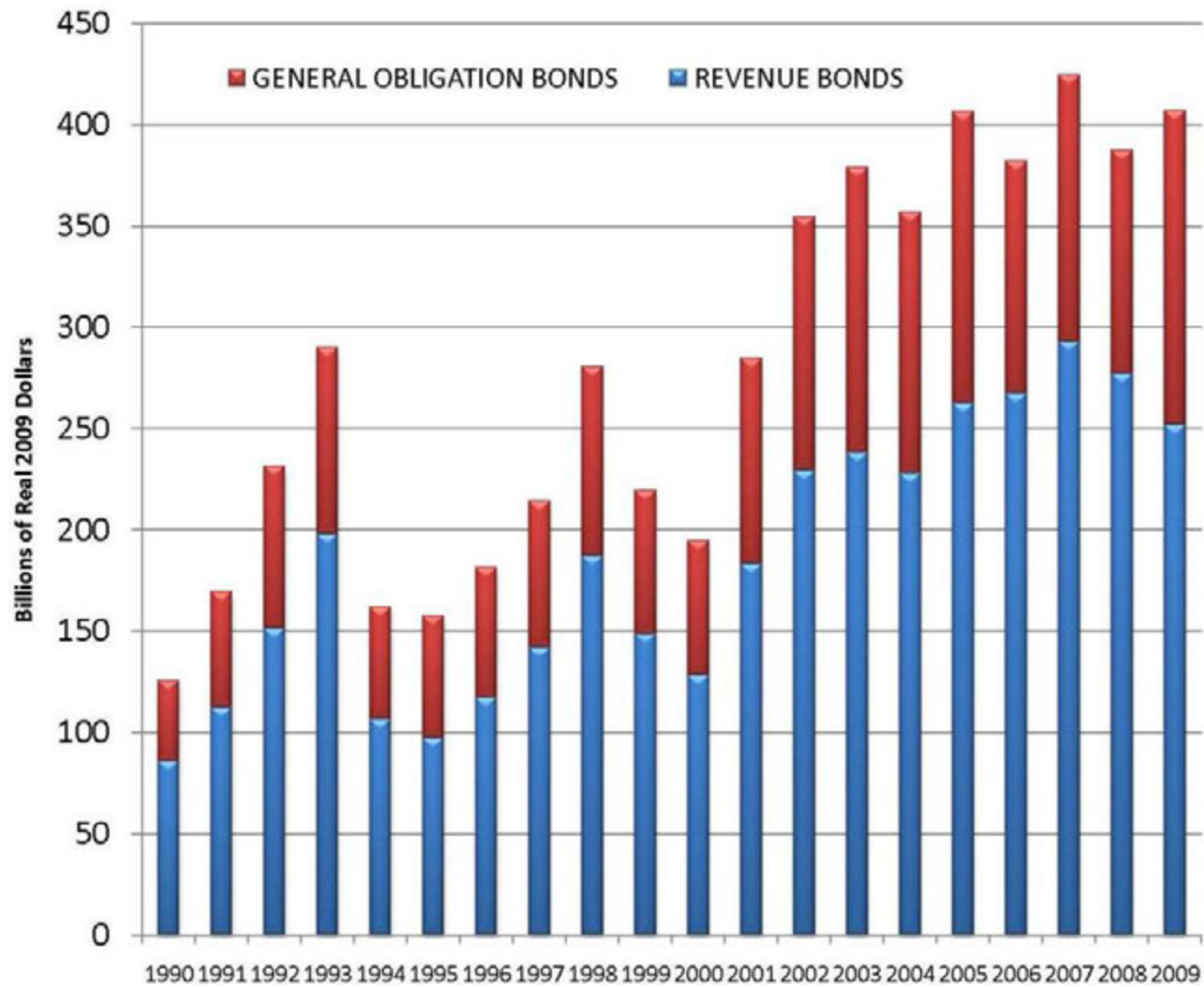
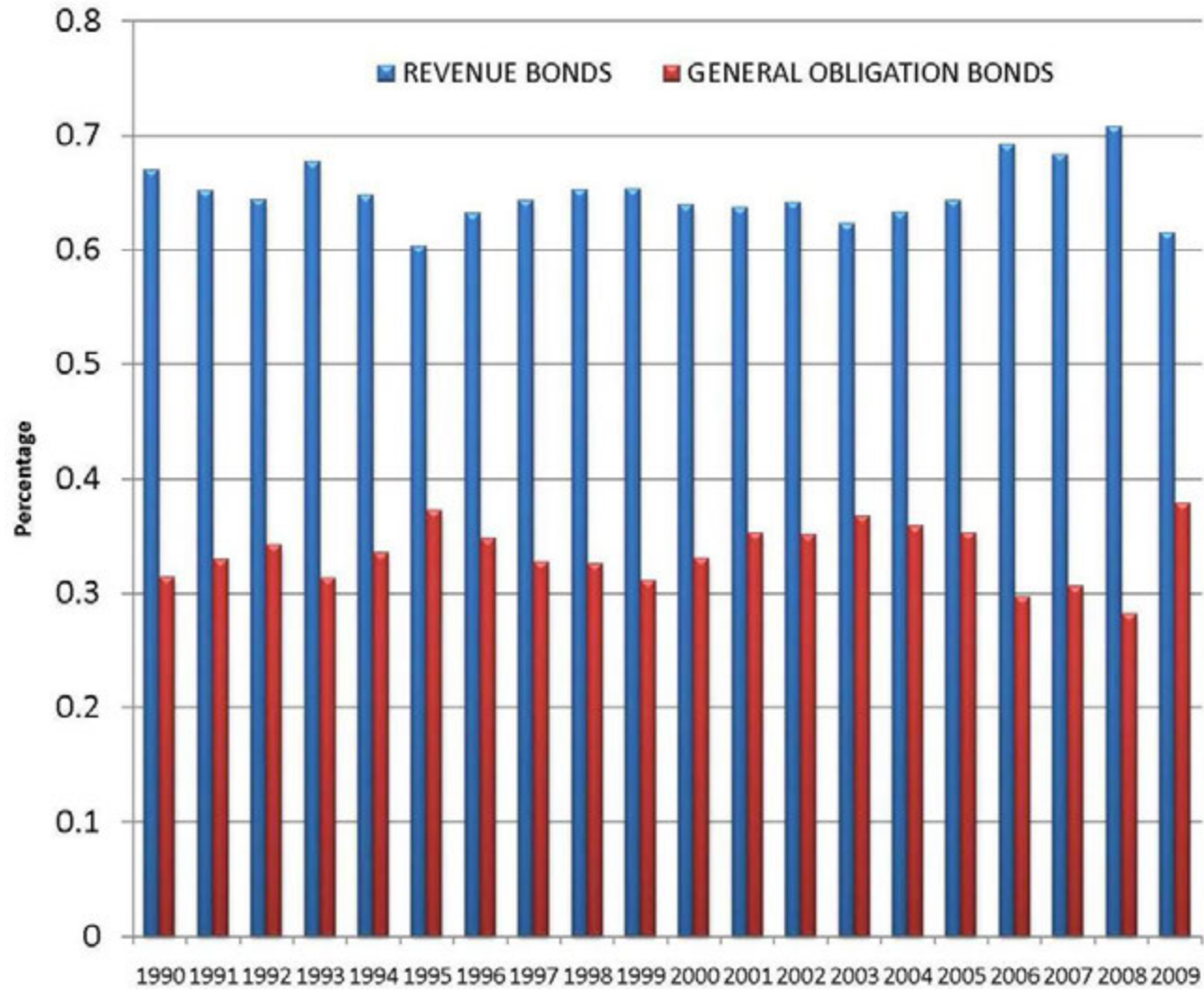


Figure 3: United States Shares of State and Local Bonds Issued by Type

Source - Securities Industry and Financial Markets Association



Magnitude of State and Local Debt

Measuring the magnitude of debt that a state or local government has incurred traditionally involves comparing aggregate debt (a “stock”), or components of that total debt (such as long-term debt), to various annual measures of fiscal and economic capacity (“flows”). The most common measures of annual economic activity to compare debt against include population, income generated by economic activity in the jurisdiction (gross product), personal income of residents, revenue received by the government, and/or the magnitude of a governmental tax base (especially the property tax base in the case of local governments). Here we present three measures of relative state and local debt burden: (1) real debt per person (debt adjusted for changes in inflation divided by population), (2) debt as a percentage of gross state product (GSP), and (3) debt as a percentage of the appropriate annual government revenue. We also present the annual cost to the government from outstanding debt (that is the annual interest payments on the debt as a percentage of annual revenue).⁵

Real per capita debt for all state and local governments increased from \$5,917 in 1992 to \$8,351 in 2007 (measured in 2009 dollars)⁶. This represents an increase of about 41 percent. Over this 15-year period, state and local debt rose even after accounting for inflation and population increases. As shown in Figure 4, essentially all of this growth arose from increased long-term debt incurred by state and local governments for traditional public purposes. There

⁵ The various *Debt Affordability Reports* issued annually by the California Treasurer since 1999 (see <http://www.treasurer.ca.gov/publications>) offers similar comparisons. Though in these reports, California debt, and comparisons of it to other states, are done as a percentage of personal income, or per capita, or as a percentage of gross state product; and are only for state government issued debt. Given California’s choice of more centralized funding and provision of subnational services than other states, these comparisons result in California’s issuance of state and local debt being at the high end. For instance, in 2007, California’s state only government debt to personal income was 4.3% and state only government debt per capita was at \$1,685. This respectively compared to the medians calculated for the 10 most populated states at 3.0% and \$986.

⁶ This report examines state and local debt for the period 1992 through 2007, although the specific data used are for years 1992, 1997, 2002, and 2007. The reason is that the Census Bureau reports separate data for the various types of local governments only for the detailed Census of Governments that are done in years ending in 2 and 5.

was no significant change during this period in the real per capita magnitudes of long-term debt for private purposes or short-term debt.⁷

Comparing state and local debt to a state's GSP provides a similar conclusion to examining real per capita debt. As shown in Figure 5, only long-term debt for traditional public purposes increased relative to GSP since 1992. Overall, state and local debt outstanding increased from 15.8% of GSP in 1992 to 17.7% in 2007. Again, all of that increase was in traditional long-term debt for public purposes (10.4% of GDP in 1992 and 13.4% of GDP in 2007).

It is also relevant to compare debt and its interest cost to the total revenue or expenditure of a government. As shown in Figure 6, outstanding state and local debt varied between 76% (1997) and 93% (2002) of annual state and local revenue between 1992 and 2007. Variation in state and local revenue affects the variation in the ratio among these four years more than aggregate outstanding debt. Over these years, debt increased more or less continuously, but the increase appears relatively greater in years when state and local revenue grew relatively slowly. Among these four years, fiscal years 1992 and 2002 came just at the end of national recessions, whereas fiscal years 1997 and 2007 came after periods of economic growth.⁸ Thus, it may make most sense to compare 2007 with 1997. Comparing these two years suggests that total outstanding state and local debt is about the same size relative to total state and local revenue. Thus, in aggregate as of 2007, it does not appear that state and local governments in the United States incurred outstanding debt disproportionate to their annual budgets.

⁷ Of course, constant real per capita debt implies that debt in that category increased at the same rate as prices and population. The annual magnitude of short-term debt is quite variable, being higher in periods of economic recession and lower during years of economic growth.

⁸ The official dates for U.S. recessions in this period are July 1990-March 1991, March 2001-November 2001, and the latest recession that began in December 2007 and ended in June 2009.

Figure 4: United States Real (2009 Dollars) Per Capita State and Local Debt by Type

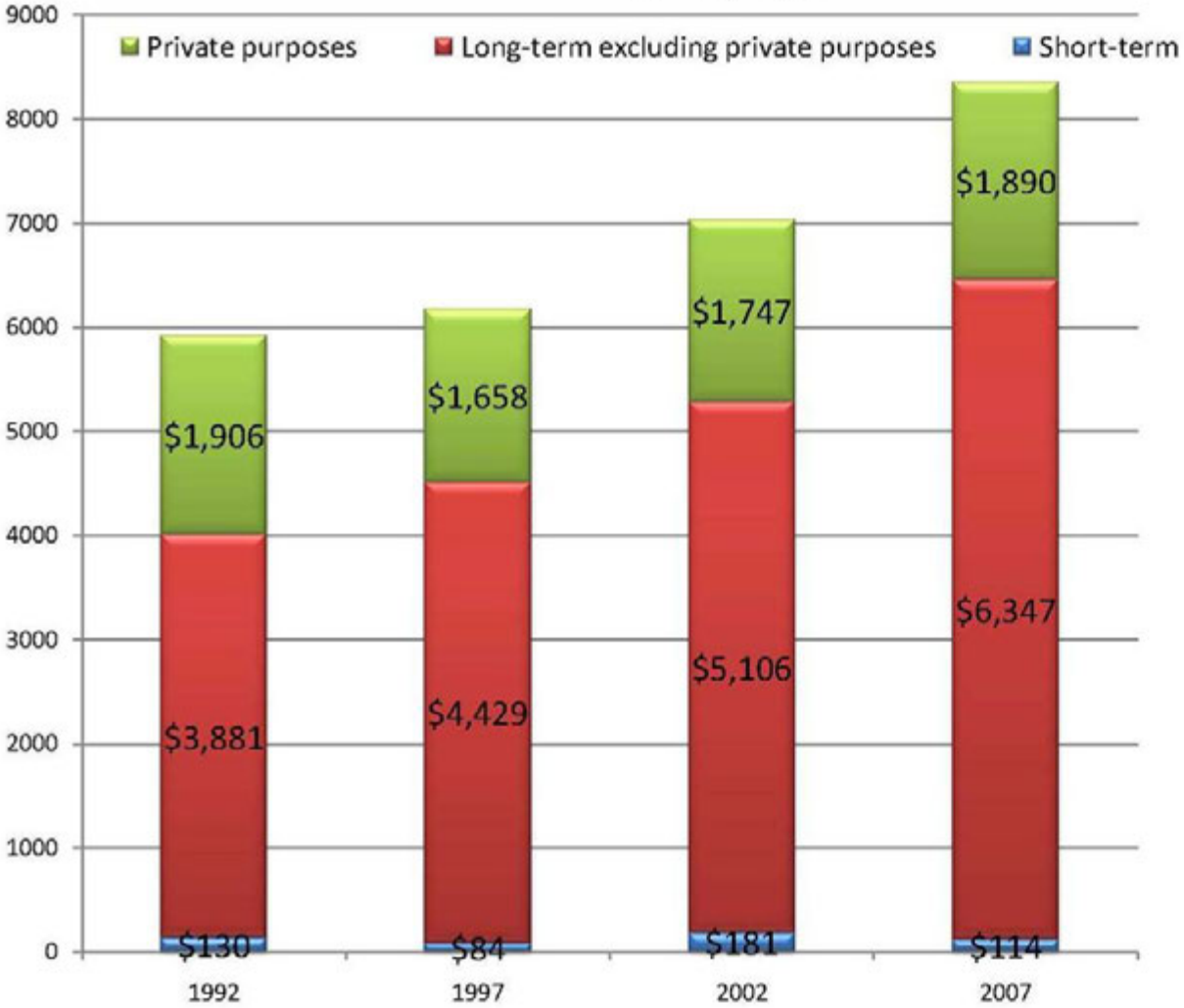


Figure 5: United States State and Local Debt as a Percentage of GSP by Type

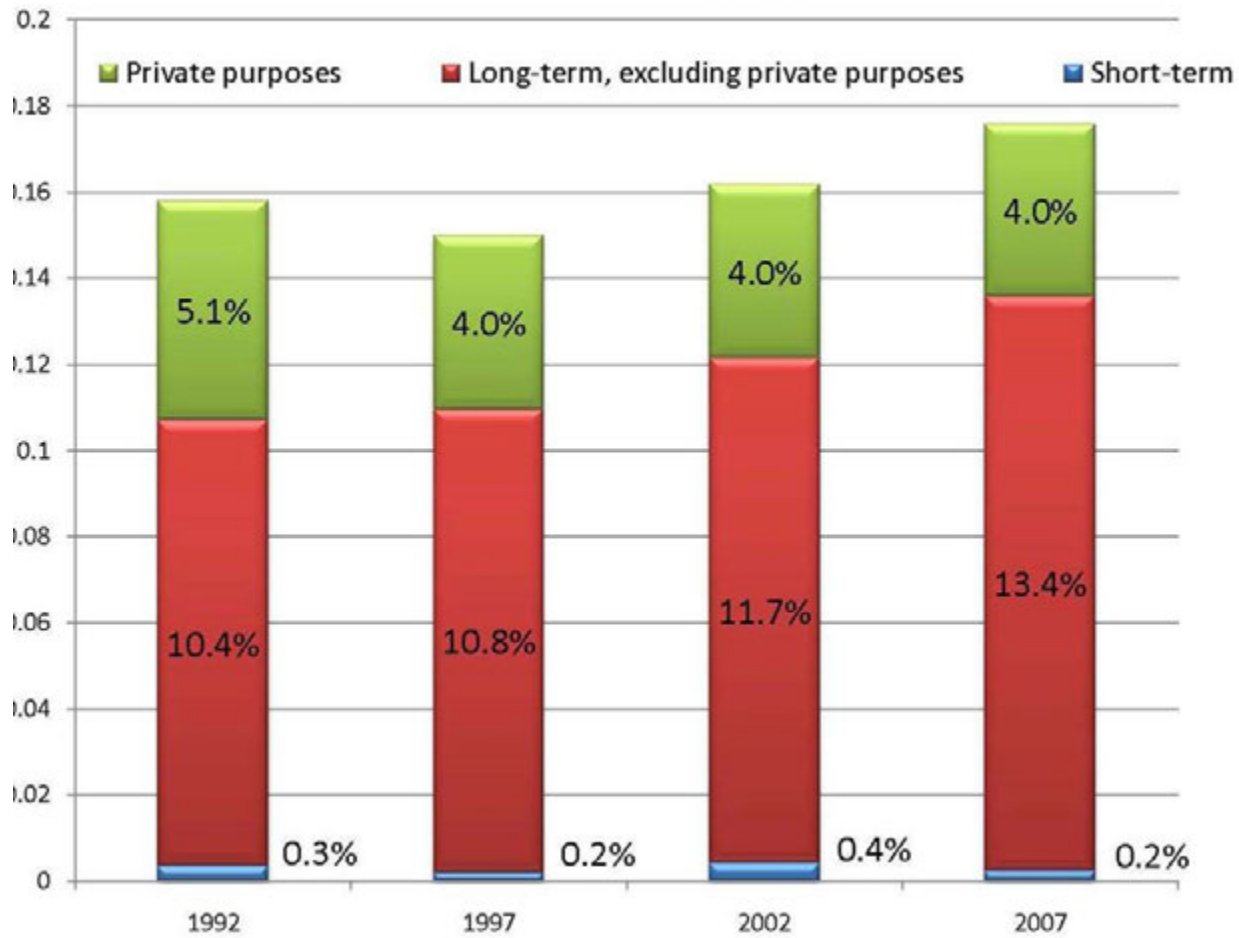
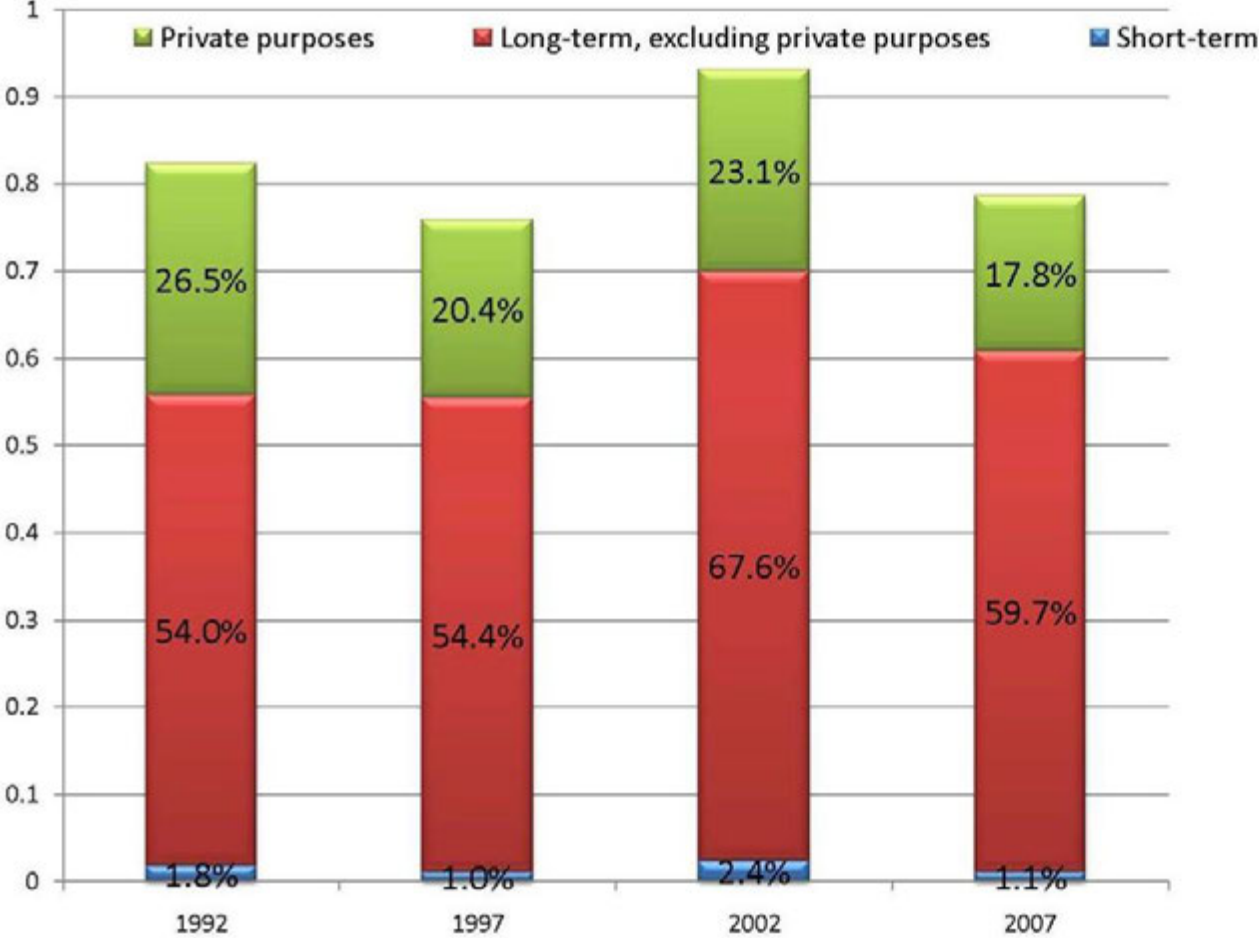


Figure 6: United States State and Local Debt as a Percentage of Annual Revenue

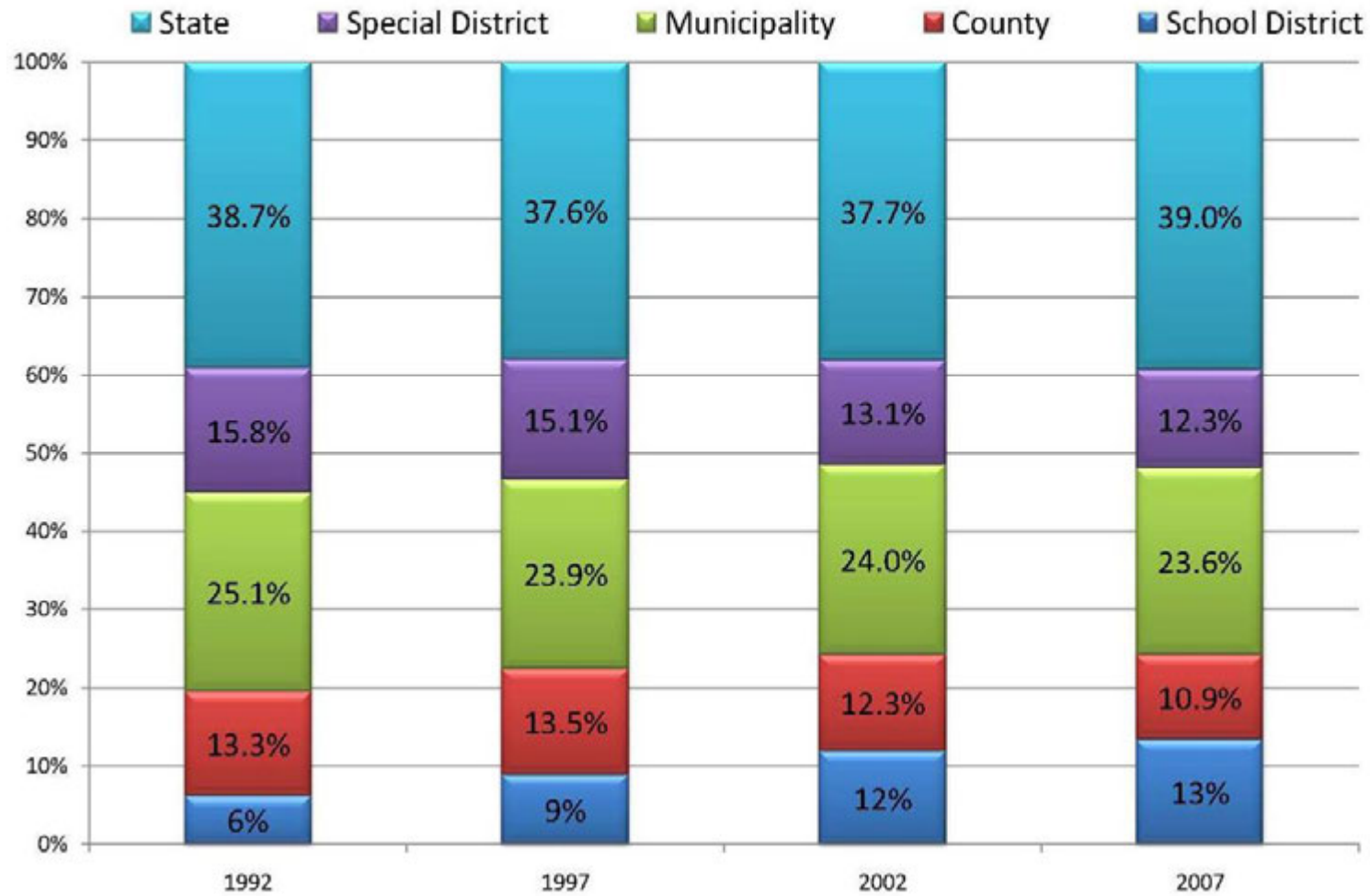


Examining debt for all state and local governments in aggregate could obscure the fact that different forms of subnational governments may have pursued different debt policies. Thus, it is also important to compare debt levels among state governments and the various types and levels of local governments. Although state and local debt has risen in relative terms (real debt per capita, as a percentage of GSP, and as a percentage of annual revenue), we have seen that the increase has been concentrated in long-term debt for traditional public purposes (excluding debt for private purposes). As illustrated in Figure 7, within the growing category of long-term debt, the largest increase has been in debt incurred by or on-behalf of school districts. Nationally, since 1992, school district long-term debt has risen from 6% of total state and local long-term debt to 13%. Because the overall local government share of long-term debt has not changed, what has likely happened is that school district issued debt has in part, at least, replaced debt issued by counties, municipalities, and special districts. The share of long-term debt for all three of the latter types of localities has declined.

The budgeted expenses related to debt come in the form of interest payments to bondholders. Over the 15-year period from 1992 to 2007, interest paid by state and local governments in aggregate decreased relative to annual revenue, declining from 5.5% of revenue in 1992 to 4.5% in 1997, 4.8% in 2002, and 3.5% in 2007. This resulted from a combination of changes in debt relative to revenue and changes in the interest rates that state and local governments faced.⁹ The decline in interest rates may partially explain increased debt issuance over this time. A reduced financing cost implies that public officials can buy more public infrastructure because its price has effectively come down. Disaggregating by type of subnational government, annual interest paid on outstanding debt decreased as a share of revenue

⁹ This is illustrated by the seven-year constant maturity United States Treasury Bill interest rate being at 14.04% in January 1982 and falling almost continuously to 3.35% in January 2010 (<http://research.stlouisfed.org>).

Figure 7: United States Share of Long-Term, State and Local Debt by Government Type



from 1992 to 2007 for all types of state and local governments, except for school districts, as shown in Figure 8. This result reinforces the point that much of the growth in this recent 15-year period has been in debt by or on behalf of schools. Though even after accounting for this growth, school districts spent less than 3% of their overall revenue on interest payments in 2007.

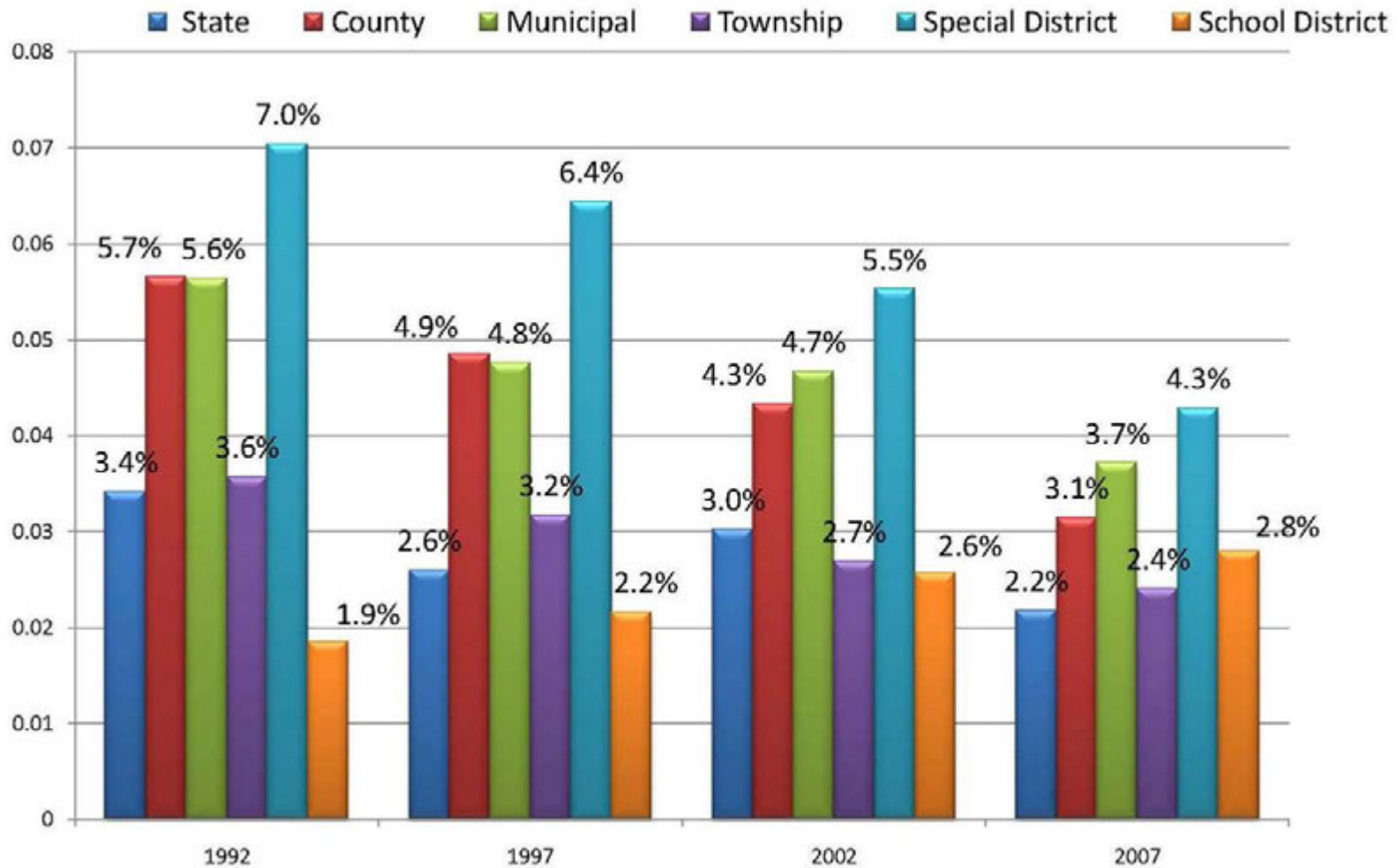
Unfunded Public Pension Costs

In addition to public state and local debt incurred through the issuance of bonds, the concept of subnational “debt” should perhaps include other future financial liabilities of these governments. In particular, future pension costs and post-retirement health care costs of past employees represent deferred compensation to employees. Depending on contractual and other legal aspects, as well as the governments’ practice of funding this deferred compensation, these liabilities very likely represent a claim on future public receipts and assets. The Governmental Accounting Standards Board has called for accountability of these deferred costs. Accordingly, in our opinion, it is difficult to evaluate the magnitude of traditional financial market debt of a state and local government without also considering the level of deferred public employee compensation that is currently unfunded.

Unfortunately, the measurement of future liability for employee pension costs is not straightforward. It requires an estimate of the values of assets and future liabilities of a pension program.¹⁰ First, asset values vary from day-to-day because most state and local pension funds invest in stocks, bonds, and real estate whose market values fluctuate. Therefore, unfunded pension liability will differ depending on when it is measured. This is especially true considering the relatively large stock market decline after 2007 and its recent gyrations in returning to pre-2007 values. Second, estimates of pension liability depend on whether liabilities count for all retirees and current public employees under the assumption they work to retirement,

¹⁰The “unfunded liability” is the difference between the value of assets and value of future liabilities.

Figure 8: United States Interest on State and Local Debt as a Percentage of Annual Revenue



or under an alternative assumption that only liabilities incurred to date count (which excludes some future liabilities if current employees continue to work). Finally, extremely relevant for a value calculation is the rate of return that pension funds can expect to earn (discount rate), which is necessary to calculate the present value of future liabilities.

The rate of return issue is as follows. Most states assume they will earn an average nominal rate of return of about 8% on investments in pension funds. Accordingly, when discounting future liabilities to present value terms, the discount rate used is 8%. However, many analysts believe that an 8% of return on an investment portfolio occurs only with substantial risk, indeed risk that would be unwise for payment of an obligated future payment stream. Thus, some analysts have argued that it is more realistic for states to plan based on average rates of return of 4% to 5% (the rate on long-term United States Treasury Bonds). If states use the long-term Treasury bond rate of 4% to 5% percent to discount future pension liabilities, rather than the 8% that states commonly use, the estimate of future liability necessarily grows.¹¹ Essentially, analysts that argue for the use of lower discount rates in evaluating future pension liabilities believe that reasonable and safe investment strategies will generate lower returns than currently assumed by many states, so that effectively the future liabilities are greater.

The Public Fund Survey (<http://www.publicfundsurvey.org>) collects and reports financial information for state and local government pension programs. The survey information, which claims to represent more than 85% of state pension members, comes primarily from retirement system annual financial reports, further augmented by actuarial valuations, benefits guides, and interviews with staff members. As shown in Table 2, information from these state reports shows that state pension programs had assets of \$2.53 trillion in 2007 and \$2.61 trillion in 2008 (2009

¹¹ If states earn a 4% to 5% return on investment annually rather than 8% (risk adjusted), then states must allocate greater funds to investment to meet future liabilities.

real dollars). Future liabilities equaled \$2.95 trillion in 2007 and \$3.06 trillion in 2008. Using these measures, the unfunded future liability for these pension programs was approximately \$420 to \$450 billion in 2007/2008. Using these figures implies that the implicit debt for unfunded future pension liability is about five times smaller than the traditional financial debt of states and localities (about \$2,600 billion as shown earlier in Table 1).

Novy-Marx and Rauh's (2009) estimate of unfunded state pension liability for the years 2005 through 2008 yielded very different conclusions.¹² These authors provide several liability estimates for each year, including one using the rate of return assumed by each state and one using the rate of return implied by rates offered on United States Treasury Bonds. For 2007, the authors estimate pension fund assets for the states to be \$2.87 trillion and future liability (in present value terms) to be \$2.90 trillion (assuming the state return estimates) or \$4.51 trillion (using Treasury bond returns). As shown in Table 2, the unfunded state pension liability in 2007 was either \$30 billion (using state return assumptions) or \$1,630 billion (using Treasury bond return assumptions).

For 2008, the estimates of Novy-Marx and Rauh changed dramatically. Assets were valued after the December stock market decline associated with the financial market crisis. In addition, a decline in Treasury bond rates served to increase the present value of future liabilities.¹³ Using this approach, the authors estimate pension fund assets to be \$1.96 trillion and future liability (in present value terms) to be \$3.02 trillion (assuming the state return estimates) or \$5.23 billion (using Treasury bond returns). By these measures, the unfunded state

¹² The National Association of State Retirement Officers (NASRA) has offered a criticism of the methodology used by Novy-Marx and Rauh that is summarized at <http://nasra.org/resources/RauhResponse.pdf>. We offer here what we believe are the two extreme estimates of the magnitude of unfunded state pension liabilities. State figures are likely too low, while those of Novy-Marx and Rauh may be too high.

¹³ The assumption is that the lower returns available after December 2007 continue to prevail into the future.

**Table 2: State Pension Funding Estimates for all United States
(2009 real trillions of dollars*)**

Source and Year	Assets	State Estimated Liabilities	Discounted Liabilities at Treasury Bond Rate	Underfunding with State Estimates	Underfunding with Treasury Bond Discounting
Public Fund Survey					
2007	\$2.53	\$2.95	NA	-\$0.40	NA
2008	\$2.61	\$3.06	NA	-\$0.45	NA
Novy-Marx and Rauh					
2007	\$2.87	\$2.90	\$4.51	-\$0.03	-\$1.63
2008	\$1.96	\$3.02	\$5.23	-\$1.05	-\$3.27

*Using the CPI Deflator available at <http://www.measuringworth.com/uscompare>

pension liability in 2008 is between \$1,050 billion (assuming the state return estimates) and \$3,270 billion (using Treasury bond returns).

For 2008, unfunded pension liability, depending on the estimation method used, fell somewhere in the range of \$1,050 to \$3,270 billion. In comparison, state and local government outstanding financial market debt in fiscal year 2008 was \$2,580 billion. Comparison of these different financial liabilities is difficult, not only because of the legal distinctions, but also because of the variability in pension liability estimates by time and evaluation method.

Nonetheless, a reasonable guess is that the unfunded future pension liabilities of state and local governments equal 50% to 100% of traditional financial market debt. We believe, therefore, that it is imperative to consider a state's future pension liabilities when asking whether its debt load is "sustainable."

California Debt Issues

Tables 3 through 5 contain information on California state and local debt issues, in total and by category, throughout the 18 years preceding 2009. Relying upon data collected by the California Debt and Investment Advisory Commission (CDIAC), and the categories that were used to classify debt issue consistently across time, we respectively report new debt issues in terms of amount per thousand dollars of gross state product, per capita using 2009 real dollars, and percentage within a category. It is important to note that these measures differ from the ones previously discussed in that these represent new debt issues each year, whereas the previous data show the total amount of debt outstanding in any year. In addition, these data include information for new debt issues during 2008 and 2009, whereas the Census Bureau information about total outstanding debt is not yet available for both of those years.

Turning to Table 3, in 2009 the state of California issued \$56.13 of debt per thousand dollars of gross state product. After subtracting the reported value of \$13.30 for “Interim Financing,” the total long-term state debt issue per thousand dollars of GSP was \$42.83. The comparable value for 2008 was \$22.27, whereas the average between 1992 and 2009 was \$16.75. The biggest increases were in the categories of “Hospital and Health Care Facilities” and “Capital Improvements and Public Works” where debt per thousand dollars of GSP was respectively 3.7 ($\$5.69/\1.55) and 3.3 ($\$14.94/\4.47) times greater in 2009 than for the 1992-2009 average. As also shown in Table 3, local governments in California in 2009 issued \$60.23 of debt per thousand dollars of gross state product. After subtracting the reported value of \$11.06 for “Interim Financing,” the total long-term local debt issue per thousand dollars of GSP was \$49.17. The comparable value was \$45.38 for 2008, while the average between 1992 and 2009 was \$34.52. Total local debt issuance in 2009 was larger than in 2008 and the long-term average, but not to the degree that occurred at the state level. In addition, across local categories, 2009 debt issuance per GSP sometimes increased and sometimes decreased in comparison to the previous year and average.

As shown in Table 4, in 2009 the state of California issued \$2,280 of debt per capita. After subtracting the reported value of \$540 for “Interim Financing,” the total long-term state debt issue per capita was \$1,740. The comparable value was \$905 in 2008, whereas the average between 1992 and 2009 was \$680. As also shown in Table 4, local governments in California in 2009 issued \$2,446 of debt per capita. Subtracting the reported value of \$449 for “Interim Financing” yields the total long-term local debt issue per capita of \$1,997. In 2008, the comparable value was \$1,843, whereas the average between 1992 and 2009 was \$1,432.

Table 3: California Debt Issues Per \$1,000 Gross State Product by Category and Years 1992-2009*

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009		
	Per	Per	Per	Per	Per	Per	Per	Per	Per	Per	Per	Per	Per	Per	Per	Per	Per	Per		
	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	1992-2009	
	GSP	GSP	GSP	GSP	GSP	GSP	GSP	GSP	GSP	GSP	GSP	GSP	GSP	GSP	GSP	GSP	GSP	GSP	GSP	Average
<u>STATE ISSUERS</u>																				
Capital Improvements and Public Works Total	\$3.00	\$4.38	\$1.35	\$1.60	\$2.37	\$1.77	\$2.52	\$1.32	\$1.32	\$1.76	\$17.31	\$3.72	\$3.97	\$6.03	\$1.59	\$5.10	\$6.38	\$14.94	\$4.47	
Commercial and Industrial Development Total	\$0.41	\$0.41	\$0.22	\$0.09	\$1.91	\$0.71	\$0.44	\$0.24	\$0.12	\$0.05	\$0.07	\$0.02	\$0.52	\$0.88	\$0.28	\$0.41	\$0.84	\$0.65	\$0.46	
Education Total	\$3.19	\$3.51	\$3.42	\$0.73	\$1.65	\$2.77	\$4.26	\$3.61	\$4.77	\$3.90	\$4.30	\$10.86	\$6.80	\$10.71	\$6.88	\$12.26	\$5.70	\$13.25	\$5.70	
Hospital and Health Care Facilities Total	\$0.54	\$0.57	\$0.82	\$0.50	\$1.33	\$0.82	\$2.48	\$0.74	\$0.32	\$0.62	\$0.51	\$1.31	\$2.09	\$1.93	\$1.59	\$2.49	\$3.45	\$5.69	\$1.55	
Housing Total	\$0.15	\$1.25	\$1.40	\$1.69	\$1.42	\$3.12	\$1.74	\$2.00	\$2.84	\$2.66	\$2.58	\$3.21	\$3.20	\$3.30	\$2.51	\$2.77	\$1.68	\$4.07	\$2.31	
Interim Financing Total	\$13.15	\$8.54	\$12.45	\$0.00	\$6.83	\$3.66	\$2.07	\$1.24	\$0.04	\$7.39	\$24.68	\$18.84	\$7.32	\$3.76	\$1.83	\$8.54	\$8.91	\$13.30	\$7.92	
Grand Total	\$20.44	\$18.66	\$19.66	\$4.61	\$15.50	\$12.85	\$13.52	\$9.15	\$9.41	\$16.39	\$50.03	\$45.20	\$38.40	\$30.71	\$15.07	\$37.15	\$31.18	\$56.13	\$24.67	
<u>LOCAL ISSUERS</u>																				
Capital Improvements and Public Works Total	\$16.59	\$25.45	\$10.46	\$10.38	\$12.22	\$15.74	\$15.95	\$13.49	\$9.37	\$16.58	\$15.44	\$20.42	\$16.01	\$17.52	\$21.07	\$24.31	\$25.49	\$25.37	\$17.32	
Commercial and Industrial Development Total	\$0.25	\$0.12	\$0.26	\$0.23	\$0.12	\$0.11	\$0.11	\$0.11	\$0.07	\$0.06	\$0.08	\$0.23	\$0.07	\$0.48	\$0.44	\$0.15	\$0.14	\$0.02	\$0.17	
Education Total	\$1.70	\$2.11	\$1.54	\$1.67	\$2.82	\$4.36	\$4.69	\$3.86	\$4.36	\$6.24	\$9.94	\$11.25	\$9.79	\$16.17	\$14.66	\$15.02	\$8.94	\$12.94	\$7.34	
Hospital and Health Care Facilities Total	\$1.65	\$3.21	\$1.77	\$1.22	\$1.07	\$1.57	\$1.86	\$2.19	\$0.73	\$1.63	\$1.49	\$1.44	\$3.39	\$3.03	\$2.87	\$7.40	\$4.84	\$5.93	\$2.63	
Housing Total	\$1.26	\$1.26	\$0.98	\$1.58	\$1.47	\$1.32	\$2.82	\$3.10	\$3.21	\$3.33	\$3.75	\$2.96	\$2.83	\$2.64	\$3.04	\$4.48	\$2.43	\$1.34	\$2.43	
Interim Financing Total	\$7.64	\$12.58	\$10.26	\$8.18	\$8.10	\$8.78	\$7.81	\$7.67	\$8.57	\$7.24	\$7.65	\$8.07	\$8.33	\$7.92	\$6.61	\$7.60	\$7.55	\$11.06	\$8.42	
Other Total	\$0.30	\$0.53	\$4.82	\$3.67	\$2.15	\$1.02	\$0.64	\$0.34	\$0.32	\$1.60	\$2.25	\$2.12	\$3.19	\$3.42	\$2.04	\$2.29	\$1.99	\$2.81	\$1.97	
Redevelopment Total	\$3.27	\$5.16	\$1.55	\$1.11	\$0.77	\$1.57	\$2.07	\$1.67	\$0.95	\$1.92	\$2.70	\$5.80	\$3.49	\$3.97	\$5.17	\$4.39	\$1.54	\$0.76	\$2.66	
Grand Total	\$32.65	\$50.43	\$31.63	\$28.04	\$28.72	\$34.46	\$35.95	\$32.42	\$27.57	\$38.60	\$43.29	\$52.29	\$47.10	\$55.14	\$55.89	\$65.62	\$52.93	\$60.23	\$42.94	
<u>STUDENT LOAN CORPORATION ISSUERS</u>																				
Grand Total	\$0.43	\$0.08	\$0.18	\$0.32	\$0.59	\$0.18	\$0.85	\$0.32	\$0.10	\$0.30	\$1.14	\$0.64	\$0.45	\$0.42	\$0.35	\$0.85	\$0.00	\$0.00	\$0.40	
<u>TOTAL CALIFORNIA DEBT ISSUES</u>	\$53.52	\$69.17	\$51.48	\$32.97	\$44.82	\$47.50	\$50.32	\$41.88	\$37.08	\$55.28	\$94.47	\$98.12	\$85.94	\$86.27	\$71.31	\$103.62	\$84.11	\$116.35	\$68.01	

*Portions of the data used to construct these values are available publicly at the “Summary of California Public Debt Issuance” publications at the California Debt and Investment Advisory Commission (CDIAC) Website <http://www.treasurer.ca.gov/cdiac/publications/alphabetical.asp#summary>. Other values provided by Nova Edwards, Research Analyst at CDIAC. It is not necessary to place these data in real dollars because the same deflator would be used for both debt issued and GDP.

Table 4: California Debt Issues Per Capita (2009 Real Dollars) by Category and Years 1992-2009*

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	
	Real	Real	Real	Real	Real	Real	Real	Real	Real	Real	Real	Real	Real	Real	Real	Real	Real	Real	
	Per	Per	Per	Per	Per	Per	Per	Per	Per	Per	Per	Per	Per	Per	Per	Per	Per	Per	1992-2009
	Capita	Capita	Capita	Capita	Capita	Capita	Capita	Capita	Capita	Capita	Capita	Capita	Capita	Capita	Capita	Capita	Capita	Capita	Average
STATE ISSUERS																			
Capital Improvements and Public Works Total	\$122	\$178	\$55	\$65	\$96	\$72	\$102	\$54	\$54	\$71	\$703	\$151	\$161	\$245	\$65	\$207	\$259	\$607	\$181
Commercial and Industrial Development Total	\$17	\$17	\$9	\$4	\$77	\$29	\$18	\$10	\$5	\$2	\$3	\$1	\$21	\$36	\$11	\$17	\$34	\$26	\$19
Education Total	\$129	\$142	\$139	\$30	\$67	\$113	\$173	\$147	\$194	\$159	\$175	\$441	\$276	\$435	\$280	\$498	\$231	\$538	\$231
Hospital and Health Care Facilities Total	\$22	\$23	\$33	\$20	\$54	\$33	\$101	\$30	\$13	\$25	\$21	\$53	\$85	\$78	\$65	\$101	\$140	\$231	\$63
Housing Total	\$6	\$51	\$57	\$68	\$58	\$127	\$71	\$81	\$115	\$108	\$105	\$130	\$130	\$134	\$102	\$112	\$68	\$165	\$94
Interim Financing Total	\$534	\$347	\$506	\$0	\$277	\$149	\$84	\$50	\$2	\$300	\$1,003	\$765	\$297	\$153	\$74	\$347	\$362	\$540	\$322
Grand Total	\$830	\$758	\$799	\$187	\$630	\$522	\$549	\$371	\$382	\$666	\$2,032	\$1,836	\$1,560	\$1,248	\$612	\$1,509	\$1,267	\$2,280	\$1,002
LOCAL ISSUERS																			
Capital Improvements and Public Works Total	\$674	\$1,034	\$425	\$422	\$496	\$639	\$648	\$548	\$381	\$674	\$627	\$829	\$650	\$712	\$856	\$987	\$1,035	\$1,030	\$704
Commercial and Industrial Development Total	\$10	\$5	\$10	\$9	\$5	\$4	\$4	\$4	\$3	\$2	\$3	\$9	\$3	\$19	\$18	\$6	\$6	\$1	\$7
Education Total	\$69	\$86	\$63	\$68	\$115	\$177	\$190	\$157	\$177	\$253	\$404	\$457	\$398	\$657	\$595	\$610	\$363	\$526	\$298
Hospital and Health Care Facilities Total	\$67	\$130	\$72	\$50	\$44	\$64	\$76	\$89	\$30	\$66	\$60	\$58	\$138	\$123	\$116	\$301	\$197	\$241	\$107
Housing Total	\$51	\$51	\$40	\$64	\$60	\$53	\$114	\$126	\$131	\$135	\$152	\$120	\$115	\$107	\$124	\$182	\$99	\$54	\$99
Interim Financing Total	\$311	\$511	\$417	\$332	\$329	\$357	\$317	\$311	\$348	\$294	\$311	\$328	\$338	\$322	\$268	\$309	\$307	\$449	\$342
Other Total	\$12	\$22	\$196	\$149	\$88	\$42	\$26	\$14	\$13	\$65	\$91	\$86	\$130	\$139	\$83	\$93	\$81	\$114	\$80
Redevelopment Total	\$133	\$210	\$63	\$45	\$31	\$64	\$84	\$68	\$38	\$78	\$110	\$236	\$142	\$161	\$210	\$178	\$63	\$31	\$108
Grand Total	\$1,326	\$2,048	\$1,285	\$1,139	\$1,167	\$1,400	\$1,460	\$1,317	\$1,120	\$1,568	\$1,758	\$2,124	\$1,913	\$2,240	\$2,270	\$2,666	\$2,150	\$2,446	\$1,744
STUDENT LOAN CORPORATION ISSUERS																			
Grand Total	\$17	\$3	\$7	\$13	\$24	\$7	\$34	\$13	\$4	\$12	\$47	\$26	\$18	\$17	\$14	\$34	\$0	\$0	\$16
TOTAL CALIFORNIA DEBT ISSUES	\$2,174	\$2,810	\$2,091	\$1,339	\$1,820	\$1,929	\$2,044	\$1,701	\$1,506	\$2,246	\$3,837	\$3,986	\$3,491	\$3,504	\$2,897	\$4,209	\$3,417	\$4,726	\$2,763

*Portions of the data used to construct these values are available publicly at the “Summary of California Public Debt Issuance” publications at the California Debt and Investment Advisory Commission (CDIAC) Website <http://www.treasurer.ca.gov/cdiac/publications/alphabetical.asp#summary>. Other values provided by Nova Edwards, Research Analyst at CDIAC.

Table 5: California Debt Issues Percent of Total by Category and Years 1992-2009*

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009		
	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	1992-2009
	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Average
STATE ISSUERS																				
Capital Improvements and Public Works Total	5.6%	6.3%	2.6%	4.9%	5.3%	3.7%	5.0%	3.1%	3.6%	3.2%	18.3%	3.8%	4.6%	7.0%	2.2%	4.9%	7.6%	12.8%	5.81%	
Commercial and Industrial Development Total	0.8%	0.6%	0.4%	0.3%	4.3%	1.5%	0.9%	0.6%	0.3%	0.1%	0.1%	0.0%	0.6%	1.0%	0.4%	0.4%	1.0%	0.6%	0.76%	
Education Total	6.0%	5.1%	6.6%	2.2%	3.7%	5.8%	8.5%	8.6%	12.9%	7.1%	4.6%	11.1%	7.9%	12.4%	9.7%	11.8%	6.8%	11.4%	7.89%	
Hospital and Health Care Facilities Total	1.0%	0.8%	1.6%	1.5%	3.0%	1.7%	4.9%	1.8%	0.9%	1.1%	0.5%	1.3%	2.4%	2.2%	2.2%	2.4%	4.1%	4.9%	2.14%	
Housing Total	0.3%	1.8%	2.7%	5.1%	3.2%	6.6%	3.5%	4.8%	7.6%	4.8%	2.7%	3.3%	3.7%	3.8%	3.5%	2.7%	2.0%	3.5%	3.64%	
Interim Financing Total	24.6%	12.4%	24.2%		15.2%	7.7%	4.1%	3.0%	0.1%	13.4%	26.1%	19.2%	8.5%	4.4%	2.6%	8.2%	10.6%	11.4%	11.51%	
Grand Total	38.2%	27.0%	38.2%	14.0%	34.6%	27.1%	26.9%	21.8%	25.4%	29.6%	53.0%	46.1%	44.7%	35.6%	21.1%	35.9%	37.1%	48.2%	33.57%	
LOCAL ISSUERS																				
Capital Improvements and Public Works Total	31.0%	36.8%	20.3%	31.5%	27.3%	33.1%	31.7%	32.2%	25.3%	30.0%	16.3%	20.8%	18.6%	20.3%	29.5%	23.5%	30.3%	21.8%	26.69%	
Commercial and Industrial Development Total	0.5%	0.2%	0.5%	0.7%	0.3%	0.2%	0.2%	0.3%	0.2%	0.1%	0.1%	0.2%	0.1%	0.6%	0.6%	0.1%	0.2%	0.0%	0.28%	
Education Total	3.2%	3.1%	3.0%	5.1%	6.3%	9.2%	9.3%	9.2%	11.8%	11.3%	10.5%	11.5%	11.4%	18.7%	20.6%	14.5%	10.6%	11.1%	10.01%	
Hospital and Health Care Facilities Total	3.1%	4.6%	3.4%	3.7%	2.4%	3.3%	3.7%	5.2%	2.0%	2.9%	1.6%	1.5%	3.9%	3.5%	4.0%	7.1%	5.8%	5.1%	3.72%	
Housing Total	2.3%	1.8%	1.9%	4.8%	3.3%	2.8%	5.6%	7.4%	8.7%	6.0%	4.0%	3.0%	3.3%	3.1%	4.3%	4.3%	2.9%	1.2%	3.92%	
Interim Financing Total	14.3%	18.2%	19.9%	24.8%	18.1%	18.5%	15.5%	18.3%	23.1%	13.1%	8.1%	8.2%	9.7%	9.2%	9.3%	7.3%	9.0%	9.5%	14.12%	
Other Total	0.6%	0.8%	9.4%	11.1%	4.8%	2.2%	1.3%	0.8%	0.9%	2.9%	2.4%	2.2%	3.7%	4.0%	2.9%	2.2%	2.4%	2.4%	3.15%	
Redevelopment Total	6.1%	7.5%	3.0%	3.4%	1.7%	3.3%	4.1%	4.0%	2.5%	3.5%	2.9%	5.9%	4.1%	4.6%	7.2%	4.2%	1.8%	0.7%	3.91%	
Grand Total	61.0%	72.9%	61.5%	85.1%	64.1%	72.6%	71.4%	77.4%	74.4%	69.8%	45.8%	53.3%	54.8%	63.9%	78.4%	63.3%	62.9%	51.8%	65.80%	
STUDENT LOAN CORPORATION ISSUERS																				
Grand Total	0.8%	0.1%	0.4%	1.0%	1.3%	0.4%	1.7%	0.8%	0.3%	0.5%	1.2%	0.6%	0.5%	0.5%	0.5%	0.8%	0.0%	0.0%	0.63%	
TOTAL CALIFORNIA DEBT ISSUES	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	

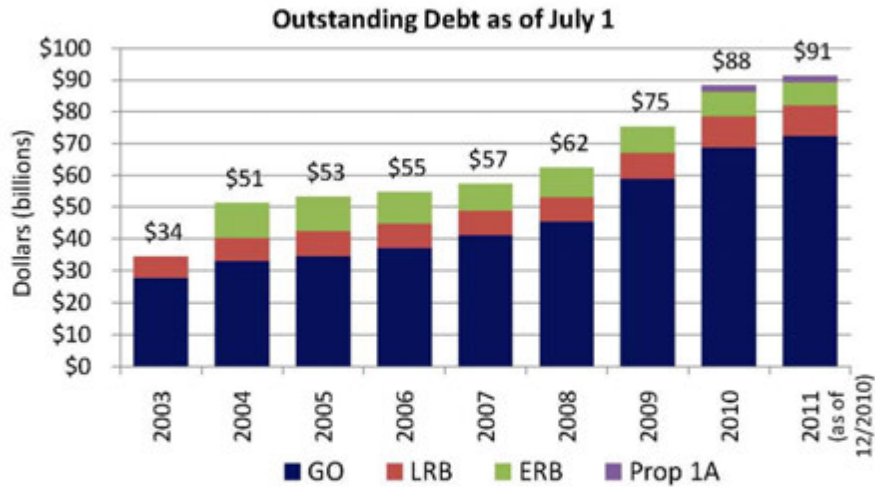
*Portions of the data used to construct these values are available publicly at the “Summary of California Public Debt Issuance” publications at the California Debt and Investment Advisory Commission (CDIAC) Website <http://www.treasurer.ca.gov/cdiac/publications/alphabetical.asp#summary>. Other values provided by Nova Edwards, Research Analyst at CDIAC.

Information in Table 5 confirms that the increase in California debt issuance observed in 2009 largely came from the state government side rather than local governments. The long-term averages of the percentage of debt issued at the state and local levels of government in California between 1992 and 2007 have respectively been 33.57% and 65.80%. In 2009, the state average rose to 48.2% and the local government average fell to 51.8%.

The point to take away from the California specific data in Tables 3 through 5 is that 2009 was indeed a unique year in California debt issuance. California State Treasurer Lockyer made the same point using the two PowerPoint slides below in a December 8, 2010 budget briefing to newly elected Governor Brown.¹⁴ The reasons for the change are likely due to a combination of factors that include a slowing of gross state product in a recession, state and local governments shut out of the bond market in 2008, and the offering of federal stimulus funds that encouraged the issuance of greater state bonds. Whether these trends continue is presently unresolved. Nevertheless, this blip in California bond issues is important to recognize.

¹⁴ For the full briefing, see http://www.treasurer.ca.gov/brown_briefing.pdf.

California's Debt Has Increased Significantly Since 2003



- The rating agencies consider the State's debt burden moderate, but note its rapid growth and significant use for deficit borrowings

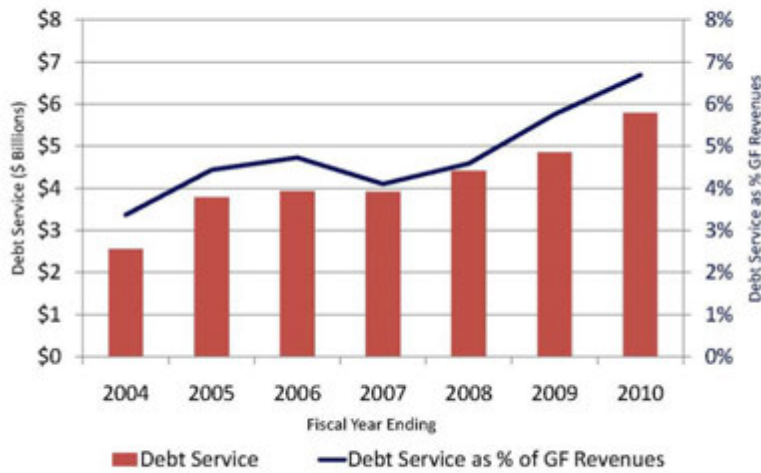
Notes: Includes Non Self Liquidating GO bonds, SPWB GO Bonds, ERB's and Prop 1A bonds. Does not include Enterprise Fund Self Liquidating bonds such as Vets GO Bonds, ERB's or outstanding commercial paper notes. ERB's were authorized in 2004. Prop 1A bonds were authorized in 2005.

California State Treasurer's Office

2



As a Result, Debt Service Has Also Increased



Notes: Includes Non Self Liquidating GO bonds, SPWB GO Bonds, and Prop 1A bonds. Does not include Enterprise Fund Self Liquidating bonds such as Vets GO Bonds, ERB's or outstanding commercial paper notes.

California State Treasurer's Office

3



The Bond Buyer Internet site collects and reports data showing both long-term and short-term bond sales by month for all the states. Although these data do not distinguish between bonds issued by the state government and those issued by local governments within the state, nor

do they distinguish between public and private purpose bonds, they do offer the possibility of further comparison of how California's bond sales during the 2008 through 2010 period compares to other states. A quick examination of this data suggests that in sheer magnitude, California had the largest amount of long-term bond sales among all states in 2008, 2009, and 2010. However, this is no different from years previous and just reflects California's size compared to other states. Based upon data from *The Bond Buyer* internet sites, long-term (inflation adjusted) bond sales by California since the start of the Great Recession were as follows: \$52.9 billion (2008), \$72.3 billion (2009), and \$61.0 billion (2010).

The growth rate of bond sales, that is the percentage change in bond sales from year-to-year, provides a more accurate and useful measure of the relative change in borrowing by the state. By this measure, California did have a large increase in long-term bond sales in 2009 compared to 2008. Bond sales in California increased from \$52.9 billion in 2008 to \$72.3 billion in 2009, or an increase of 36.8 percent. Nevertheless, California's increase in bond sales in 2009 ranked only ninth among all the states in percentage terms (Alabama, Arkansas, Delaware, Hawaii, Iowa, Kansas, Mississippi, and New Hampshire all had relatively larger percentage increases). However, bond sales by all California governments fell between 2009 and 2010 (\$72.3 billion in 2009 to \$61.0 billion in 2010, a decrease of 15.6 percent). In contrast to California, 29 other states displayed an increase in bond sales in 2010 compared to 2009. Montana and Vermont led with 286 percentage and 103 percentage increases in bond issues from 2009 to 2010, respectively.

When interpreting these values, note that annual sales data can be deceiving. They do not capture long-term trends, which can be important because of the periodic nature of capital investment and the timing of projects. As an example, consider a state with a large bond sale in

December of 2008 and again in January of 2010. With such a pattern, the use of 2009 bond sales to characterize the issuance of bonds between 2008 and 2010 would misleadingly show it as low, whereas the use 2008 or 2010 would show the opposite effect. It also is difficult to interpret the magnitude of these sales relative to a state's economy and relative to a state's past debt. A state might have a large new issuance of bonds in one year and retire a similar large amount of old bonds in that same year. In that case, the large new issuance would not increase total debt. In a later section of this report, we describe this data in more detail for all states and conduct a regression-based statistical examination of it.

What Remains

In principle, evaluating the magnitude of debt for a state or local government should take into account all of the factors just described. In practice, it is necessary to make only the possible calculations, and then to compare the magnitudes of these to other governments past and current, and to compare to reasonable estimates of future economic and fiscal circumstances. In this research, we do this through both tabular and more elaborate statistical (regression) comparisons based on the logic and best practices of previous academic inquiries. Descriptions of our methodologies and results are in the remaining six sections of this report.

In the next section, we briefly describe some of the methods used to evaluate the desirability of a subnational government's use of debt. Using one of these methods, we compare in the section that follows the reported trends in California to United States' averages and to five states similar to California. In the following section we offer a regression analysis using a nationwide data set that lets us sort out a further answer to this question using statistics. We then offer a tabular and regression-based analysis *The Bond Buyer* data on 2008-2010 state and local bond issues and of publicly available data on the use of Build America Bonds in 2009 and 2010.

In a final section, we answer a set of policy related questions about subnational debt in the State of California that are the focal points of this research.

II. METHODS FOR POLICYMAKERS TO EVALUATE DEBT

Evaluating the magnitude of debt that a state or local government has incurred traditionally involves comparing that aggregate debt (a “stock”) to various annual measures of fiscal and economic strength (which are “flows”). The most common measures of annual economic vitality include population, personal income of residents, revenue received by the government, or the magnitude of a governmental tax base, especially the property tax base in the case of local governments. It is also possible to compare debt to the magnitude of various debt limits set constitutionally or statutorily in a state. Although there are some “rules of thumb” that may be useful in estimating roughly how high a government’s debt is by any of these measures, there are no absolute objective standards. The reason is that governments differ so dramatically in political and economic circumstances. For instance, a government might have a currently high ratio of debt to annual receipts because it has elected to keep current taxes unusually low. Nevertheless, as long as the government is politically willing and has the economic capacity to increase taxes in the future, then such debt may not be a concern.

Therefore, more complete and comprehensive methods to evaluate debt are desirable. The literature suggests three alternative approaches to evaluating public debt amounts. These include examination by affordability, optimality, or comparability. We discuss the necessary technical approaches, as well as the advantages and disadvantages of all three methods next.

Affordability: Demands on Economic and Fiscal Resources

The most basic concept of debt evaluation is to compare debt (or debt costs) to measures of the economic or fiscal capacity of the jurisdiction or government. The most straightforward question is whether there are (or will be) sufficient resources to service the debt. For instance, do residents of a jurisdiction have sufficient income to repay the debt and interest costs, or does the

public entity have sufficient revenue to repay the debt? These types of questions have led to computing simple measures such as debt as a fraction of jurisdiction or resident income, debt as a fraction of the government's revenue, and interest costs as a fraction of revenue. Nevertheless, such an approach can be misleading because even if residents have sufficient income or governments have sufficient revenue, it seems unlikely that they would want to devote all of that income or revenue to debt. Individuals and governments may want to purchase other goods and services.

A more refined version of these questions, then, is whether individuals and governments can afford the debt and everything else that they want to purchase.¹⁵ From the perspective of individuals or residents of a jurisdiction, the issue is the magnitude of taxes they are willing to pay to cover the costs (interest and principal payments) of government debt. From a government's perspective, the issue is the fraction of revenue required for the government entity to cover the cost of debt, and whether the remaining revenue is sufficient to fund other demanded public services. These questions lead to examining changes in the ratios of debt (or debt costs) to income and revenue. If the ratio of debt to income or debt to revenue is growing, then there may be a potential for debt to crowd out other purchases or public services.

Even this second approach to affordability may be too simplistic, as some argue that it is the ratio of debt (or debt costs) to income and revenue in the future that matters, rather than the current values. There are two reasons why considering future ratios may give a different picture than current ones. First, even with constant tax rates, revenue in the future may be lower if tax bases do not grow as expected or some taxes are not used. Second, the share of the budget required for services not financed by long-term debt may rise. If the relative costs of public

¹⁵ Think of the following question for a person or family: "Can I afford a Ferrari?" One may have sufficient income to buy a Ferrari (it is affordable) but not to buy a Ferrari and a house and food (a Ferrari is not affordable with other things).

services not financed by debt increase, then providing those services will require a larger share of budgets in the future than currently. Alternatively, citizen demands may change because of demographic changes, mandating a different set of public services.

To deal with the first issue, some authors essentially argue that states should evaluate debt relative to long-term or future revenue streams. One study (Brecher *et.al*, 2003) compares debt and unfunded pension liabilities to what revenues would be if the government had a "representative revenue system," a concept developed a number of years ago by the United States Advisory Commission on Intergovernmental Relations. Essentially, it asks what revenues would be if a jurisdiction taxed at the average rate of all jurisdictions in the United States and applied those average tax rates to its actual tax bases. This acts as a measure of "revenue capacity" to which debt may be compared. This approach adjusts for the fact that a government may temporarily have unusually high or low tax rates, even including zero rates for some potential taxes. Accordingly, debt may seem high relative to current actual revenue, but perhaps would be lower relative to potential revenue if that government taxed all bases at average rates.

One difficulty with the "representative revenue system" approach is that it may not be optimal or feasible for each state or government to utilize the same tax rates. In some jurisdictions, the tax base may be very sensitive to the tax rates because of economic or geographic characteristics. Changing the tax rate to the average value in such instances would also affect the tax bases. For instance, if a state without an income tax were to implement one, it may be incorrect to assume that aggregate resident taxable income would remain constant. Instead, some residents may leave or work effort may change. In such instances, the "representative revenue system" approach produces a misleading or inaccurate estimate of fiscal capacity.

Baker *et.al* (2002) attempt to deal with both future revenue and estimates of future public service costs by looking at the age and gender mix in each state and by assuming a labor productivity growth rate. The age distribution and gender mix of the population enables one to estimate the labor force. Employment, coupled with information about productivity (output per worker), allows researchers to estimate and forecast income (and thus revenue). Changes in the age and gender mix of the population also imply changes in the demand for various public services. Researchers can use this information to estimate the present value of future spending. The comparison is between estimated future spending and debt to estimated future revenue.

The method used by Baker *et.al* (2002) is ambitious and relatively comprehensive, but raises several concerns. First, this approach takes the current political choices about revenue and expenditure in each state as given and assumes they persist into the future. For instance, spending per student might be taken as a given, which produces an estimate of total education spending as the number of students changes. However, this does not allow for changes in residents' preferred amount of spending per student. Second, the approach is a forecast that depends on assumptions about labor productivity growth and about population change. As with all forecasts, to the extent that the assumptions turn out to be incorrect, the forecast will also be inaccurate.

The goal of the more complex approaches to affordability is trying to determine whether current debt levels are sustainable. Sustainable being defined as: Can debt service continue without major tax increases or without reducing the quantity or quality of other public services? If revenue growth is expected to be lower in the future than currently, or if the desired quantity of some public service not related to debt is expected to increase, or if the costs of providing

those other public services are expected to increase, then current debt levels may not be sustainable.

Optimality: Optimal Investment in Public Services and Facilities

Recognizing that all state governments (except Vermont) have some type of requirement for a balanced budget, essentially all long-term state and local debt is used to acquire some form of capital goods rather than to pay for current public services. As noted previously, those capital goods include: (1) traditional public facilities such as roads, airports, schools, universities, parks, etc., (2) publicly-subsidized private facilities such as sports venues, rental homes, commercial ventures, etc., and (3) investment in human capital such as education, job training, etc. Thus, an entirely different approach to evaluating debt is to ask whether a state is buying the level of public facilities and public services desired by residents, and then financing the appropriate share of the costs for these with debt.

This approach requires estimating both demand for public services (the residents of all jurisdictions are not expected to want the same types, quantity, or quality of public facilities) and the optimal financing mix between taxes and debt (residents of different jurisdictions may prefer to finance different percentages of public facility costs with debt). A complication is that these two aspects are interdependent. If a jurisdiction faces relatively low costs of debt (low borrowing rates), it may induce residents to demand greater amounts of public facilities. On the other hand, jurisdictions that over-consume public services (taxes high relative to income) may find that perceived financial risk causes borrowing costs to increase. Temple (1994) uses this exact approach. Her work suggests that the demands for public service and public capital depend on the socio-economic characteristics of the state and the political environment. Temple's answer to the capital financing issue is that states should equate marginal costs of different

revenue sources. In common language, the cost to the state of collecting the last dollar of revenue from any source should be the same. If the full economic cost of increasing a state tax (such as income or sales) to finance a capital project is greater than the cost to the state of incurring the debt (including any effect on the state's interest costs) then the state should use more debt and less current taxation to finance the project. The government should continue this substitution until the cost of the two financing methods is the same.

Assuming that government officials responsible for debt choose the level that minimizes the cost to residents, the optimal debt share is then the value that equates the marginal costs of debt and tax finance. Deviations from this optimal debt share could be due to binding debt limits, although these were generally not important at the time of Temple's research. Assuming that a government chooses the optimal tax-debt mix for financing capital expenditure, the second issue is determining the amount of such capital spending that will maximize the utility of residents, subject to both the budget constraint of the residents and that of the issuing government. The preferred amount of capital expenditure in any year is assumed to depend on resident income, the current and future tax cost to a typical resident, the expected interest cost of debt, the size of the existing public capital stock in that jurisdiction, and market interest rates.

The results of Temple's statistical analysis using this approach is that states with higher personal incomes issue more debt due to a higher demand for capital investment and a resulting higher optimal share of debt in these states. She finds that differences in the share of capital expenditure financed by debt do not affect the level of capital investment in states. She also reports a regional effect, with states in the Sunbelt relying relatively more on current taxation than debt to fund capital expenditures compared to other regions.

Comparability: Comparison to Other Similar Governments

As just discussed, an analyst must make numerous assumptions and projections to apply either the criteria of “affordability” and/or “optimality” to an assessment of whether the level of subnational debt undertaken in a state is desirable. For instance, an application of the affordability criterion to California’s debt situation requires assumptions of a specific stream of future public revenue that is above, equal, or below that currently raised. Alternatively, one could assume that California’s state and local governments raise in the future an amount of revenue that is equivalent to applying a current United States “representative tax system” to California’s expected tax bases. Because of these issues, we do not follow the affordability method here for two reasons. First, as described earlier, California’s current level of debt is seemingly consistent with other states, and one could easily deem it affordable with an appropriate assumption about the future public revenues necessary to cover it. Second, it seems unlikely that California’s policymakers wish to base an assessment of the affordability of their level of state and local debt on a hypothetical tax system that is very likely to be unrelated to the specific current or future tax system in California.

In addition, an application of the previously described optimality criterion would require a projection of public demand for future state and local government services and infrastructure. This is only possible with a forecast of the future demographic characteristics of California, and even more problematic, assumptions about how these expected future demographic characteristics translate into desires for public services and infrastructure. Then, after all of this is done, one would be further required to determine in a theoretical sense whether California’s mix of current taxes and debt meets this forecast demand for subnational government services

and infrastructure in an “optimal” manner that is based on economic theory and not political reality.

Therefore, for the purpose of the analysis offered here, we believe it most straightforward and appropriate to evaluate California’s state and local debt by comparing it to other states. Of course, one must do this after accounting for differences in economic circumstances, demographics, geographic characteristics, and institutions between California and the comparison states. **The relevant question is whether California’s level of subnational debt is unusually high (or low) after adjusting for those different circumstances.** In Section IV of this report, we describe the use of a statistical technique (regression analysis) that employs the preferred “comparability” criterion to do this.

III. CALIFORNIA COMPARED TO OTHER SELECTED STATES

Although the regression analysis of state debt use reported in the following section of this report provides a more complete interstate comparison, it is also illustrative to compare debt levels and composition in California to a selected set of “similar” states. In what follows, we compare California’s debt situation to that in four other large and highly urbanized states (Florida, Illinois, New York, and Texas), and one other state (Arizona) that borders California and is mentioned often as an alternative location from which to do business.

Similarities and a few key differences are immediately apparent from the summary data in Table 6. First, and perhaps foremost, the state and local government debt level in California is not substantially out of line compared to these other five states. Although California’s per capita state and local debt may appear relatively high (exceeded only by New York), California’s debt compared to the size of the state’s economy is in the middle among these states (lower than in New York and Illinois, about the same as Florida, and higher than in Texas and Arizona).

Compared to the magnitude of state and local government annual revenue, however, California’s public debt is the lowest among these states – and substantially lower than in Illinois, New York, and Texas. Thus, this rough comparison suggests that California is not out of line compared to other large, urban states in having the resources to sustain its outstanding public debt. Similar observations arise when we compare California to the average of all states, rather than just these five large, urban states. Although per capita public debt seems high (14% above the U.S. average), outstanding public debt relative to the size of the state’s economy, or relative to state and local government revenue, is not dramatically different from the average for all states.

Table 6 also indicates that New York and Texas utilize short-term debt to a substantially greater degree than the other comparison states (including California). California has also used public long-term debt for private purposes to a substantially lesser degree than these other states. Public debt for private purposes is roughly only half as great in California as in the other five states. Indeed, California's use of short-term debt and long-term debt for private purposes is substantially lower than the average for all states.

Focusing on interest payments, as shown in Table 6, California also does not seem high compared to other states. For all state and local governments in 2007, interest paid on debt took 3.2% of revenue in California and 3.5% nationally.¹⁶ Among the states in Table 6, California's relative interest payments are the same as in Arizona and Florida; and relatively less than in Illinois, New York, and Texas. For school districts, interest payments take 2.6% of revenue in California and 2.8% nationally.¹⁷

The relative position of California in terms of public debt compared to other states is slightly different if one focuses only on long-term debt for traditional public purposes, as shown in Table 7. California has used long-term debt for private purposes to a lesser extent than other states.¹⁸ Among the six comparison states, long-term debt excluding that for private purposes in California was 16.2% of GSP in 2007, second only to New York. However, long-term debt excluding that for private purposes remained a relatively low fraction of annual revenue in California, with only Arizona being lower. Compared to all states in Table 7, California's long-term debt for public purposes was higher than the aggregate United States average for all three measures.

¹⁶ The value of 3.2% is less than the value given in the second table on p. 45 due to that interest on debt figure being a percentage of only general fund revenue.

¹⁷ Calculation made from U.S. Census Bureau data; U.S. Department of Commerce, Bureau of Economic Analysis.

¹⁸ If California's overall long-term debt is about average, but long-term debt for private purposes is below average, then it is necessary that long-term debt for public purposes be above average .

Table 6: Comparison of Debt in California and Selected States in 2007

Debt Measure	California	Arizona	Florida	Illinois	New York	Texas	United States
Per Capita Total State and Local Real* Debt (in dollars)	\$9,495	\$6,572	\$7,663	\$9,482	\$13,873	\$8,386	\$8,351
Per Capita Short-term Real Debt (in dollars)	\$27	\$23	\$22	\$17	\$294	\$214	\$114
Per Capita Long-term Real Debt (in dollars)	\$9,468	\$6,550	\$7,641	\$9,464	\$13,579	\$8,172	\$8,237
Per Capita Public Real Debt for Private Purposes (in dollars)	\$1,091	\$1,659	\$1,222	\$2,348	\$2,743	\$1,871	\$1,890
Total State and Local Debt as % of GSP	18.3%	16.0%	18.1%	18.9%	23.5%	16.5%	17.6%
Short-term Debt as % of GSP	0.1%	0.1%	0.1%	0.0%	0.5%	0.4%	0.2%
Long-term Debt as % of GSP	18.3%	15.9%	18.0%	18.8%	23.0%	16.1%	17.3%
Public Debt for Private Purposes as % of GSP	2.1%	4.0%	2.9%	4.7%	4.6%	2.5%	4.0%
State and Local Debt as % of Annual Revenue	70.6%	76.5%	77.5%	97.5%	88.6%	96.6%	78.6%
Short-term Debt as % of Annual Revenue	0.2%	0.3%	0.2%	0.2%	1.9%	2.5%	1.1%
Long-term Debt as % of Annual Revenue	70.4%	76.3%	77.3%	97.4%	86.8%	94.2%	77.5%
Public Debt for Private Purposes as % Annual Revenue	8.1%	19.3%	12.4%	24.2%	17.5%	21.6%	17.8%
Annual State and local Interest Paid as % of Revenue	3.2%	3.2%	3.2%	4.5%	4.0%	4.4%	3.5%
Characteristics							
Population	35,979,208	6,192,100	18,088,505	12,718,011	19,356,564	23,369,024	298,593,212
2009 Population Rank for 50 States (1 Highest)	1	16	4	5	3	2	
Real Per Capita GSP	\$50,078	\$39,720	\$41,013	\$48,546	\$57,088	\$49,148	\$47,094
2009 Real Per Capita GSP Rank for 50 States (1 Highest)	10	43	24	14	5	29	

Sources: U.S. Census Bureau; U.S. Department of Commerce, Bureau of Economic Analysis.

*Using the CPI Deflator available at <http://www.measuringworth.com/uscompare> .

Rather than comparing California and other selected states based on debt levels in a single year (2007), one can also compare these states in terms of how debt amounts have changed over time. Table 8 contains the changes in the three measures of debt (real per capita debt, debt as a percentage of state GSP, and debt as a percentage of revenue) for these comparison states and the United States overall from 1992 to 2007. Figures 9 and 10 contain comparisons of real per capita debt and debt relative to annual state and local government revenue. Real per capita state and local debt increased substantially in California over this period, by \$3,754 or about 65 percent. Among these states, only Illinois and New York had larger absolute increases, whereas real per capita debt in Arizona declined. The picture is the same if one compares only long-term debt, as that comprises such a large fraction of the total.

However, the perspective is quite different if one compares changes in subnational debt to changes in gross state product or to subnational government revenue. The state and local debt share of GSP declined in all six of these states between 1992 and 1997. In contrast, state and local debt increased nationally more than total GSP (so the ratio of debt to total GSP rose). In California, state and local debt declined from 13.9% of GSP in 1992 to 8.8% in 2007 (a decrease of more than five percentage points). Among these six states, only Illinois had a smaller relative decrease, at just more than five percentage points. Comparing subnational debt to subnational revenue, debt in California increased just slightly more than revenue over this period, from 69.5% in 1997 to 70.6% in 2007. Among these six states, Arizona and Florida stand out as states

Table 7: Comparison of Debt in California and All Other States in 2007

	Real Per Capita Long-term Debt Excluding Private Purposes	Percentage of US Average	Percentage of GSP Long-term Debt Excluding Private Purposes	Percentage of US Average	Percentage of Annual Revenue Long-term Debt Excluding Private Purposes	Percentage of US Average
United States Total	\$6,347	100.0%	13.4%	100.0%	59.7%	100.0%
California	\$8,377	132.0%	16.2%	121.1%	62.3%	104.3%
Arizona	\$4,890	77.0%	11.9%	89.1%	56.9%	95.3%
Florida	\$6,419	101.1%	15.1%	113.3%	64.9%	108.6%
Illinois	\$7,116	112.1%	14.2%	106.1%	73.2%	122.5%
New York	\$10,837	170.7%	18.3%	137.4%	69.2%	115.9%
Texas	\$6,300	99.3%	12.4%	92.8%	72.6%	121.5%
Alabama	\$4,869	76.7%	13.1%	98.5%	53.2%	89.0%
Alaska	\$8,401	132.3%	12.3%	91.7%	35.5%	59.5%
Arizona	\$4,890	77.0%	11.9%	89.1%	56.9%	95.3%
Arkansas	\$2,856	45.0%	8.2%	61.2%	34.5%	57.7%
California	\$8,377	132.0%	16.2%	121.1%	62.3%	104.3%
Colorado	\$7,225	113.8%	14.1%	105.4%	70.9%	118.7%
Connecticut	\$6,800	107.1%	10.8%	80.8%	61.7%	103.4%
Delaware	\$5,219	82.2%	7.0%	52.3%	46.6%	78.0%
District of Columbia	\$13,373	210.7%	8.2%	61.1%	66.3%	110.9%
Florida	\$6,419	101.1%	15.1%	113.3%	64.9%	108.6%
Georgia	\$4,465	70.3%	10.3%	77.1%	52.9%	88.6%
Hawaii	\$7,696	121.2%	15.3%	114.6%	70.0%	117.2%
Idaho	\$2,162	34.1%	5.9%	44.0%	24.8%	41.5%
Illinois	\$7,116	112.1%	14.2%	106.1%	73.2%	122.5%
Indiana	\$5,024	79.1%	12.3%	91.9%	62.4%	104.4%
Iowa	\$3,371	53.1%	7.4%	55.7%	34.9%	58.4%
Kansas	\$5,250	82.7%	12.0%	89.5%	59.1%	98.9%
Kentucky	\$5,231	82.4%	14.0%	105.0%	63.1%	105.6%
Louisiana	\$5,059	79.7%	10.0%	74.8%	44.3%	74.1%
Maine	\$3,681	58.0%	9.7%	72.9%	37.8%	63.3%
Maryland	\$4,007	63.1%	8.2%	61.5%	40.3%	67.4%
Massachusetts	\$9,301	146.5%	16.5%	123.6%	82.7%	138.4%
Michigan	\$5,836	91.9%	15.0%	112.1%	61.4%	102.8%
Minnesota	\$5,932	93.4%	11.7%	87.5%	54.3%	90.9%
Mississippi	\$3,658	57.6%	11.7%	87.5%	34.6%	57.9%
Missouri	\$3,980	62.7%	9.8%	73.7%	45.3%	75.8%
Montana	\$2,261	35.6%	6.0%	45.2%	22.5%	37.7%
Nebraska	\$5,480	86.3%	11.6%	86.9%	50.4%	84.4%
Nevada	\$8,339	131.4%	15.5%	116.4%	86.6%	144.9%
New Hampshire	\$4,322	68.1%	9.5%	71.0%	52.9%	88.5%
New Jersey	\$8,068	127.1%	14.6%	109.1%	70.6%	118.1%
New Mexico	\$4,384	69.1%	10.9%	82.0%	39.2%	65.7%
New York	\$10,837	170.7%	18.3%	137.4%	69.2%	115.9%
North Carolina	\$4,704	74.1%	10.3%	77.3%	53.1%	88.9%
North Dakota	\$3,702	58.3%	8.0%	59.8%	35.9%	60.0%
Ohio	\$3,897	61.4%	9.4%	70.1%	35.5%	59.4%
Oklahoma	\$3,785	59.6%	9.6%	71.8%	43.1%	72.1%
Oregon	\$7,028	110.7%	15.8%	118.2%	59.8%	100.2%
Pennsylvania	\$5,604	88.3%	12.7%	94.8%	55.7%	93.2%
Rhode Island	\$5,685	89.5%	12.5%	93.4%	51.8%	86.7%
South Carolina	\$7,359	115.9%	20.3%	152.3%	78.2%	130.9%
South Dakota	\$2,688	42.3%	5.8%	43.6%	29.0%	48.5%
Tennessee	\$4,715	74.3%	11.3%	84.7%	53.2%	89.0%
Texas	\$6,300	99.3%	12.4%	92.8%	72.6%	121.5%
Utah	\$4,574	72.1%	10.8%	81.0%	49.2%	82.4%
Vermont	\$3,739	58.9%	9.1%	68.1%	35.2%	58.9%
Virginia	\$5,254	82.8%	10.1%	75.7%	55.1%	92.2%
Washington	\$8,668	136.5%	17.2%	128.8%	73.8%	123.5%
West Virginia	\$2,426	38.2%	7.3%	54.8%	28.6%	47.9%
Wisconsin	\$5,483	86.4%	12.6%	94.7%	52.9%	88.5%
Wyoming	\$1,562	24.6%	2.5%	18.4%	9.1%	15.2%

Figure 9: Debt Per Capita for California and Comparable States

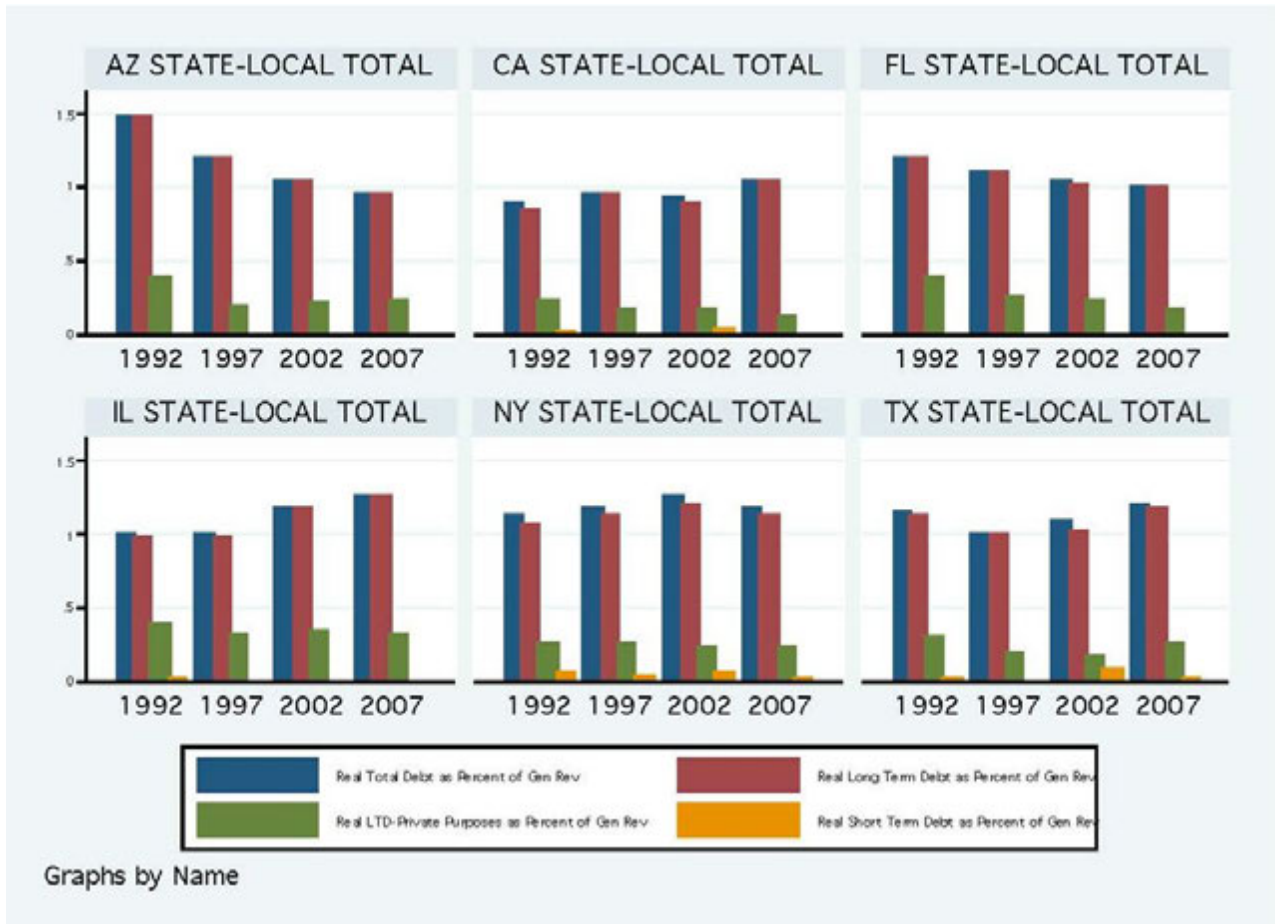


Figure 10: Debt as a Percentage of General Revenue for California and Comparable States

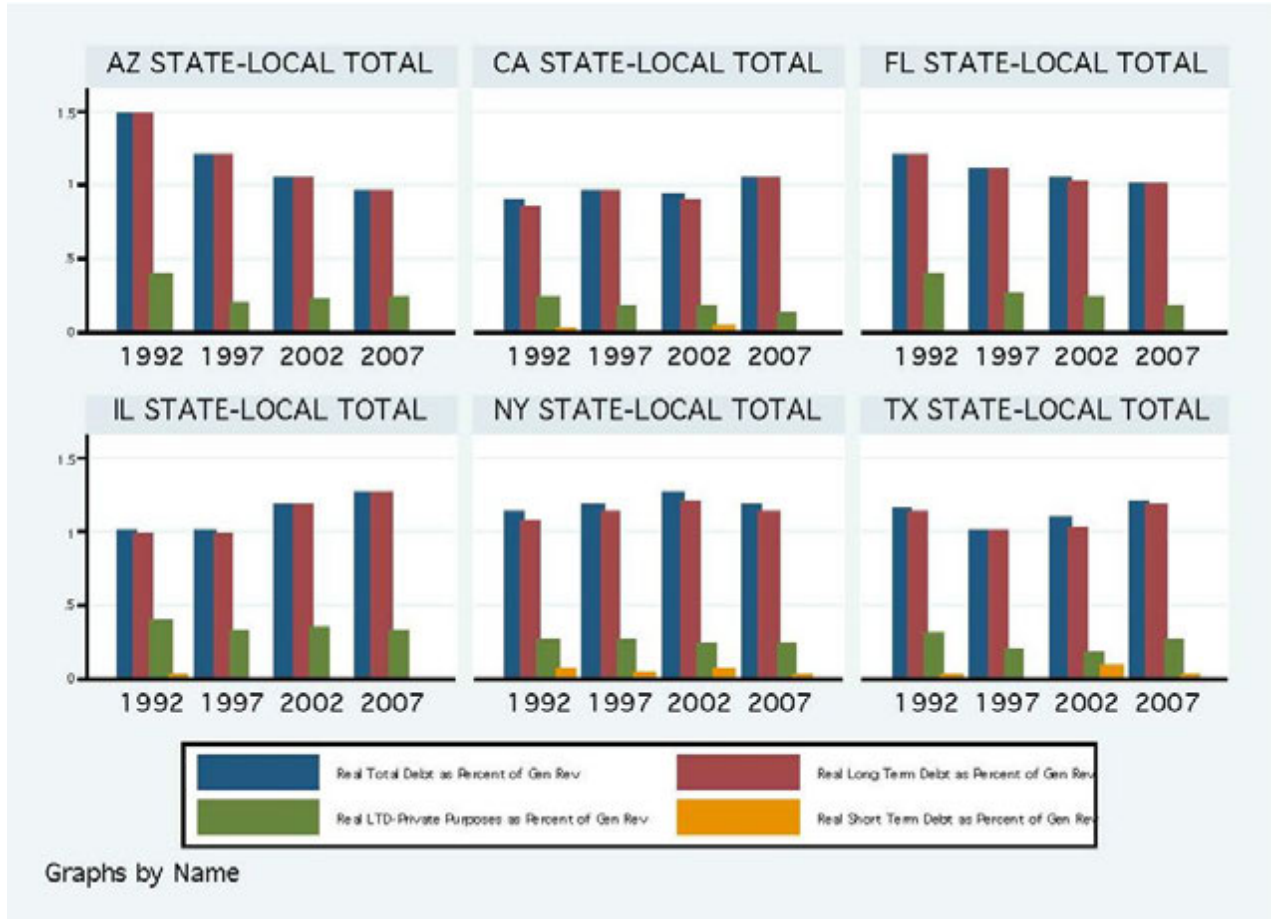


Table 8: Change in State and Local Debt Amounts from 1992 to 2007

Debt Measure	California	Arizona	Florida	Illinois	New York	Texas	United States
<i>Per Capita Total State and Local Real Debt</i>							
Change, 1992 to 2007	\$3,754	-\$1,195	\$1,302	\$4,097	\$4,027	\$2,622	\$1,431
Percentage Change, 1992 to 2007	65.4%	-15.4%	20.5%	76.1%	40.9%	45.5%	41.1%
<i>Per Capita Long-Term Real Debt</i>							
Change, 1992 to 2007	\$3,916	-\$1,215	\$1,288	\$4,149	\$4,255	\$2,466	\$1,415
Percentage Change, 1992 to 2007	70.5%	-15.6%	20.3%	78.0%	45.6%	43.2%	42.3%
<i>Total State and Local Debt as % of GSP</i>							
Change, 1992 to 2007	-5.1%	-16.3%	-10.8%	-4.3%	-10.5%	-7.5%	1.8%
<i>Long-Term Debt as % of GSP</i>							
Change, 1992 to 2007	-4.7%	-16.3%	-10.8%	-4.1%	-9.6%	-7.6%	1.9%
<i>Total State and Local Debt as % of Annual Revenue</i>							
Change, 1992 to 2007	1.1%	-41.8%	-23.8%	13.0%	-3.1%	-1.3%	-3.7%
<i>Long-Term Debt as % of Annual Revenue</i>							
Change, 1992 to 2007	3.2%	-42.0%	-23.9%	13.9%	-0.1%	-2.8%	-2.9%

where debt grew much less than government revenue, whereas Illinois is the state where debt increased substantially more than revenue. Debt relative to revenue in 2007 remained higher in Illinois, New York, and Texas than in California. In California, it is clear that state and local debt has not grown relative to the size of the state's economy or relative to the size of state and local budgets since 1992.

School District Debt

As noted previously, the largest increase in debt nationally since 1992 has been in debt incurred by or on behalf of school districts. Nationally, school district long-term debt rose from 6% of total state and local long-term debt in 1992 to 13% in 2007. As shown in Figure 11, this trend is especially strong in California where school district debt increased from 1.4% to 15.1% of outstanding long-term debt between 1992 and 2007. The state government's share of long-term debt remained at about one-third of the total, whereas the shares for other types of local governments (counties, municipalities, and special districts) declined. Thus, over this 15-year period in California, long-term school district debt served, at least in part, to replace long-term debt by other local governments.

Table 9 compares school district debt in California in 2007 to school district debt in the five other states. School district debt is substantially greater in Texas, both in absolute amounts and relative to the size of the economy and government budgets, than in any of the other states. In contrast, school district debt is relatively low in Arizona and New York. California appears in the middle of these six states in terms of debt issued by school districts, comparable to Florida and Illinois.

Figure 11: Share of California Long-Term Debt by Type of Government

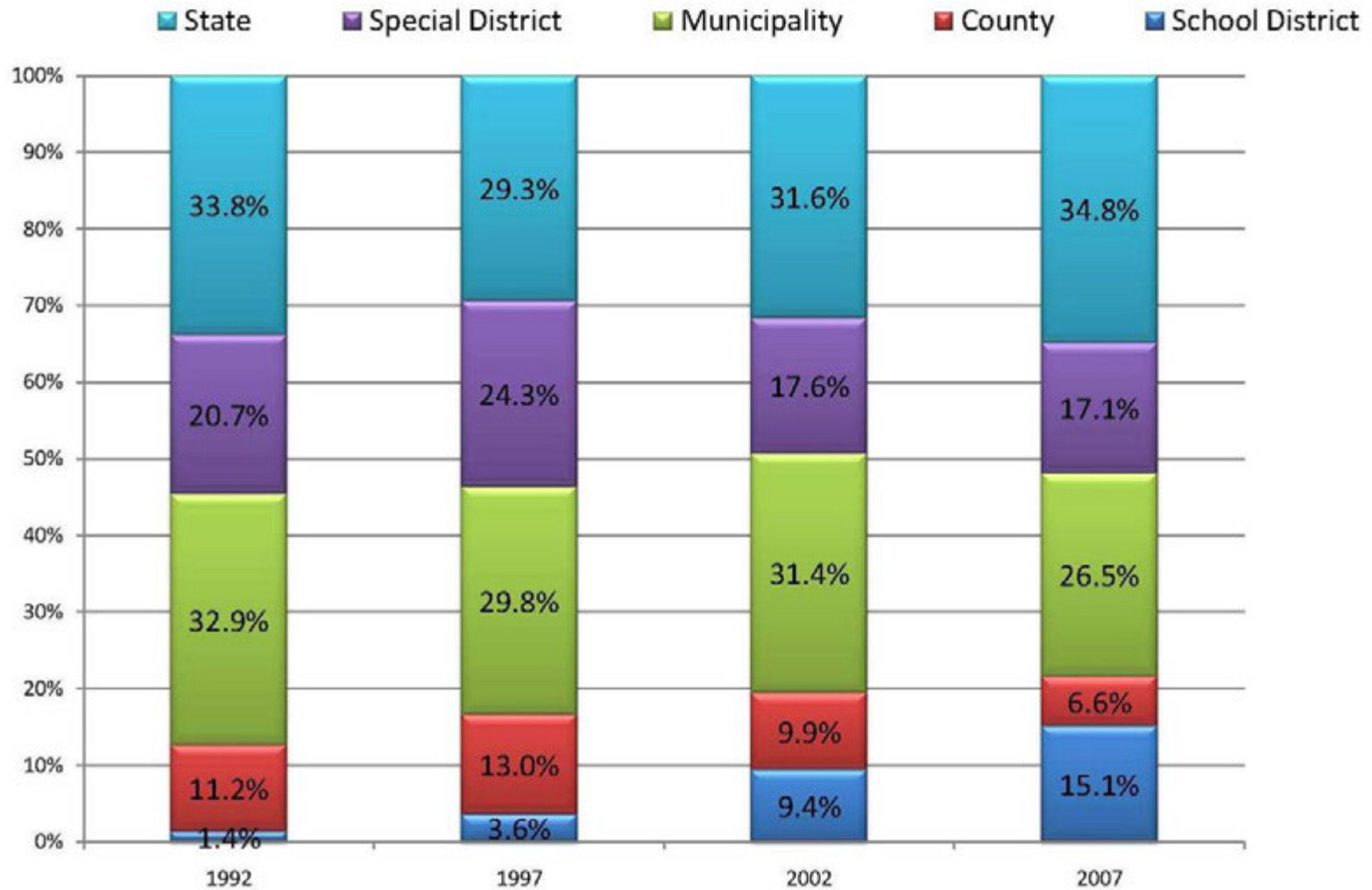


Table 9: Comparison of School District Debt in California and Selected States in 2007

Debt	California	Arizona	Florida	Illinois	New York	Texas
Per Capita Total State and Local Real School District Debt (in dollars)	\$1,433	\$775	\$944	\$1,399	\$845	\$2,319
Per Capita Short-term Real School District Debt (in dollars)	\$8	\$1	\$1	\$11	\$62	\$96
Per Capita Long-term Real School District Debt (in dollars)	\$1,425	\$774	\$943	\$1,389	\$783	\$2,222
Total State and Local School District Debt as % of GSP	2.8%	1.9%	2.2%	2.8%	1.4%	4.6%
Short-term School District Debt as % of GSP	0.0%	0.0%	0.0%	0.0%	0.1%	0.2%
Long-term School District Debt as % of GSP	2.8%	1.9%	2.2%	2.8%	1.3%	4.4%
Total State and Local School District Debt as % of Annual State and local Revenue	10.7%	9.0%	9.5%	14.4%	5.4%	26.7%
Short-term State and local Debt as % of Annual State and local Revenue	0.1%	0.0%	0.0%	0.1%	0.4%	1.1%
Long-term State and local Debt as % of Annual State and local Revenue	10.6%	9.0%	9.5%	14.3%	5.0%	25.6%
Economic Characteristics						
Population	35,979,208	6,192,100	18,088,505	12,718,011	19,356,564	23,369,024
Public School Enrollment	6,406,750	1,068,249	2,671,513	2,118,276	2,809,649	4,599,509
Public School Enrollment per 1000 Population	178	173	148	167	145	197
Number of Dependent School Systems (Municipalities and Counties)	58	14	na	na	36	1

A number of institutional factors complicate the comparison of school district debt. First, the Census Bureau reports debt based on the type of local government rather than by service function. School district debt as reported by the Census includes debt for independent school districts, but does not include debt incurred for education by so-called “dependent school systems” (K-12 school systems operated by counties or municipalities). The importance of dependent school systems varies among states, with the number of such systems listed in the table. Nevertheless, the number of systems does not necessarily indicate their relative importance; schools in New York City are part of a city-run system, for instance, which may partly explain the apparently low level of school district debt in New York State.

Second, public school enrollment also varies substantially among states because of differences in the age structure of the population and because of the relative importance of private schools. Table 9 also records public school enrollment per thousand residents. Texas again stands out with nearly 20% of the state’s population enrolled in public schools, substantially higher than in any of the other states. In addition to the level of enrollment, recent growth in the number of students may also affect school district debt. The recent growth in public school enrollment has also been greater in Texas than in these other states, more than 10% since 2001 in Texas, but less than 3% in California. Finally, the method of issuing school district debt sometimes varies among states. Independent school districts may incur debt individually in most instances, although state entities may incur the debt on behalf of school districts in a few cases.

In summary, the debt of state and local governments in California in 2007 is not substantially different relative to the size of its economy or revenue compared to other large, highly urbanized states. However, California has issued relatively less short-term debt than other

states and has used public debt for private purposes to a relatively lesser degree than other states. Consequently, outstanding long-term debt for traditional public purposes is a bit higher in California than other states. A substantial portion of the increase in long-term debt in California since 1992 has arisen from growing school district borrowing. The outstanding debt and the annual interest payments on debt remain a relatively low fraction of state and local government budgets in the state.

IV. REGRESSION ANALYSIS OF SUBNATIONAL DEBT

The motivation for this research project stems from the possibility that California's state and local debt load has reached a level that may be of concern. In other sections of this report, we address this issue through descriptive observation of all levels of California subnational debt. We do this through comparison to other states, and through economic and financial theory that has sought to characterize when a public entity has taken on a comparable amount of too much debt. In this section of our report we pursue a statistical "regression analysis" of the levels of state and local debt issued by the 50 states between 1997 and 2007.¹⁹ Such an analysis allows us to quantify the factors that have driven differences in debt loads across the states over the time period observed and to determine if state-specific trends beyond these expected causal factors have caused California's debt load to be above or below that observed in other states. A regression-based comparison offers one way of determining whether California is out of line with other states regarding its degree of state and local debt activity.

To place our regression analysis in the context of earlier research, we offer next a review of similar studies. These studies offer valuable insights into both the choice of dependent variable and the economic and political theories to consider when selecting the appropriate explanatory variables. Then we offer a description of the specific regression models used here and descriptive statistics for the variables used to implement it. Next, we describe the results of two different forms of regression analysis. Finally, we conclude with the implications from these analyses as to what is influencing differences in subnational debt activity across the states and if California's debt load over the period observed is greater than other states after controlling for those factors expected to influence it.

¹⁹ Later we will offer a similar regression analysis of new debt issues between 2008 and 2010.

Previous Research on Differences in Subnational Debt Activity within a State

Bahl and Duncombe (1993) was one of the first studies to use regression analysis to determine the factors that influence differences in debt burdens across states.²⁰ They define a state's debt burden as the total amount of a particular form of debt issued at a point in time in a state (a stock) divided by the state's total personal income for the previous year (a flow). For three years (1988, 1989, and 1990) and 49 states (Alaska was deemed an outlier and excluded), Bahl and Duncombe gather inflation-adjusted data for: (1) total state and local debt, (2) state and local government public-purpose debt, (3) full faith and credit state and local government public-purpose debt, and (4) public non-guaranteed debt. They hypothesized that differences in these values were due to four general factors: (1) service demand differences accounted for by population and income differences; (2) expansionary government differences controlled for with per-capita spending in different expenditure categories and state debt limitations; (3) debt mix as measured by private or public non-guaranteed debt as a fraction of total debt; and (4) the historic debt burden from 1977. Bahl and Duncombe find that population, population density, historic debt burden, and current government expenditure exert a positive influence on most of the measures of current debt used in their analysis. In contrast, the use of private purpose debt and a debt limit exert a negative influence.

This study laid the groundwork for further studies of this type. However, one should be cautious of putting too much credence on one specific set of regression findings. As illustrated by this regression study, a number of statistical problems may be present that limit the reliability of the result. For instance, for a regression analysis to function properly, independent variables

²⁰ Regression analysis requires a model where the value of one dependent variable changes based on multiple other independent (or explanatory) variables (http://en.wikipedia.org/wiki/Regression_analysis). Statistical analysis then allows the calculation of how a one-unit change in one of the explanatory variables influences a change in the dependent variable, holding the other explanatory variables constant.

need to be truly independently determined. In the Bahl and Duncombe study, it is questionable as to whether all of the explanatory variables used to analyze debt choice are determined independent of it. Government spending is an obvious example. Another concern that can arise in regression analysis is explanatory variables that move very closely together (highly correlated) with each other. In the Bahl and Duncombe study, this is likely to be the case for the explanatory variables that measure income and government spending. Furthermore, in this study there was no attempt to control for the statistical issues that arise when using a data set that includes the states at one point in time (cross section) and looking at them over multiple years (pooled cross section and time series data).

Trautman (1995) followed with a regression analysis of pooled 1984, 1985, and 1986 data on real per-capita long-term debt issued by the 50 states. She was interested specifically in finding the effect of debt limitation rules on the issuance of debt, but included other political and institutional factors expected to influence state debt activity. These additional factors were the degree of decentralization in state and local government, use of a capital budget, executive tenure remaining, executive appointment power, and the number of state public authorities authorized to issue debt (which she appropriately modeled as endogenous, that is determined in part by the degree of debt issue). Furthermore, she accounted for the expected effect of service demand differences by including as explanatory variables the percentage the state population in urban areas, percentage that is college educated, percentage that is greater than age 65, and the state per-capita income, as well. Trautman also included dummy variables for three of the four major Census Regions, but no state or time dummy variables to account for the panel nature of her data (multiple states in multiple years). Her findings support the notion that debt management and strong executive control reduce the amount of debt activity exhibited by a state.

Clingermayer and Wood (1995) published the first regression study of long-term, per-capita state debt that explicitly accounted for the pooled nature of the data used – 48 states (Alaska and Hawaii excluded) observed over the 29 years between 1961 and 1989. Observing that state debt levels over time are not stationary (last year's debt makes up the bulk of this year's), they examine the change in the dependent variable from year-to-year and relate that to the change in all of the explanatory variables included in their regression analysis. Appropriately, they also deal with important statistical issues in the data (autocorrelation and heteroskedasticity).²¹

Clingermayer and Wood (1995) hypothesize that the observed differences in debt levels are due to economic, political, and institutional factors. Economic factors measured only in the year that debt is observed include real per-capita income, real per-capita own source state and local revenues, and real per-capita federal revenue. Economic factors measured in the year debt is observed and for the previous nine years include the change in the three previous described economic factors, and the change in short-term debt. Two additional economic variables include an interest rate measure across the years and a dummy variable to account for the 1986 federal tax reform. Political and institutional explanatory variables included are: (1) real federal debt (constant across states in a given year), (2) a measure of political liberalism in the state (constant across years in a given state), (3) the degree of electoral competition in the state, (4) the degree of divided government in the state, (5) fiscal centralization as measured by the ratio of state government revenue to all state and local revenues, (6) a dummy variable if a tax or spending limit is in place, and (7) a dummy variable if a debt limit is in place. All of the economic factors included as explanatory variables in the Clingermayer and Wood regression study are

²¹ See <http://en.wikipedia.org/wiki/Heteroscedasticity> and <http://en.wikipedia.org/wiki/Autocorrelation> for summaries of these concerns to regression analysis.

statistically relevant and exhibit the expected direction of effect. A more liberal and electorally competitive state exhibits greater debt, whereas a state with a Democrat as governor and a Republican legislature exhibits relatively less debt. Surprisingly, they find the presence of tax and spending limits in a state is associated with greater per-capita debt levels.

Finally, Ellis and Schansberg (1999) examine the reasons why the change in real long-term debt levels varies across states by designing a regression study that weights this measure by either a state's population or its total state and local government spending. Note the difference in dependent variable used here (change in debt level) from that used in the previous studies just discussed (total debt level). The Ellis and Schansberg data set consists of 29 annual observations between 1966 and 1994 for all 50 states. They also believe that economic, political, institutional, and constituency factors influence the state differences. The panel nature of their data set is accounted for with a one-way error component regression model that subtracts the observed mean of a variable in a given time period across the 50 states from its observed value in a state. In statistical terms, this is equivalent to including a set of state dummy variables in the regression. Ellis and Schansberg find that a higher percentage young people in the population (old) exerts a positive (negative) influence on both measures of a state's change in debt level, whereas per-capita income exerts a positive influence on change in debt per capita and a negative influence on change in debt per government spending. Only a few of the included political and institutional explanatory variables exerted a statistically significant influence on either debt measure. The significant variables included that a Republican majority in the upper house reduces debt per population; whereas, same party control of upper and lower houses, or a governor with at least one more term to serve, increases state debt per dollar of government spending.

After reviewing this sample of articles, we came away with the following insights regarding our own regression analysis of the topic. First, it is necessary to use a panel data set that contains observations from the states spread over multiple years. Doing so offers the increased variation of not only observing differences in debt burden across the states, but also differences over time within a state. But when adopting this approach, the fixed effects on state debt that are constant in one year for all states and constant in a state over multiple years need to be accounted for. In addition, it is important to control for inflationary effects using real dollar values. Second, the choice of how to measure debt burden is important. We only wish to examine long-term debt (taken on for more than a year). Nevertheless, as demonstrated by the choices in previous studies, it is important to distinguish between different forms of long-term debt when trying to explain what influences the different choices state make. For instance, the causes of differences in public debt taken on for private purposes are likely to be different from the factors influencing differences in public debt for public purposes.

Furthermore, there has emerged a clear consensus on the general casual factors that influence differences in long-term debt burdens across the states. Broadly defined, the categories are economics, politics, institutions, and demographics. The inclusion of explanatory variables that account for all of these factors helps to insure that a regression analysis does not suffer from “omitted variable bias” (that the effect picked up from one explanatory variable is due, in part, to the variable being correlated with another explanatory variable that has been left out). In this regard, there are other statistical concerns to deal with when constructing a regression model of this type. The inclusion of explanatory variables that are endogenous (the explanatory variable is influenced by the dependent variable being studied) should be avoided. An endogenous

explanatory variable not only causes the dependent variable, but the reverse causation is also present.

One example from the previous research is the use of government spending to explain debt activity. Here there is not a clear dependent and independent variable designation, as debt activity also influences government expenditure. If we do not account for simultaneous determination, regression estimation yields a biased causal effect of government expenditure on debt. Our solution is to specify a reduced-form regression model that excludes clearly endogenous explanatory variables. In addition, in research of this type explanatory variables can be determined exogenously but still move closely together. Termed “multicollinearity,” this occurrence is a concern because it biases the standard error of regression estimates upward and reduces the likelihood of statistical significance. This, too, requires correction if present. “Heteroskedasticity” and “autocorrelation” are also two technical regression considerations that are likely to be present. Both introduce biases into the calculated standard errors of regression estimation. Corrections for these problems are available if detected.

A Regression Model of Determinants of State Debt

We utilize data from the decennial Census of Governments on the nominal level of long-term state and local debt in the 50 states for the years 1992, 1997, 2002, and 2007 (the only years of compilation for the Census of Governments). In addition, we have information on the amount of this public debt used for private purposes, and a separate measure of the long-term debt issued by schools in the 45 states where the school district is not specifically a part of state government. We recalculate all of these measures in thousands of dollars and real 2009 terms (accounting for inflation), and divide by state population (to account for obvious scale effects) in the respective year. The result is four dependent variables used in our regression analysis: (1) Real Long Term

Debt Per Capita, (2) Real Public Debt Private Purpose Per Capita, (3) Real Long Term Debt Less Private Per Capita, and (4) Real Long Term School District Debt Per Capita.²²

We begin with the simple relationship that debt in period “t” (D_t), is equivalent to debt in the previous period “t-1” (D_{t-1}), plus new bond issues in period “t” (B_t), less bond retirement in period “t” (R_t):

$$D_{t,i} = D_{t-1,i} + B_{t,i} - R_{t,i} ;$$

where,

$i = 1, 2, 3, \dots 50$ states,

$t = 1997, 2002, \text{ and } 2007$ years, and

$t - 1 = 1992, 1997, \text{ and } 2002$ years

For the period between 1992 and 2007, we do not have data on “ $B_{t,i} - R_{t,i}$ ” and instead assume that differences in this can be accounted for by the four general causal factors discovered earlier in our review of the literature plus Borrowing Costs.

$$B_{t,i} - R_{t,i} = f(\text{Demographics}_{t,i}, \text{Politics}_{t,i}, \text{Economics}_{t,i}, \text{Institutions}_{t,i}, \text{Borrowing Costs}_{t,i}),$$

where,

Demographics = f (Percentage Population Age 65 Plus, Percentage Population Public K-12 Enrolled),

Politics = f (BRH Liberal Citizen Ideology),

Economics = f (Real Gross State Product Per Capita, Federal Intergovernmental Revenue Per Capita, State Fiscal Balance as Percentage of Expenditure, Unemployment Rate),

Institutions = f (Limit on Debt Issue by Amount, No Mandatory Revenue or Spending Limit),

²² We also ran regressions with the same explanatory variables, but two additional dependent variables (1) State Only Real Long Term Debt Per Capita and (2) Real Long Term Debt Per Revenue Raised. The reason for trying dependent variable (1) was to test if some of the included explanatory variables exerted a greater influence on state government only issued debt as compared to combined state and local issued debt. We subsequently found no substantial difference and thus do not report these results. We also tried dependent variable (2) to check if debt weighted by government activity (revenue) reacts differently to the chosen set of explanatory variables than debt per capita. Again, no significant difference found, and thus the results not reported.

Borrowing Costs = f (Previous Period's Debt).

The specific explanatory variables chosen to represent the general factors are similar to variables used in previous studies. We have taken a parsimonious approach to variable choice to avoid issues of multicollinearity and endogeneity. Table 10 offers the source and descriptive statistics for all variables used in this analysis. Recall that our goal in estimating this regression analysis is twofold. First, we desire to offer information about which explanatory variables exert a statistically significant influence on debt. Second, we wish to determine that if after accounting for these causal factors, has California (or any other state of the reader's choosing) issued more or less debt than the other states.

As noted in Wooldridge (2000, Chapters 13 and 14) there are two ways by which to estimate a panel data regression. The first is by "first-differencing" observations on all variables for two consecutive periods observed. The benefit of using this approach is that it avoids the use of a set of state dummy variables and the resulting introduction of multicollinearity into the regression. If present, we can also correct for autocorrelation. The downside to the use of first differencing is that it does not yield the fixed effect regression estimates necessary to determine if a specific state was offering more or less debt over this period than other states. An alternative to first differencing is a "fixed effects" regression model that pools state observations on debt over time and includes a set of time dummy variables and a set of state dummy variables to account for and measure these influences. As just noted, this is likely to introduce multicollinearity and reduce the likelihood of finding statistically significant influences on the dependent variable. In addition, it is difficult to account for the presence of both heteroskedasticity and autocorrelation if present in a fixed effects regression. Wooldridge's (p. 447) suggestion is to run both types of pooled regression models and only report the results of

both if significantly different. We did this and found no autocorrelation issues in the first-differenced model and similar results in both models.

Regression Results

We included a time dummy variable to represent the three different first-differenced cross sections of data when we estimated the first-differenced version of our regression model.

Wooldridge (p. 430) suggests this inclusion to control for time specific effects not picked up through the other explanatory variables. We begin this estimation by first estimating four first-differenced regressions with our variety of explanatory variables. In each case, a Breusch-Pagan test for heteroskedasticity indicates its presence, and we then re-estimate with robust standard errors. The residuals from these regressions are retrieved and used to test for AR(1) autocorrelation as suggested by Wooldridge (p. 431) and not found. The combination of all these statistical adjustments means that we have attempted to correct for known statistical problems. Table 11 contains the results of these four first-differenced regressions, corrected for heteroskedasticity. The cells in the body of the table contain the estimated regression coefficient (or how much the dependent variable changes with a one-unit change in the explanatory variable) and below it in parenthesis the regression coefficient's standard error. The regression results recorded in Table 11 assume that the effect of any of the casual variables on debt is consistent across the 15-year time period observed.

We also estimate four fixed-effect regressions using the same data as employed for the first-differenced regressions. Again, a Breusch-Pagan test for heteroskedasticity indicates its presence in all four regressions. We thus re-estimate with standard errors that are robust to the clusters of different states included in each regression. Table 12 contains these regression results. We also wish to test whether the amount of unfunded real state pension liability exerts

Table 10: Debt Regressions Variable Description, Source, and Descriptive Statistics

Variable Name	Source	Mean (Std. Dev.)	Max. (Min.)
<i>Dependent Variables</i>			
Real Long Term Debt PC* (1000 \$s)	Census of Governments; 1992, 1997, 2002, and 2007 http://www.census.gov/govs/estimate . Consumer Price Index; 1982-84 Base Year http://www.bls.gov/data . U.S. Census American FactFinder; 1992, 1997, 2002, and 2007 http://factfinder.census.gov/servlet/SAFFPopulation?_submenuId=population_0&sse=on .	6.711 (3.040)	22.355 (1.995)
Real Public Debt Private Purpose PC (1000 \$s)	Census of Governments; 1992, 1997, 2002, and 2007 http://www.census.gov/govs/estimate . Consumer Price Index; 1982-84 Base Year http://www.bls.gov/data . U.S. Census American FactFinder; 1992, 1997, 2002, and 2007 http://factfinder.census.gov/servlet/SAFFPopulation?_submenuId=population_0&sse=on .	2.229 (1.530)	13.666 (0.386)
Real Long Term Debt Less Private PC (1000 \$s)	Census of Governments; 1992, 1997, 2002, and 2007 http://www.census.gov/govs/estimate . Consumer Price Index; 1982-84 Base Year http://www.bls.gov/data . U.S. Census American FactFinder; 1992, 1997, 2002, and 2007 http://factfinder.census.gov/servlet/SAFFPopulation?_submenuId=population_0&sse=on .	4.482 (2.399)	16.176 (0.729)
Real Long Term School District Debt PC (1000 \$s)	Census of Governments; 1992, 1997, 2002, and 2007 http://www.census.gov/govs/estimate . Consumer Price Index; 1982-84 Base Year http://www.bls.gov/data . U.S. Census American FactFinder; 1992, 1997, 2002, and 2007 http://factfinder.census.gov/servlet/SAFFPopulation?_submenuId=population_0&sse=on .	0.679 (0.613)	3.733 (0.006)
<i>Explanatory Variables</i>			
Percentage Pop Age 65 Plus	U.S. Census Population Estimates; 1996, 2002, and 2006 http://www.census.gov/popest/archives .	12.62 (1.91)	18.55 (4.23)
Percentage Pop Public K-12 Enrolled	U.S. Department of Education, National Center for Education Statistics, <i>Digest of Education Statistics</i> , 2009, http://nces.ed.gov/programs/digest/ .	17.17 (3.06)	33.05 (8.49)
BRH Liberal Citizen Ideology	Drawn from the “revised 1960-2008 citizen ideology series” measure developed by Berry, Ringquist, and Hanson (1998) for 1997, 2002, and 2007 where 0 = most conservative and 1 = most liberal http://www.uky.edu/~rford/readme_update2008.pdf .	50.92 (16.56)	90.97 (8.45)
Real Gross State Product PC (1000 \$s)	Bureau of Economic Analysis; Regional Economic Accounts; 1997, 2002, and 2007 http://www.bea.gov/regional/gsp/ . Consumer Price Index; 1982-84 Base Year http://www.bls.gov/data/ . U.S. Census American FactFinder; 1997, 2002, and 2007 http://factfinder.census.gov/servlet/SAFFPopulation?_submenuId=population_0&sse=on .	42.260 (12.897)	104.136 (19.673)
Fed Intergovernmental Revenue PC or Per Student (1000 \$s)	Census of Governments; 1997, 2002, and 2007 http://www.census.gov/govs/estimate/ . Consumer Price Index; 1982-84 Base Year http://www.bls.gov/data/ . U.S. Census American FactFinder; 1997, 2002, and 2007 http://factfinder.census.gov/servlet/SAFFPopulation?_submenuId=population_0&sse=on .	1.497 (0.635)	4.634 (0.408)
State Fiscal Balance as Percentage of Expenditure	<i>Budget Processes in the States</i> (1997, 2002, and 2008), NASBO, http://www.nasbo.org/Publications/BudgetProcessintheStates	8.89 (13.08)	99.50 (-19.4)
Unemployment Rate	Regional and State Unemployment 1997, 2002, and 2007 Annual Averages, Bureau of Labor Statistics, http://www.bls.gov/schedule/archives/laus_nr.htm .	4.80 (1.13)	7.7 (2.4)
Limit Debt Issue by Amount	<i>Budget Processes in the States</i> (1997, 2002, and 2008), NASBO, http://www.nasbo.org/Publications/BudgetProcessintheStates	0.690 (0.446)	1 (0)
No Mandatory Revenue or Spending Limit	<i>State Tax and Expenditure Limits</i> (2008), NCSL, http://www.ncsl.org/default.aspx?tabid=12633 .	0.480 (0.500)	1 (0)
Unfunded Real State Pension Liability PC (1000s)	<i>The Public Fund Survey</i> , http://www.publicfundsurvey.org .	0.720 (0.760)	3.750 (-0.890)

*PC = Per Capita; Real dollars measured in 2009 constant dollars based upon the Bureau of Labor Statistics Consumer Price Index for all U.S. urban consumers.

Table 11: Debt First Differenced Regression Results (2002-1997, 2007-2002)

Dependent Variables Explanatory Variables	Real Long Term Debt PC	Real Public Debt Private Purpose PC	Real Long Term Debt Less Private PC	Real Long Term School District Debt PC~
Constant	0.659*** (0.129)	0.209*** (0.062)	0.332** (0.099)	-0.047** (0.022)
2007-2002 Dummy	0.072 (0.162)	0.009 (0.050)	0.059 (0.110)	-0.043 (0.034)
Lag Value of Respective Dependent Variable	0.171 (0.163)	-0.109* (0.056)	0.550*** (0.116)	0.848*** (0.149)
Percentage Pop Age 65 Plus	0.124 (0.102)	-0.033 (0.054)	0.109 (0.097)	0.028 (0.036)
Percentage Pop Public K-12 Enrolled	0.141*** (0.040)	0.034* (0.016)	0.075*** (0.026)	0.026** (0.012)
BRH Liberal Citizen Ideology	-0.003 (0.004)	-0.002 (0.002)	-0.001 (0.003)	0.0001 (0.002)
Real Gross State Product PC (1000 \$s)	0.006 (0.025)	-0.015 (0.013)	0.022 (0.019)	-0.004 (0.007)
Fed Intergovernmental Revenue PC or Per Student (1000 \$s)	-0.696** (0.323)	-0.276* (0.154)	-0.414 (0.275)	0.199 (0.491)
State Fiscal Balance as Percentage of Expenditure	0.001 (0.004)	-0.0004 (0.003)	.0003 (0.004)	0.003 (0.002)
Unemployment Rate	0.032 (0.052)	-0.018 (0.0251)	0.044 (0.043)	0.010 (0.012)
Limit Debt Issue by Amount	-0.064 (0.088)	-0.001 (0.057)	-0.051 (0.071)	-0.016 (0.022)
No Mandatory Revenue or Spending Limit	0.100 (0.130)	-0.045 (0.041)	0.120 (0.114)	-0.026 (0.032)
Observations	100	150	150	90~
R-Squared	0.468	0.125	0.562	0.584

~ AK, HA, MD, NC, and VA excluded due to statewide school districts whose bond issue is measured in total state and local bond measures.

For all regression result tables, each cell contains the calculated regression coefficient and its standard error in parenthesis below it. The statistical confidence that can be placed in a regression coefficient regarding its calculated effect being different than zero in a two-tailed test is indicated as follows: *** = 99% or greater confidence, **=95 to 99% confidence, and 90 to 95% confidence.

an influence on debt issue. However, because a consistent measure of this explanatory variable is only available for 2002 and 2007, and because we expect unfunded pension liability to influence only Real Long Term Debt PC, we re-estimate this regression using a panel data set from only this total measure of state and local debt derived from only these two years. Table 13 contains these results. These are also informative to check if the influences of the explanatory variables in these two most recent periods are different from those calculated for all three periods on this dependent variable.

Interpretation of Regression Results

Turning first to the first-differenced results for 1997 to 2007 in Table 11, the only explanatory variable found to exert a statistically significant influence on all four forms of debt is the percentage of a state's population enrolled in K-12 public schools. A one-percentage point increase in children raised long term debt per capita by \$141, raised public debt for private purposes by \$34, raised long term debt less private debt per capita by \$75, and also school district debt per capita by \$26. In addition, a one thousand dollar (2009 real dollars) increase in federal revenue sharing per capita reduces long-term debt per capita by \$696 and reduces private purpose debt per capita by \$454, and public debt less private purpose debt by \$276. One could attribute the lack of statistical significance of the other explanatory variables included in Table 11 to multicollinearity if these other explanatory variables moved together so closely that the regression procedure could not separate out their independent influences. We dismissed this possibility through a check of the appropriate variance inflation factor (VIF) statistics.²³ As confirmed in our own running of these regressions without first differencing (and therefore without fixed-effect controls), far more of these explanatory variables were found to be significant. This absence of significance in the regression findings recorded in Table 11 is

²³ See http://en.wikipedia.org/wiki/Variance_inflation_factor for an explanation of this statistical test.

Table 12: Debt Fixed Effects Regression Results (1997, 2002, 2007)

Dependent Variables Explanatory Variables	Real Long Term Debt PC	Real Public Debt Private Purpose PC	Real Long Term Debt Less Private PC	Real Long Term School District Debt PC~
Constant	-0.584 (1.436)	0.786 (0.715)	-1.018 (1.342)	-0.454 (0.483)
2002 Dummy	0.501*** (0.127)	0.190*** (0.060)	0.188** (0.087)	0.038 (0.030)
2007 Dummy	1.067*** (0.262)	0.378*** (0.113)	0.399** (0.170)	0.007 (0.055)
Lag Value of Respective Dependent Variable	0.265 (0.188)	-0.051 (0.084)	0.766*** (0.131)	0.987*** (0.144)
Percentage Pop Age 65 Plus	0.037 (0.104)	-0.039 (0.051)	0.048 (0.097)	0.029 (0.038)
Percentage Pop Public K-12 Enrolled	0.117** (0.047)	0.030* (0.016)	0.056** (0.028)	0.022** (0.011)
BRH Liberal Citizen Ideology	0.002 (0.005)	-0.0003 (0.003)	0.003 (0.004)	0.001 (0.002)
Real Gross State Product PC (1000 \$s)	0.022 (0.026)	-0.009 (0.013)	0.019 (0.018)	-0.006 (0.006)
Fed Intergovernmental Revenue PC or Per Student (1000 \$s)	-0.551* (0.314)	-0.274 (0.174)	-0.153 (0.262)	0.043 (0.547)
State Fiscal Balance as Percentage of Expenditure	-0.001 (0.005)	-0.0004 (0.003)	.001 (0.004)	0.004*** (0.002)
Unemployment Rate	0.058 (0.053)	-0.006 (0.025)	0.047 (0.040)	0.007 (0.156)
Limit Debt Issue by Amount	0.153 (0.145)	0.128** (0.064)	-0.043 (0.101)	-0.009 (0.032)
No Mandatory Revenue or Spending Limit	0.047 (0.154)	-0.061 (0.066)	0.061 (0.163)	-0.038 (0.054)
AL Dummy	-0.918* (0.453)	-0.034 (0.232)	-0.527 (0.464)	-0.153 (0.189)
AK Dummy	2.673* (1.324)	3.341*** (0.483)	-0.386 (0.663)	-
AZ Dummy	-0.580 (0.493)	0.032 (0.218)	-0.407 (0.469)	-0.257 (0.201)
AR Dummy	-1.534** (0.615)	0.247 (0.219)	-0.958* (0.542)	-0.183 (0.219)
CO Dummy	0.539 (0.505)	0.384 (0.322)	0.070 (0.389)	-0.032 (0.136)
CT Dummy	0.219 (0.547)	0.716*** (0.211)	-0.512 (0.558)	-0.249* (0.149)
DE Dummy	0.252 (0.543)	1.667*** (0.299)	-0.618 (0.492)	-0.103 (0.144)
FL Dummy	-0.315 (0.806)	0.289 (0.364)	-0.316 (0.787)	-0.234 (0.316)
GA Dummy	-1.173*** (0.428)	-0.376** (0.186)	-0.522 (0.410)	-0.130 (0.141)
HI Dummy	0.193 (0.471)	-0.259 (0.216)	0.227 (0.470)	-
ID Dummy	-1.879*** (0.654)	0.026 (0.225)	-0.929* (0.507)	-0.168 (0.173)
IL Dummy	-0.006 (0.344)	0.601*** (0.153)	-0.331 (0.395)	-0.033 (0.153)
IN Dummy	-0.851** (0.393)	0.053 (0.151)	-0.537 (0.392)	-0.245* (0.140)
IA Dummy	-1.478** (0.625)	-0.016 (0.252)	-0.854 (0.539)	-0.262 (0.197)
KS Dummy	-0.920* (0.506)	0.193 (0.213)	-0.517* (0.478)	-0.085 (0.202)
KY Dummy	0.145 (0.429)	1.311*** (0.218)	-0.487 (0.457)	-0.112 (0.188)
LA Dummy	-0.708 (0.374)	0.287* (0.148)	-0.650 (0.444)	-0.224 (0.139)
ME Dummy	-0.615 (0.459)	0.712*** (0.217)	-0.903* (0.475)	-0.296 (0.191)
MD Dummy	-0.738* (0.386)	0.424*** (0.142)	-0.765* (0.401)	-
MA Dummy	1.425** (0.625)	1.458*** (0.304)	0.005 (0.4469)	-0.234 (0.147)
MI Dummy	-0.567* (0.321)	0.169 (0.142)	-0.499 (0.354)	-0.080 (0.153)
MN Dummy	-0.384 (0.377)	0.250 (0.157)	-0.478 (0.452)	-0.015 (0.168)

MS Dummy	-1.240** (0.529)	-0.111 (0.222)	-0.586 (0.461)	-0.272 (0.176)
MO Dummy	-0.869** (0.493)	0.417* (0.243)	-0.651* (0.448)	-0.158 (0.166)
MT Dummy	-0.500 (0.465)	1.436** (0.335)	-0.993** (0.464)	-0.349** (0.176)
NE Dummy	-0.655 (0.423)	0.175 (0.214)	-0.575 (0.471)	-0.175 (0.181)
NV Dummy	0.760** (0.357)	-0.234 (0.190)	0.957** (0.385)	0.185 (0.146)
NH Dummy	-0.116 (0.492)	1.403*** (0.259)	-0.648 (0.427)	-0.126 (0.149)
NJ Dummy	0.072 (0.401)	0.315 (0.200)	-0.167 (0.425)	-0.120 (0.150)
NM Dummy	-0.743* (0.419)	0.471*** (0.162)	-0.576 (0.419)	-0.215 (0.161)
NY Dummy	1.759*** (0.632)	0.905*** (0.183)	0.192 (0.512)	-0.101 (0.169)
NC Dummy	-0.803** (0.345)	0.011 (0.130)	-0.503 (0.359)	-
ND Dummy	-0.994* (0.551)	0.621** (0.241)	-0.844 (0.545)	-0.330* (0.195)
OH Dummy	-1.106** (0.463)	0.232 (0.183)	-0.770* (0.449)	-0.144 (0.170)
OK Dummy	-1.304** (0.526)	-0.087 (0.232)	-0.766 (0.470)	-0.316* (0.182)
OR Dummy	-0.246 (0.429)	-0.048 (0.157)	-0.175 (0.466)	0.075 (0.162)
PA Dummy	-0.008 (0.577)	0.973*** (0.278)	-0.629 (0.587)	-0.073 (0.253)
RI Dummy	0.495 (0.527)	1.666*** (0.234)	-0.640 (0.582)	-0.298 (0.184)
SC Dummy	-0.209 (0.465)	-0.130 (0.159)	0.032 (0.460)	0.044 (0.199)
SD Dummy	-0.773 (0.480)	1.200** (0.247)	-0.987** (0.507)	-0.220 (0.187)
TN Dummy	-1.098** (0.443)	-0.204 (0.171)	-0.464 (0.404)	-0.282* (0.153)
TX Dummy	-0.682* (0.405)	-0.173 (0.194)	-0.290 (0.377)	0.066 (0.160)
UT Dummy	-0.848 (0.553)	-0.170 (0.230)	-0.640 (0.523)	-0.167 (0.163)
VT Dummy	-0.392 (0.423)	0.853*** (0.184)	-0.832* (0.450)	-0.204 (0.147)
VA Dummy	-0.701* (0.374)	0.140 (0.164)	-0.406 (0.417)	-
WA Dummy	0.475 (0.347)	-0.169 (0.134)	0.082 (0.391)	-0.084 (0.130)
WV Dummy	-0.917 (0.605)	1.089*** (0.298)	-1.167** (0.572)	-0.381 (0.241)
WI Dummy	-0.478 (0.399)	0.237 (0.166)	-0.415 (0.419)	-0.124 (0.166)
WY Dummy	-0.920** (0.448)	1.362*** (0.233)	-1.110** (0.477)	-0.281* (0.157)
Observations	150	150	150	135
R-Squared	0.963	0.953	0.970	0.951

~ AK, HA, MD, NC, and VA excluded due to statewide school districts whose bond issue is measured in total state and local bond measures.

Standard errors are robust for intra-group correlation among a state, relaxing the usual requirement that observations be independent. That is, the observations are independent across states but not necessarily within a state across years.

Table 13: Debt Fixed Effects Regression Results (2002, 2007)

Dependent Variables Explanatory Variables	Real Long Term Debt PC
Constant	-0.584 (1.436)
2007 Dummy	0.156 (0.158)
Unfunded Real State Pension Liability PC (1000s)	0.216** (0.089)
Lag Value of Respective Dependent Variable	0.721*** (0.142)
Percentage Pop Age 65 Plus	0.295 (0.260)
Percentage Pop Public K-12 Enrolled	0.112*** (0.041)
BRH Liberal Citizen Ideology	-0.0003 (0.005)
Real Gross State Product PC (1000 \$s)	-0.006 (0.025)
Fed Intergovernmental Revenue PC or Per Student (1000 \$s)	-0.746*** (0.275)
State Fiscal Balance as Percentage of Expenditure	0.009* (0.006)
Unemployment Rate	-0.051 (0.071)
Limit Debt Issue by Amount	0.128 (0.121)
No Mandatory Revenue or Spending Limit	0.127 (0.117)
AL Dummy	-1.687* (0.895)
AK Dummy	1.337 (1.365)
AZ Dummy	-1.275* (0.731)
AR Dummy	-2.107** (0.944)
CO Dummy	0.470 (0.559)
CT Dummy	-1.586 (1.015)
DE Dummy	-0.765 (0.838)
FL Dummy	-2.167 (1.697)
GA Dummy	-0.941* (0.549)
HI Dummy	-1.733* (0.962)
ID Dummy	-1.883*** (0.664)
IL Dummy	-0.798 (0.558)
IN Dummy	-1.222* (0.673)
IA Dummy	-2.242** (1.127)
KS Dummy	-1.669** (0.775)
KY Dummy	-1.146 (0.719)
LA Dummy	-1.047* (0.537)
ME Dummy	-1.934* (1.084)
MD Dummy	-1.411*** (0.449)
MA Dummy	0.194 (0.869)
MI Dummy	-0.922 (0.600)
MN Dummy	-1.265** (0.611)
MS Dummy	-1.425** (0.617)

MO Dummy	-1.347 (0.804)
MT Dummy	-1.400 (0.946)
NE Dummy	-1.753** (0.858)
NV Dummy	0.157 (0.474)
NH Dummy	-1.401** (0.669)
NJ Dummy	-0.836 (0.725)
NM Dummy	-1.272** (0.591)
NY Dummy	0.364 (0.787)
NC Dummy	-0.785 (0.522)
ND Dummy	-2.237* (1.159)
OH Dummy	-1.698** (0.786)
OK Dummy	-2.209** (0.863)
OR Dummy	-0.352 (0.661)
PA Dummy	-1.612 (1.283)
RI Dummy	-1.173 (1.039)
SC Dummy	-0.683 (0.652)
SD Dummy	-1.884* (1.024)
TN Dummy	-1.322** (0.643)
TX Dummy	-0.430 (0.544)
UT Dummy	-0.983 (0.733)
VT Dummy	-1.345* (0.748)
VA Dummy	-1.204** (0.472)
WA Dummy	-0.001 (0.449)
WV Dummy	-2.711** (1.312)
WI Dummy	-1.109 (0.728)
WY Dummy	-1.519*** (0.570)
Observations	100
R-Squared	0.985

Standard errors are robust for intra-group correlation among a state, relaxing the usual requirement that observations be independent. That is, the observations are independent across states, but not necessarily within a state across years.

therefore likely due to a correlation between explanatory variables in the regressions with state-based fixed effects (which once controlled for) reduce the statistical significance of demographic, political, economic, and institutional factors previously found important in the earlier regression studies we examined. That is, non-measured, specific factors in each state exert substantial influence on state and local debt choice. Thus, in the comparability terms discussed earlier, it is appropriate to determine if this factor in California (or simply “California being California”) has caused it to issue more or less debt than other states.

The fixed effects regression results in Table 12 confirm the lack of statistical significance for many of the explanatory factors found significant in previous studies. For the full sample of states from 1997 to 2007, the percentage of a state’s population that was enrolled in K-12 public education was again found to exert a statistically significant positive influence on all four forms of debt with magnitudes of effect that were similar to that calculated in the first-differenced regression. As also found earlier, federal intergovernmental revenue exerted a similar negative influence on long-term debt per capita. Furthermore, two new statistically significant findings appeared in the fixed effects regressions and not the first-differenced. The first being a one percent increase in a state’s fiscal balance as a percentage of its expenditure yielding a modest \$4 per capita increase in a state’s school district debt per capita. The second being if a state puts some limit on the debt issued then public debt for private purposes increases by \$128.

For the purpose of this report, it also important to note the statistical significance and magnitudes of the 2002 and 2007 time dummies included in the Table 12 fixed effects regressions. Since we excluded a dummy for period 1997, these represent the increase in the issue of the different types of bonds in the 2002 and 2007 periods holding the other causal factors constant. For Real Long Term Debt Per Capita, that averaged \$6,771, it grew by \$501 in

2002 over 1997, and by \$1,067 in 2007 over 1997. For Real Public Debt for Private Purposes Per Capita, that averaged \$2,229, it grew by \$190 in 2002 over 1997, and by \$378 in 2007 over 1997. For Real Long Term Debt Less Private Debt Per Capita, that averaged \$4,482, it grew by \$188 in 2002 over 1997, and by \$399 in 2007 over 1997. Also relevant is that we found that time alone exerted no influence on school district debt.

As stated earlier, the purpose of estimating fixed effects regressions is to derive state specific effects. We accomplish this with a set of state dummy variables that excludes California and thus sets it as the baseline state. Using this technique, the coefficient on a state's variable reflects that state's position relative to California, after allowing for the effects of the other factors that are included in the model. This permits one to compare California's debt situation to any other individual state or set of states. For all of the fixed effects regressions we ran, we first ran a similar regression that excluded the state dummy variables. F-tests indicated that the set of state dummy variables as a whole exerted a statistically significant influence on all measures of debt no matter the time period observed.

The primary purpose of running the fixed effect regressions is to observe the state specific effects derived from them. A statistically significant, positive (negative) regression coefficient on a state dummy in Tables 12 and 13 indicates that relative to California, and holding other causal factors included in the regression constant, this state has taken on more (less) debt.²⁴ Thus, in answer to our question of whether California has taken on too much debt, it is appropriate to turn to an examination of these regression coefficients.

A tally of state dummy variables that are for each type of debt, for each of the two samples used in the fixed effects regressions, is particularly illuminating. Controlling for

²⁴The definition of statistical significance used throughout this research as being at least 90 percent confident (in a two-tailed test) that an effect is non-zero.

respective debt issued five years earlier, over the entire 10-year period from 1997 to 2007, 20 states offered less Real Long Term Debt Per Capita than California, and only four (AK, MA, NV, and NY) issued more.²⁵ Given an average issue of \$6,711 across all states, the fixed effects regression model indicated that Alaska's amount over California (after controlling for other causal factors expected to drive differences) was the largest at \$2,673. Examining private purpose debt per capita, the number of states below California drastically fell to one (GA), while the number above drastically rose to 21. For private purpose debt per capita, with an average value of \$2,229 across all states, Alaska's amount over California was again the largest at \$3,341.

Turning to an examination of Real Long Term Debt Less Private Per Capita, the results more closely follow the findings for total debt; 12 states were below California and only one state (NV) was above. Exhibiting an average value of \$4,482, West Virginia issued the least public debt less private at \$1,167 below California. Fewer states exhibited school district debt per capita different from California with only seven states being below. With Real Long Term School District Debt Per Capita over this period averaging \$679, Montana was the farthest below California at \$349 less.

These results characterize the 1997 to 2007 period. Thus, over the full period, California's overall state and local debt level, this debt less public debt for private purposes, and school district debt was generally more than other states (after controlling for the respective amount of debt issued five years earlier, demographic, economic, political, and institutional differences among the states). In contrast, California's use of public debt for private purposes was generally less than other states.

²⁵ The determination of a state offering more (less) in a particular form of debt is based on a particular state dummy variable regression coefficient being statistically significant and positive (negative).

The regression in Table 13 is included to test whether the estimated amount of Unfunded Real State Pension Liability Per Capita in a state exerts a measurable influence on its Real Long Term Debt Per Capita. It can only be run for the years 2002 and 2007 because data for this new explanatory variable is only available then. Interestingly, we find that for every \$1,000 increase in unfunded pension liability per capita, long-term debt rises by \$216. Of additional note in this regression is the continued pattern of California offering more debt of this type than 25 other states and offering less than no other. Furthermore, federal intergovernmental revenue and K-12 public student percentage continue to exert respective negative and positive influences on total debt. While now, a state in a better fiscal situation as measured by its year-end balance relative to expenditure, issues more total debt.

We summarize the state-specific results from this careful statistical analysis in terms of a comparison between two types of debt: (1) total public debt, public less public debt for private purposes, and school district debt) and (2) public debt for private purposes. After controlling for respective debt five years earlier, and for demographic, political, economic, and institutional differences expected to influence the amount of debt taken on, California has offered more debt over the 1997 to 2007 of type (1) and less of type (2). This is particularly acute when comparing total debt to public debt for private purposes with California offering **more** than 20 states for total debt and **less** than 21 states for public debt for private purposes.

Summary of Debt Conclusions from Regression Findings

We began our regression analysis with a survey of the previous literature that indicated what other scholars have found regarding the factors that influence differences in debt levels by state. This survey yielded a regression model and concerns to be aware of when using that technique. We then use that background to conduct our own empirical study of the importance of

institutional, economic, political, demographic, unfunded pension liability and non-measurable state-specific factors on differences in four different measures of real state debt per capita.

Following this analysis, we conclude that:

- ***Around half of the variance in long-term total debt per capita, public debt less private debt per capita, and school district debt across the states between 1997 and 2007 is explainable through the causal factors used in previous studies.*** This falls to about one-eighth for private purpose debt per capita.
(This is based upon the R-squared values from the first-differenced regressions in Tables 11.)
- Relative to 1997 and controlling for causal and state specific factors expected to cause differences in debt issue, ***across all three forms of non-school district debt there was an increase in the amount issued in 2002, and a further increase in 2007.***
(This is based upon the time dummy values from the fixed effects regressions in Table 12.)
- ***The most persistent influence on total real long-term state debt per capita of all types is the percentage of a state's population that attends K-12 public school.*** A one thousand dollar increase in this value raises long-term debt per capita by between \$141 and \$117.
(This is based upon the first-differenced regression results in Tables 11 and fixed-effects results in Table 12.)
- After controlling for differences in debt issued five years earlier, and demographic, political, economic, and institutional differences, between 1997 and 2007 ***California's total real long-term public debt is greater than 20 other states and only less than four other states. For the remaining 26 states, its outstanding debt per capita in this category is similar.***
(This is based upon the fixed-effects regression results in Table 12.)
- After controlling for differences in debt issued five years earlier, demographic, political, economic, and institutional differences between 1997 and 2007 ***California's real long-term public debt for private purposes is less than 21 other states and only greater than one other state. For the remaining 28 states, its outstanding debt per capita in this category is similar.***
(This is based upon the fixed-effects regression results in Table 12.)
- After controlling for differences in debt issued five years earlier, demographic, political, economic, and institutional differences between 1997 and 2007 ***California's real long-term public debt for public purposes alone is greater than 12 other states and only less than one other state. For the remaining 37 states, its outstanding debt per capita in this category is similar.***
(This is based upon the fixed-effects regression results in Table 12.)

- After controlling for differences in debt issued five years earlier, demographic, political, economic, and institutional differences between 1997 and 2007 ***California's real long-term public debt taken on by school districts purposes alone is greater than 7 other states and less than no other state. For the remaining 43 states, its outstanding debt per capita in this category is similar.***

(This is based upon the fixed-effects regression results in Table 12.)

- ***Regarding the question of whether the amount of unfunded pension liability in a state correlates with its amount of debt, the answer is yes and it does so positively.*** We are not certain if this relationship is causal in nature, or merely a positive correlation that indicates that states that took less care to fund their pension liabilities, also took care less care in the control of their total debt.

(This is based upon the fixed-effects regression results in Table 13.)

We can use the regression results derived here to forecast how future changes in certain causal variables might influence the amount of debt issued in California if behavior in the future continues as in the past. As an example of how to do this, observe the regression results recorded in Table 11 for Real Long Term Debt Per Capita. For every one-percentage point increase in a state's population enrolled in K-12 public education, the regression indicates a \$141 expected increase in real long-term debt per capita. One should note that this estimate is a midpoint for a 90% confidence interval of the effect equivalent to the midpoint estimate plus or minus the regression coefficient's standard error (\$4), multiplied by the appropriate t-statistic (1.64). Thus, the best way to interpret this regression coefficient is to say that we can be 90% confident that a one percentage point increase in California's future population enrolled in K-12 public education will result in a \$134 to \$148 increase in its real long-term debt per capita. Using a similar method of calculation, a future \$1,000 increase in the real federal intergovernmental revenue going to California per resident generates with 90% confidence a decrease of \$166 to \$1,019 in real long-term debt per capita.

V. A DESCRIPTIVE AND REGRESSION EXAMINATION OF RECENT STATE AND LOCAL BOND ACTIVITY

In this section, we extend our analysis of debt in California to a comparison across all states of traditional long term bonds issued by state and local governments in a state for the period 2008 through 2010, and for a new form of “Build America Bond” (BABs) issued by state and local governments. BABs, created as part of the American Recovery and Reinvestment Act, were offered by state and local governments between April 2009 and December 2010.²⁶ Traditional state and local bonds are attractive to high-income individual investors, and hence a lower interest rate are offered on them, because the interest is not subject to federal income taxation, or even state income taxation, if a subnational government within the taxpayer’s state issues the bond. BABs instead achieved the objective of lowering the interest rate that state and local governments pay on them by providing a federal subsidy of 35% of the interest paid to either the bondholder in the form of a refundable income tax credit (Tax Credit BABs), or an equivalent payment to the public issuer (Direct Payment BABs). Institutional investors, such as insurance companies, mutual funds, and foreign banks, bought the vast majority of BABs issued. There was a total of \$181 billion in BABs issued.

Recent Traditional State and Local Bond Issues

Figure 12 shows total traditional state and local bond issues in 2009 real dollars by year, separated out into long-term and short-term sales. For both short-term and long-term issues, new traditional debt undertaken by states and localities was low in 2008. This was the first full year of the Great Recession and perhaps the greatest uncertainty in the financial markets. The volume

²⁶ See “Build America Bonds: A Preliminary Assessment” a report by the American Association of State Highway and Transportation Officials for further background on BABs. This is available at http://www.transportation-finance.org/pdf/funding_financing/financing/build_america_bonds_prelim_assessment.pdf.

of traditional bonds issued increased in 2009 and 2010. In aggregate, 2010 was similar to 2007, the year prior to the start of the Great Recession.

Per Capita Comparisons

The following figures and tables provide a basic perspective about the per capita amounts of new bond issues undertaken by state and local governments in the various states between 2008 and 2010. The first set applies only to Build America Bonds. The second set covers traditional non-taxable bonds. Note that Table 14 and Figure 13 are in nominal terms, while Table 15 and Figure 14 are in 2009 real dollars.

As shown in Table 14 and Figure 13, in per capita terms, state and local governments in California issued the third largest amount of BABs in the United States behind Utah and New York. As given in Table 15 and Figure 14, for traditional non-taxable bonds, between 2008 and 2010, state and local governments in California issued the fourth largest amount of bonds relative to population. Only governments in New York, Connecticut, and Massachusetts borrowed more in per capita terms than did governments in California. Table 15 also shows that for traditional long-term, non-taxable bond issues in the 2008 to 2010 period, the unusual year for governments in California was 2009. Indeed, only in 2009 were nominal per capita bond issues larger than in 2007, before the effects of the recession and financial market crisis. Per capita bond issues by governments in California were smaller in 2008 and 2010 than in 2007.²⁷

A Comparison of Long-Term Bond and Build America Bond Issues

The basic data of per capita bond issues reported previously permits comparison among states of bond issues during the recession, and permits comparison of debt issues during the Great Recession to issues in 2007 (immediately before the recession). However, such comparisons do

²⁷ For a comparison of total debt per capita between California and five other selected states see Figure 9 and Table 6. For the same comparison between California and all states in 2007, see Table 7.

Table 14: Per Capita Build America Bonds Issues, 2009 – 2010

State	Per Capita BABs Issues
Alabama	\$131
Alaska	\$520
Arizona	\$304
Arkansas	\$14
CALIFORNIA	\$1,030
Colorado	\$825
Connecticut	\$547
Delaware	\$593
Florida	\$301
Georgia	\$385
Hawaii	\$985
Idaho	\$94
Illinois	\$874
Indiana	\$324
Iowa	\$254
Kansas	\$582
Kentucky	\$694
Louisiana	\$213
Maine	\$67
Maryland	\$612
Massachusetts	\$739
Michigan	\$262
Minnesota	\$286
Mississippi	\$260
Missouri	\$502
Montana	\$31
Nebraska	\$566
Nevada	\$979
New Hampshire	\$269
New Jersey	\$850
New Mexico	\$139
New York	\$1,060
North Carolina	\$176
North Dakota	\$106
Ohio	\$724
Oklahoma	\$224
Oregon	\$257
Pennsylvania	\$400
Rhode Island	\$11
South Carolina	\$265
South Dakota	\$441
Tennessee	\$294
Texas	\$686
Utah	\$1,063
Vermont	\$203
Virginia	\$490
Washington	\$934
West Virginia	\$49
Wisconsin	\$386
Wyoming	\$266

Table 15: Per Capita* Real Non-Taxable, Long-term Bond Issues, by Year and State**

	2007	2008	2009	2010	2008 - 2010	2008 – 2010 Average
Alabama	\$1,505	\$470	\$877	\$821	\$2,169	\$723
Alaska	\$2,352	\$1,174	\$1,555	\$1,348	\$4,077	\$1,359
Arizona	\$1,430	\$1,454	\$1,006	\$943	\$3,403	\$1,134
Arkansas	\$604	\$402	\$555	\$833	\$1,790	\$597
CALIFORNIA	\$1,886	\$1,427	\$1,968	\$1,635	\$5,030	\$1,677
Colorado	\$1,736	\$1,592	\$1,344	\$1,470	\$4,407	\$1,469
Connecticut	\$1,411	\$2,055	\$1,877	\$1,718	\$5,650	\$1,883
Delaware	\$1,334	\$952	\$1,519	\$1,770	\$4,241	\$1,414
Florida	\$1,580	\$978	\$807	\$1,041	\$2,827	\$942
Georgia	\$1,119	\$875	\$1,075	\$970	\$2,921	\$974
Hawaii	\$1,121	\$787	\$1,967	\$2,239	\$4,994	\$1,665
Idaho	\$860	\$711	\$474	\$482	\$1,667	\$556
Illinois	\$1,289	\$1,230	\$1,159	\$1,994	\$4,383	\$1,461
Indiana	\$1,133	\$971	\$1,027	\$760	\$2,758	\$919
Iowa	\$917	\$728	\$1,308	\$1,027	\$3,063	\$1,021
Kansas	\$1,022	\$768	\$1,362	\$1,200	\$3,329	\$1,110
Kentucky	\$1,208	\$943	\$1,216	\$1,244	\$3,403	\$1,134
Louisiana	\$1,427	\$1,068	\$799	\$1,446	\$3,313	\$1,104
Maine	\$867	\$942	\$929	\$715	\$2,586	\$862
Maryland	\$1,164	\$1,183	\$1,124	\$986	\$3,292	\$1,097
Massachusetts	\$1,909	\$1,892	\$1,511	\$2,029	\$5,432	\$1,811
Michigan	\$975	\$916	\$650	\$821	\$2,388	\$796
Minnesota	\$1,319	\$1,298	\$1,297	\$1,418	\$4,013	\$1,338
Mississippi	\$1,307	\$616	\$928	\$1,034	\$2,578	\$859
Missouri	\$1,101	\$810	\$864	\$1,241	\$2,915	\$972
Montana	\$897	\$259	\$159	\$711	\$1,128	\$376
Nebraska	\$2,240	\$1,307	\$1,532	\$1,637	\$4,475	\$1,492
Nevada	\$1,669	\$1,556	\$1,255	\$1,425	\$4,235	\$1,412
New Hampshire	\$970	\$737	\$1,094	\$844	\$2,674	\$891
New Jersey	\$1,590	\$1,338	\$1,245	\$1,683	\$4,266	\$1,422
New Mexico	\$1,156	\$1,602	\$1,694	\$1,433	\$4,729	\$1,576
New York	\$1,701	\$2,043	\$2,248	\$2,041	\$6,331	\$2,110
North Carolina	\$889	\$813	\$1,087	\$832	\$2,732	\$911
North Dakota	\$1,136	\$817	\$829	\$870	\$2,515	\$838
Ohio	\$1,413	\$997	\$995	\$1,349	\$3,341	\$1,114
Oklahoma	\$696	\$701	\$665	\$913	\$2,279	\$760
Oregon	\$1,178	\$1,025	\$1,140	\$973	\$3,139	\$1,046
Pennsylvania	\$1,475	\$1,238	\$1,547	\$1,471	\$4,255	\$1,418
Rhode Island	\$1,342	\$1,220	\$947	\$678	\$2,846	\$949
South Carolina	\$883	\$878	\$812	\$1,128	\$2,818	\$939
South Dakota	\$1,066	\$1,056	\$742	\$779	\$2,578	\$859
Tennessee	\$1,057	\$928	\$766	\$950	\$2,644	\$881
Texas	\$1,668	\$1,689	\$1,339	\$1,497	\$4,525	\$1,508
Utah	\$963	\$1,134	\$1,553	\$1,238	\$3,925	\$1,308
Vermont	\$1,439	\$1,488	\$505	\$1,008	\$3,001	\$1,000
Virginia	\$1,089	\$948	\$1,183	\$1,085	\$3,215	\$1,072
Washington	\$1,514	\$1,318	\$1,534	\$1,857	\$4,709	\$1,570
West Virginia	\$1,119	\$719	\$446	\$545	\$1,710	\$570
Wisconsin	\$903	\$1,059	\$1,169	\$1,009	\$3,237	\$1,079
Wyoming	\$1,666	\$1,230	\$602	\$651	\$2,483	\$828

* 2007 population for all years; ** 2007 data from The Bond Buyer; 2008 - 2010 data from Thomson Reuters; Amounts in 2009 real dollars.

Figure 12: Real Non-Taxable State-Local Bond Issues, by Length and Year

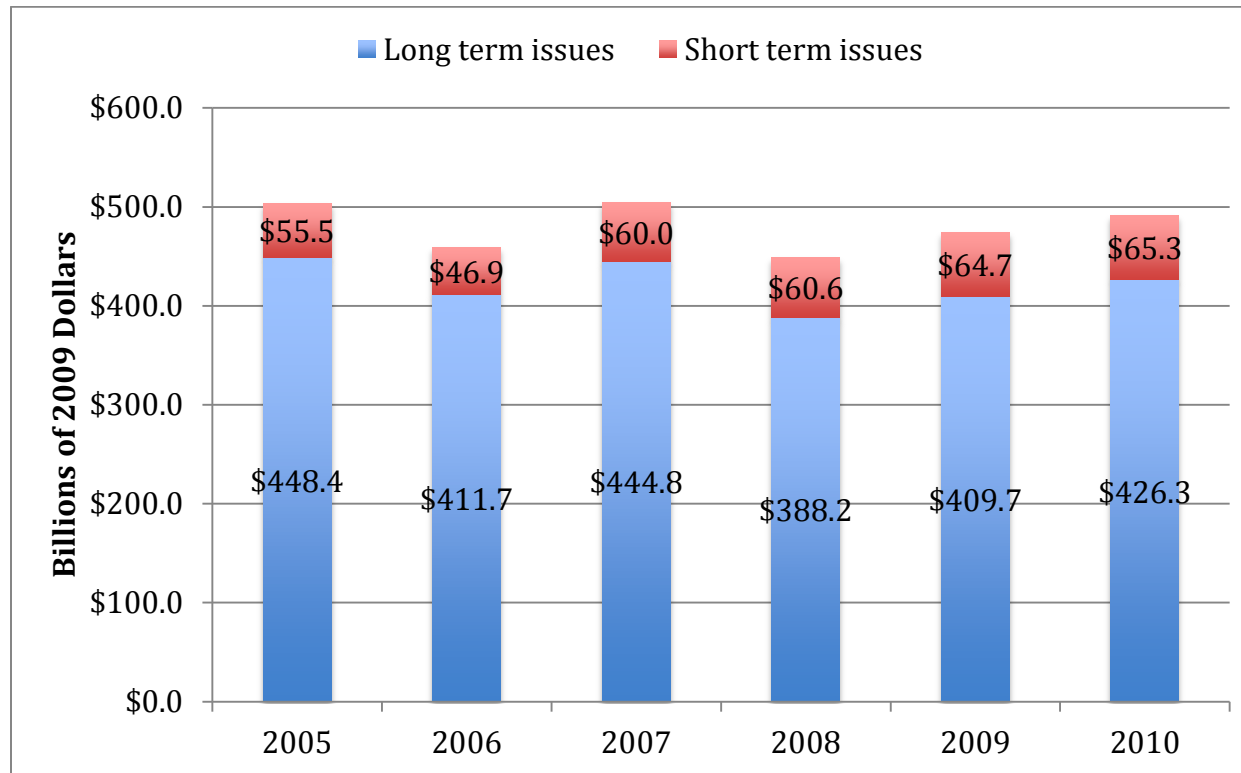


Figure 13: Per Capita Build America Bond Issues by State, 2009 – 2010

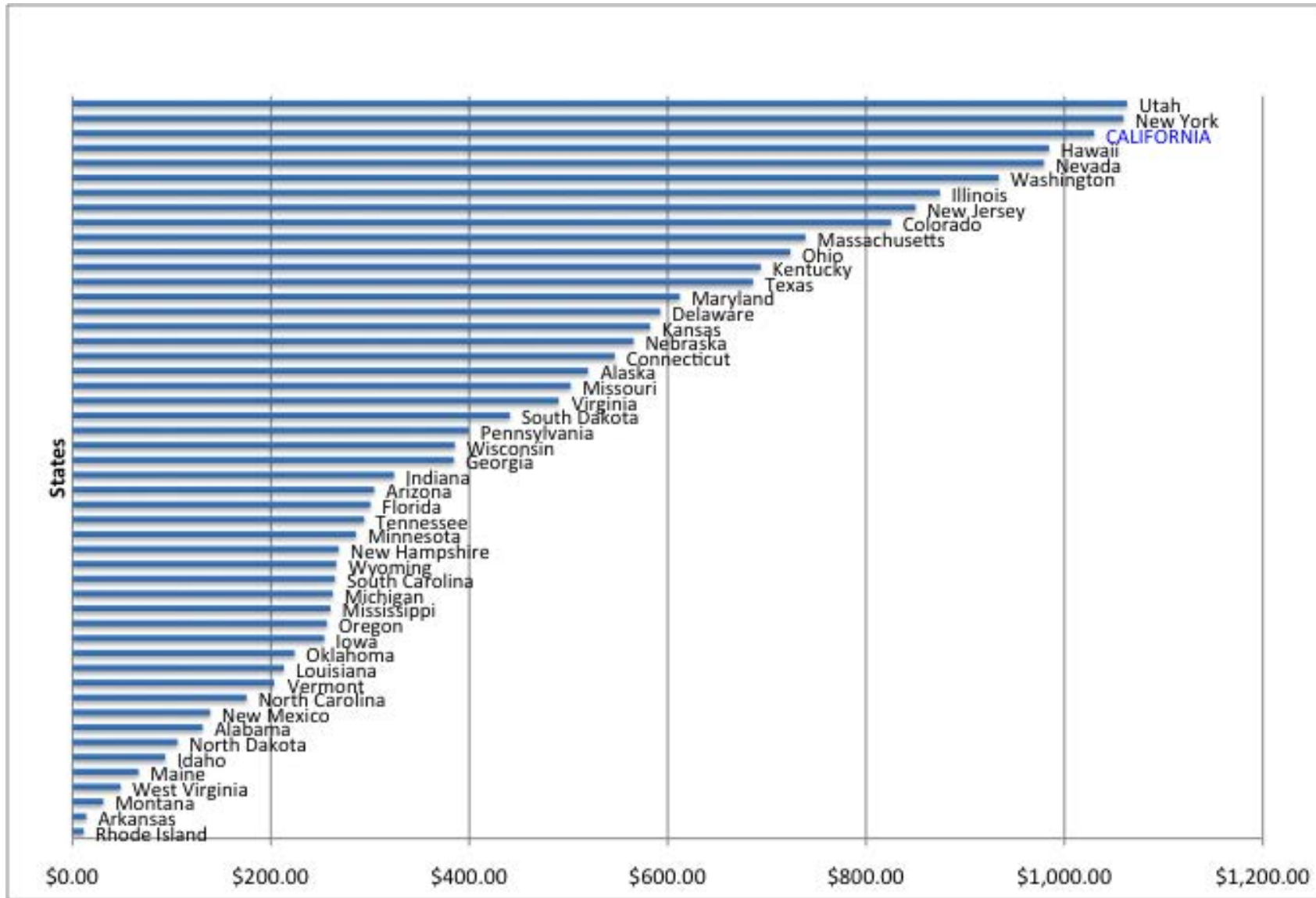
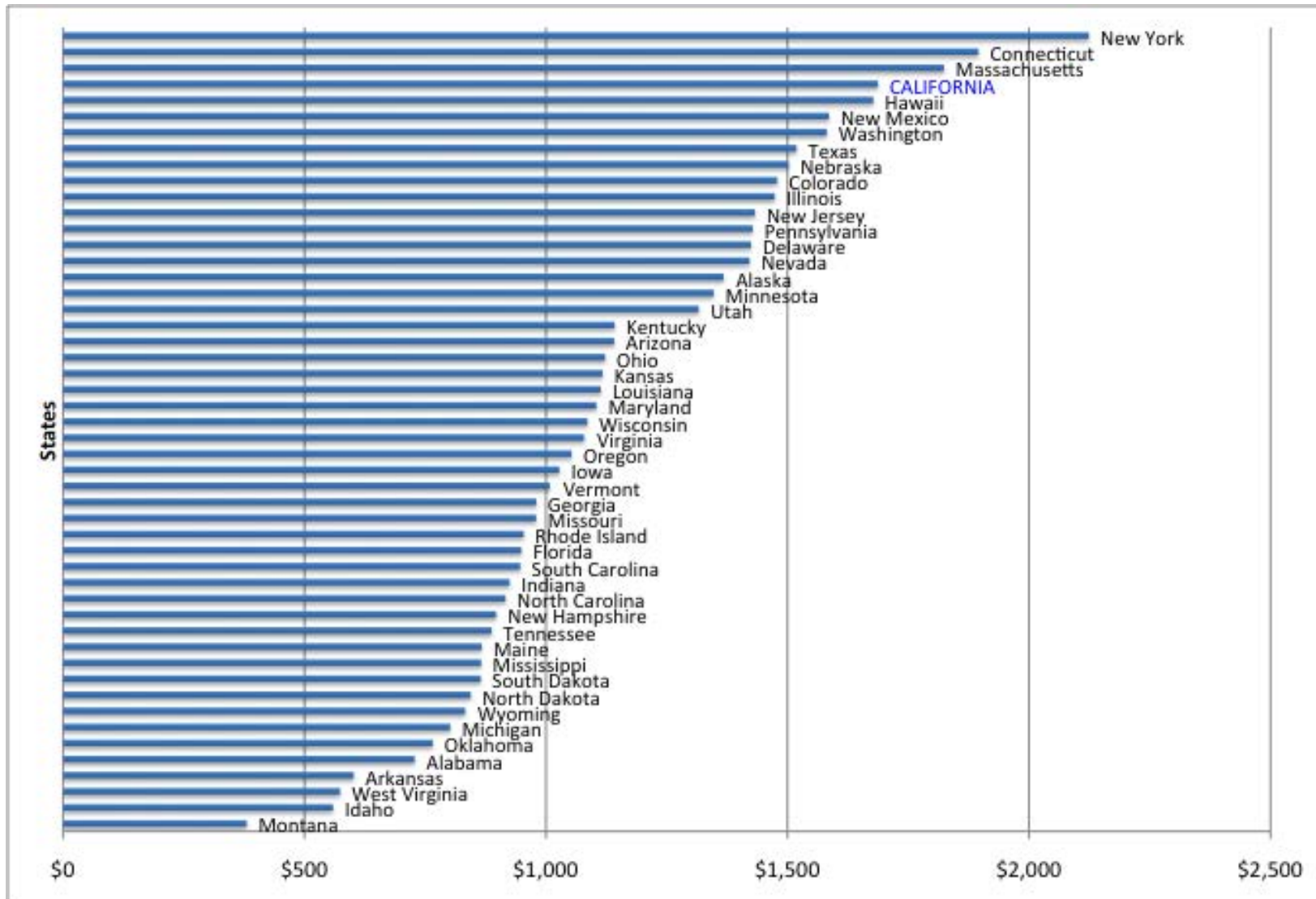


Figure 14: Per Capita Non-Taxable, Long-Term Bond Issues, 2008 – 2010



not provide information showing whether the borrowing behavior of state and local governments during the Great Recession was substantially different from the historical borrowing of these governments. To provide a longer perspective, one can compare bond issues from 2008 to 2010, to total outstanding debt during 2007. The outstanding debt in 2007 was not determined solely during 2007, but is the cumulative effect of many years of previous borrowing, and thus is reflective of the long-run borrowing behavior of state and local governments.

The tables and charts that follow are based on the ratio of the percentage of new issues in the 2008 to 2010 period, divided by the percentage of outstanding debt in 2007 (separately for traditional and Build America Bonds). A ratio of greater than one indicates that governments in that state made relatively more use of borrowing from 2008 to 2010 period than they had in the previous long-run period (measured by the aggregate outstanding debt in 2007).

For traditional bonds, as shown in Table 16 and Figure 15, California did relatively more borrowing during this recent period than it had previously. In 2007, California's outstanding debt was 13.7% of all state-local government outstanding debt. However, between 2008 and 2010, governments in California issued about 15.7% of all non-taxable long-term bond issues. Thus, borrowing by California governments from 2008 to 2010 was 14 percent greater than expected by the 2007 debt share (that is the long-run borrowing behavior).²⁸ By this measure, 10 other states were even heavier borrowers than California during this period as compared to their historical borrowing patterns. These states being New Mexico, Nevada, Utah, Hawaii, Iowa, Connecticut, Mississippi, Wyoming, Georgia, and Texas.

For Build America Bonds, as shown in Table 17 and Figure 16, California stands out as

²⁸ The fact that California exceeded its relative historic rate may be a function of the ability of the state to respond to the financing opportunity represented by BABs.

Table 16: Non-Taxable Bond Issue Volume, 2008 – 2010, Relative to Historic Debt

State	State 2008-10 Bond Volume as % of All States	State 2007 Debt as % of All States	Ratio of Column 2 to Column 3
New Mexico	0.79%	0.51%	1.56
Nebraska	0.67%	0.48%	1.41
Utah	0.91%	0.66%	1.38
Hawaii	0.55%	0.43%	1.28
Iowa	0.78%	0.61%	1.27
Connecticut	1.68%	1.36%	1.24
Mississippi	0.65%	0.52%	1.24
Wyoming	0.11%	0.09%	1.21
Georgia	2.40%	2.01%	1.19
Texas	9.25%	7.86%	1.18
CALIFORNIA	15.65%	13.70%	1.14
Arizona	1.86%	1.63%	1.14
Minnesota	1.79%	1.61%	1.11
Maryland	1.59%	1.43%	1.11
Louisiana	1.26%	1.17%	1.08
North Carolina	2.15%	2.08%	1.03
Oklahoma	0.71%	0.69%	1.03
Nevada	0.94%	0.92%	1.03
Ohio	2.90%	2.83%	1.03
Idaho	0.22%	0.22%	1.00
Tennessee	1.41%	1.41%	1.00
Illinois	4.80%	4.84%	0.99
Pennsylvania	4.55%	4.64%	0.98
New York	10.48%	10.77%	0.97
Kansas	0.79%	0.82%	0.97
Virginia	2.03%	2.12%	0.96
Colorado	1.84%	1.92%	0.96
Vermont	0.16%	0.17%	0.95
Missouri	1.48%	1.61%	0.92
Washington	2.36%	2.58%	0.91
North Dakota	0.14%	0.15%	0.91
Wisconsin	1.55%	1.74%	0.89
New Jersey	3.15%	3.56%	0.89
South Dakota	0.18%	0.20%	0.88
Maine	0.29%	0.33%	0.88
Arkansas	0.44%	0.51%	0.86
Indiana	1.49%	1.72%	0.86
Delaware	0.32%	0.37%	0.86
Alabama	0.86%	1.02%	0.85
Oregon	1.00%	1.20%	0.84
Massachusetts	3.02%	3.72%	0.81
Kentucky	1.23%	1.53%	0.80
Florida	4.44%	5.56%	0.80
South Carolina	1.08%	1.49%	0.72
New Hampshire	0.30%	0.43%	0.71
West Virginia	0.26%	0.38%	0.70
Michigan	1.99%	3.03%	0.65
Rhode Island	0.25%	0.44%	0.59
Alaska	0.24%	0.41%	0.58
Montana	0.09%	0.26%	0.37

Figure 15: Non-Taxable Bond Issue Volume, 2008 – 2010, Relative to Historic Debt

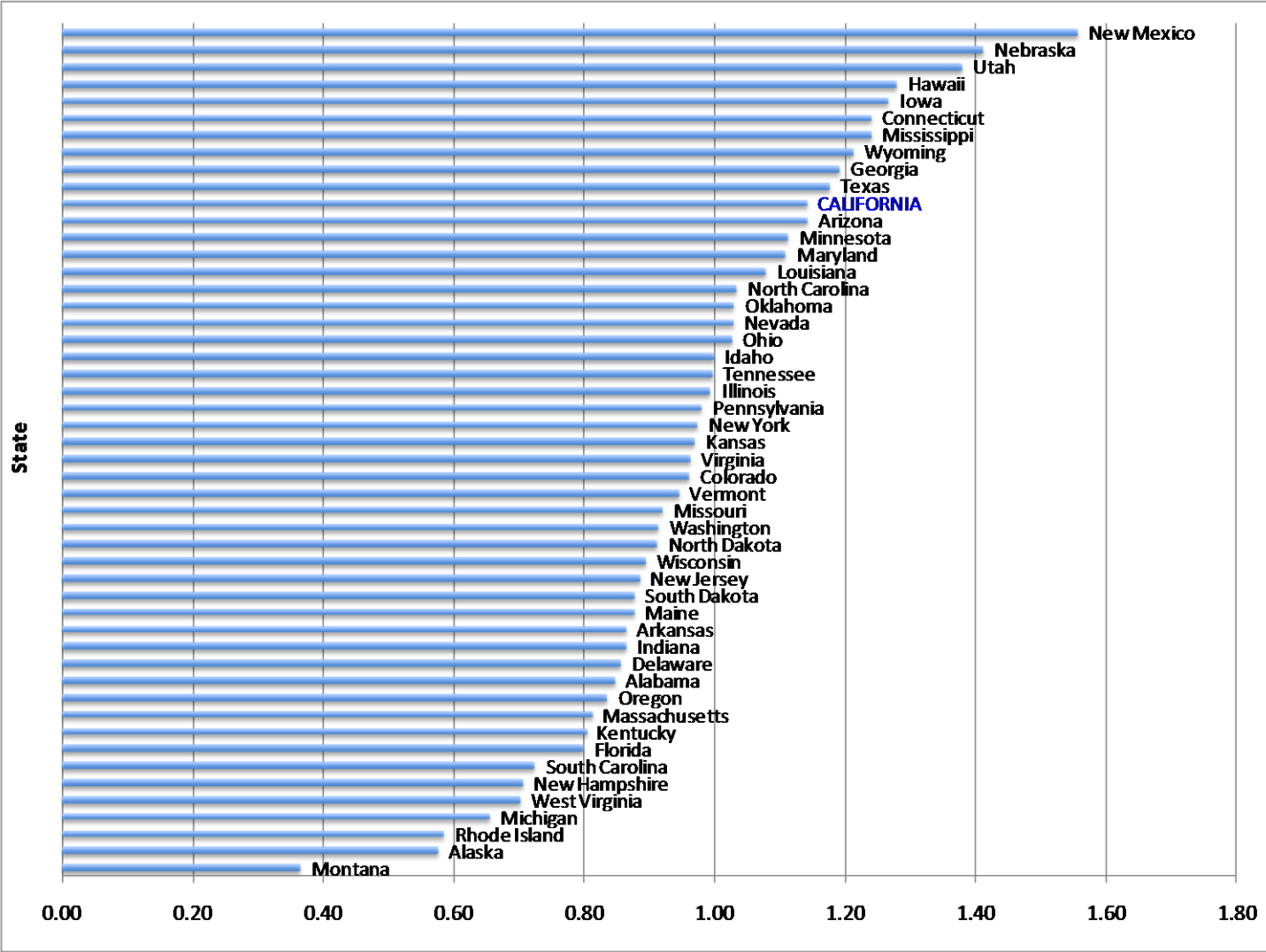
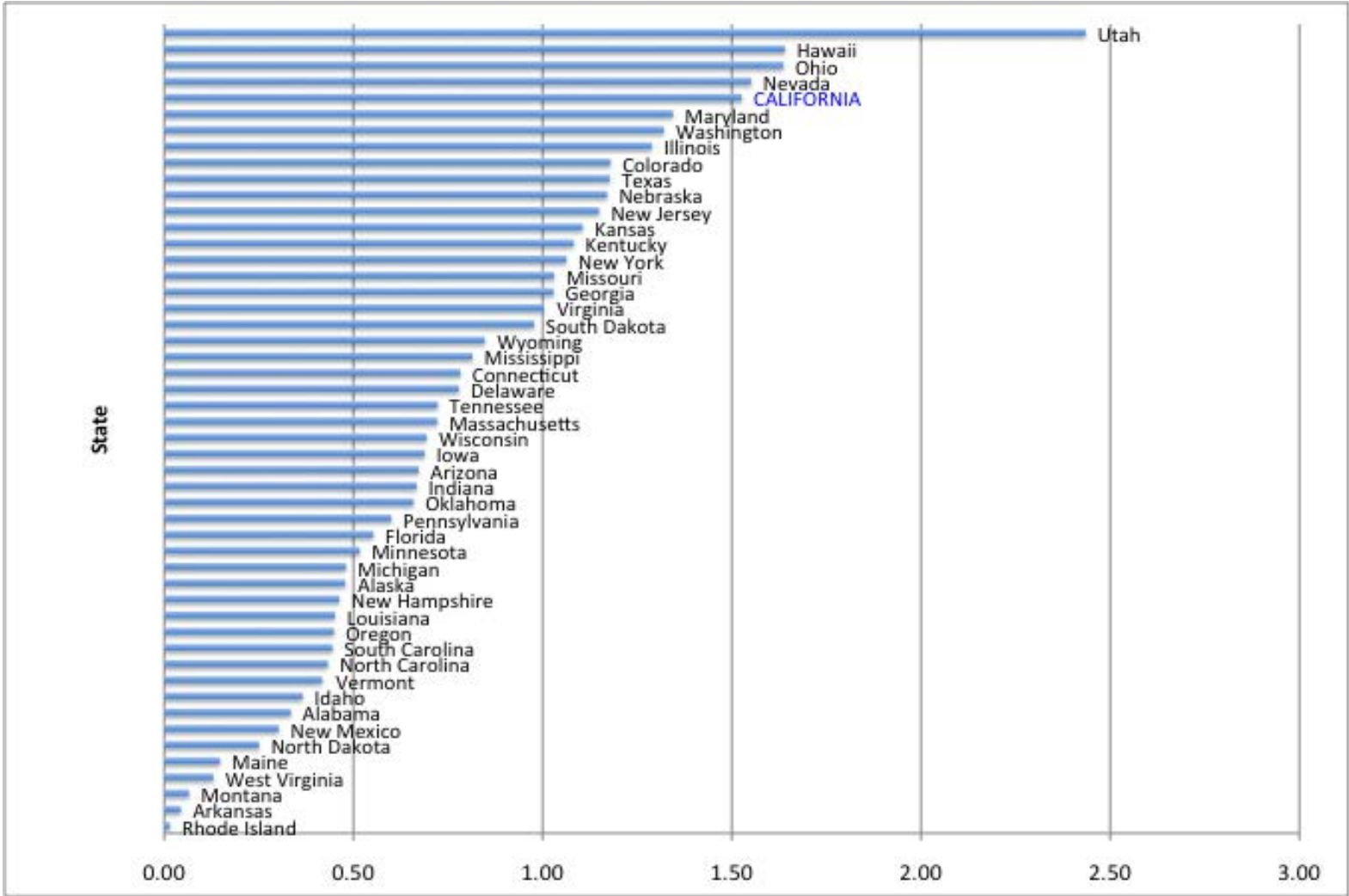


Figure 16: Build America Bond Issue Volume, 2009 – 2010, Relative to Historic Debt



one of the most substantial relative users among all states. The outstanding debt of California state and local governments represented 13.7% of all state-local outstanding debt in 2007. Nevertheless, governments in California issued 20.9% of all Build America Bond issue volume. Thus, California's use of Build America Bonds was 53 percent greater than its historical share of state and local borrowing. Even so, California was below the most prolific users of Build America Bonds relative to historical borrowing patterns. The share of Build America Bond volume relative to historical debt amounts was even greater for Utah, Hawaii, Iowa, and Nevada.

As already noted, BABs were only issued between April 2009 and the end of December 2010. Thus, the 2009 Build America Bond data shown in the chart are from just nine months in that year. Understanding this, the data depicted in Figure 17 clearly illustrates that 2009 was a very unusual year for borrowing by California governments with a substantially larger total amount of bonds issued than in the past. Non-taxable bond issues by California governments decreased from 2009 to 2010, whereas Build America Bond issues increased in those years (even adjusting for the limited nine-month period in 2009). However, the increase in Build America Bond volume in 2010 was not large enough to offset completely the decrease in non-taxable bond issues that year.

A Regression Examination

Next, we examine the recent issues of traditional and Build America Debt using regression analysis in a similar manner done earlier for total debt issued. Recall from the model proposed earlier that we expect:

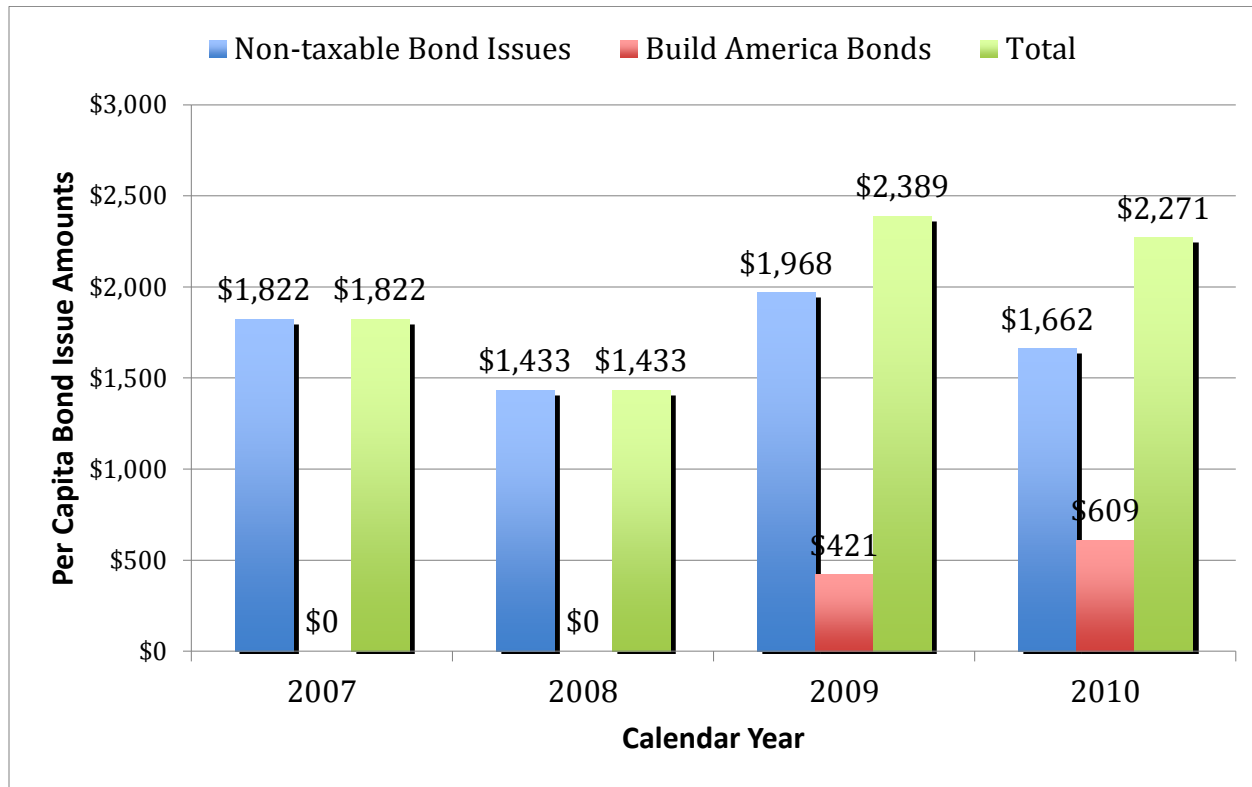
$$B_{t,i} - R_{t,i} = f(\text{Demographics}_{t,i}, \text{Politics}_{t,i}, \text{Economics}_{t,i}, \text{Institutions}_{t,i}, \text{Borrowing Costs}_{t,i}).$$

where,

Table 17: Build America Bond Issue Volume Relative to Historic Debt

State	State 2008-10 Bond Volume as % of All States	State 2007 Debt as % of All States	Ratio of Column 2 to Column 3
Utah	1.61%	0.66%	2.44
Hawaii	0.70%	0.43%	1.64
Ohio	4.63%	2.83%	1.64
Nevada	1.42%	0.92%	1.55
CALIFORNIA	20.91%	13.70%	1.53
Maryland	1.92%	1.43%	1.34
Washington	3.40%	2.58%	1.32
Illinois	6.23%	4.84%	1.29
Colorado	2.26%	1.92%	1.18
Texas	9.25%	7.86%	1.18
Nebraska	0.56%	0.48%	1.17
New Jersey	4.09%	3.56%	1.15
Kansas	0.90%	0.82%	1.11
Kentucky	1.65%	1.53%	1.08
New York	11.45%	10.77%	1.06
Missouri	1.66%	1.61%	1.03
Georgia	2.07%	2.01%	1.03
Virginia	2.12%	2.12%	1.00
South Dakota	0.20%	0.20%	0.98
Wyoming	0.08%	0.09%	0.85
Mississippi	0.42%	0.52%	0.81
Connecticut	1.06%	1.36%	0.78
Delaware	0.29%	0.37%	0.78
Tennessee	1.02%	1.41%	0.72
Massachusetts	2.68%	3.72%	0.72
Wisconsin	1.20%	1.74%	0.69
Iowa	0.42%	0.61%	0.69
Arizona	1.10%	1.63%	0.67
Indiana	1.15%	1.72%	0.67
Oklahoma	0.45%	0.69%	0.66
Pennsylvania	2.79%	4.64%	0.60
Florida	3.07%	5.56%	0.55
Minnesota	0.83%	1.61%	0.52
Michigan	1.46%	3.03%	0.48
Alaska	0.20%	0.41%	0.48
New Hampshire	0.20%	0.43%	0.46
Louisiana	0.53%	1.17%	0.45
Oregon	0.54%	1.20%	0.45
South Carolina	0.66%	1.49%	0.44
North Carolina	0.90%	2.08%	0.43
Vermont	0.07%	0.17%	0.42
Idaho	0.08%	0.22%	0.37
Alabama	0.34%	1.02%	0.33
New Mexico	0.15%	0.51%	0.30
North Dakota	0.04%	0.15%	0.25
Maine	0.05%	0.33%	0.15
West Virginia	0.05%	0.38%	0.13
Montana	0.02%	0.26%	0.07
Arkansas	0.02%	0.51%	0.04
Rhode Island	0.01%	0.44%	0.02

Figure 17: California Non-Taxable and Build America Bonds Compared



$B_{t,i}$ = new bond issues in period “t” for state “i”, and

$R_{t,i}$ = bond retirement in period “t” for state “i”.

We have gathered data for all 50 states on the amount of traditional long-term bonds issued between 2008 and 2010, and on the amount of Build America Bonds (BABs) issued over the period they were available (2009 through 2010). Since we do not have data on traditional bond retirements over this period, and there were no BAB retirements, we will use the model above and specify that $B_{t,i}$ (in terms of traditional or BABs) is a function of the same Demographics, Politics, Institutions, and Borrowing Cost variables that we used earlier. However, because $R_{t,i}$ is not included, we do not expect the derived relationships to be comparable to what was found earlier. In addition, we are able to add another explanatory variable category that we believe measures differences in the need for public infrastructure replacement across the states and thus the greater likelihood of issuing more bonds. This being the percentage of a state’s roads deemed in poor or mediocre condition. Thus, the two regressions run are:

Traditional Long Term Bonds Per Capita₂₀₀₈₋₂₀₁₀ or

Build America Bonds Per Capita₂₀₀₉₋₂₀₁₀

= f (Percentage Population Age 65 Plus₂₀₀₉, Percentage Population Public K-12 Enrolled₂₀₀₉, BRH Liberal Citizen Ideology₂₀₀₈, Real Gross State Product Per Capita₂₀₀₉, Federal Intergovernmental Revenue Per Capita₂₀₀₉, State Fiscal Balance as Percentage of Expenditure₂₀₀₉, Unemployment Rate₂₀₀₉, Limit Debt Issue By Amount₂₀₀₉, No Mandatory Revenue or Spending Limit₂₀₀₉, Poor RoadsPercentage₂₀₀₉, Real Long Term Debt Per Capita₂₀₀₇).

Furthermore, in a set of two additional regressions, we have chosen to add a California Dummy variable to each of these regressions to test whether after holding these expected causal factors constant, has California offered an amount of either of these bonds that is statistically distinguishable from the other states. Information on the sources for all these variables and descriptive statistics for each of them are in Table 18.

The second and third columns of Tables 19 and 20 contain the regression results using traditional long-term bonds per capita issued between 2008 and 2010, and Build America Bonds per capita issued between 2009 and 2010 as dependent variables. The fourth column contains an additional regression that accounts for the fact that traditional long-term bond and BAB offers during this period within a state were not determined independently of each other. That is, a state or local government could have substituted the issue of one for the other. Thus, in the fourth column of Tables 19 and 20, we repeat the BABs regression with the inclusion of an additional explanatory variable measuring the traditional bonds offered over this period. This new explanatory variable is simultaneously determined (or “endogenous”) with this regression’s dependent variable and a Two-Stage Least Squares regression estimation is therefore required.²⁹

Two-Stage Least Squares Regression requires the identification of additional “instrumental variables” that influence state-by-state differences in the endogenous explanatory variable, but not the dependent variable. We list these variables at the base of both of these tables. They represent differences across the states in the percentage of high income and high wealth taxpayers in a state, whether the state has an income tax, the state’s highest marginal income tax rate, and the taxable income value at which the highest rate is paid. These are appropriate instruments because the interest earned by taxpayers in a state who purchase traditional long-term bonds, issued by subnational governments in the same state, is free from state income taxes. The value of this tax free benefit to the citizenry of a state is greater the percentage of high income households in a states, the higher the upper marginal income tax rate, and the lower the taxable income for which the highest marginal income tax rate applies.

Understanding this, a state’s policymakers are likely to offer more of this traditional debt, the

²⁹ See http://en.wikipedia.org/wiki/Simultaneous_equations_model for a simple description of Two-Stage Least Squares. A description of the process of using Instrumental Variables is at http://en.wikipedia.org/wiki/Instrumental_variable.

Table 18: Bond Regressions Variable Description, Source, and Descriptive Statistics

Variable Name	Source	Mean (Std. Dev.)	Max. (Min.)
<i>Dependent Variables</i>			
Traditional Long Term Bonds PC*	The Bond Buyer's Year in Statistics, 2009 and 2010.	2948.71 (1061.66)	6125.23 (928.62)
Build America Bonds PC	The Bond Buyer, http://www.bondbuyer.com/	441.28 (305.09)	1055.69 (11.39)
<i>Explanatory Variables</i>			
Percentage Pop Age 65 Plus	U.S. Census Population Estimates; 1996, 2002, and 2006 http://www.census.gov/popest/archives .	13.13 (1.69)	17.25 (7.44)
Percentage Pop Public K-12 Enrolled	U.S. Department of Education, National Center for Education Statistics, <i>Digest of Education Statistics</i> , 2009, http://nces.ed.gov/programs/digest/ .	19.50 (3.81)	33.05 (15.10)
BRH Liberal Citizen Ideology	Drawn from the "revised 1960-2008 citizen ideology series" measure developed by Berry, Ringquist, and Hanson (1998) for 2008 where 0 = most conservative and 1 = most liberal http://www.uky.edu/~rford/readme_update2008.pdf .	61.34 (117.55)	91.84 (25.24)
Real Gross State Product PC (1000 \$s)	Bureau of Economic Analysis; <i>Regional Economic Accounts</i> ; 2009 http://www.bea.gov/regional/gsp/ . Consumer Price Index; 1982-84 Base Year. http://www.bls.gov/data/ U.S. Census American FactFinder; 2009. http://factfinder.census.gov/servlet/SAFFPopulation?_submenuId=population_0&_sse=on	44.96 (10.15)	68.98 (9.14)
Fed Intergovernmental Revenue PC or Per Student (1000 \$s)	Census of Governments; 2009 http://www.census.gov/govs/estimate/ . Consumer Price Index; 1982-84 Base Year. http://www.bls.gov/data/ U.S. Census American FactFinder; 2009 http://factfinder.census.gov/servlet/SAFFPopulation?_submenuId=population_0&_sse=on .	1686.22 (615.00)	3908.92 (537.42)
State Fiscal Balance as Percentage of Expenditure	<i>Budget Processes in the States</i> (2009), NASBO, http://www.nasbo.org/Publications/BudgetProcessintheStates	10.16 (22.22)	150.2 (-3)
Unemployment Rate	Regional and State Unemployment 2009 Annual Averages, Bureau of Labor Statistics, http://www.bls.gov/schedule/archives/laus_nr.htm .	8.44 (1.99)	13.3 (4.3)
Limit Debt Issue by Amount	<i>Budget Processes in the States</i> (2009), NASBO, http://www.nasbo.org/Publications/BudgetProcessintheStates	0.72 (0.45)	1 (0)
No Mandatory Revenue or Spending Limit	<i>State Tax and Expenditure Limits</i> (2009), NCSL, http://www.ncsl.org/default.aspx?tabid=12633 .	0.40 (0.49)	1 (0)
Poor Roads Percentage	<i>Infrastructure Report Card</i> , 2009, http://www.infrastructurereportcard.org .	32.58 (13.91)	78.0 (11.0)
Real Long Term Debt PC* (100 \$s)	Census of Governments; 1992, 1997, 2002, and 2007 http://www.census.gov/govs/estimate . Consumer Price Index; 1982-84 Base Year http://www.bls.gov/data . U.S. Census American FactFinder; 1992, 1997, 2002, and 2007 http://factfinder.census.gov/servlet/SAFFPopulation?_submenuId=population_0&_sse=on .	53.54 (20.17)	108.37 (15.62)

*PC = Per Capita; Real dollars measured in 2009 constant dollars based upon the Bureau of Labor Statistics Consumer Price Index for all U.S. urban consumers.

greater that it benefits the state's citizens.³⁰ This is not the case for BABs, which did not enjoy such tax-free status. Unfortunately, we could not think of a similar set of instrumental variables that would influence differences across the states in BAB offers and not traditional bond offers. Therefore we were unable to run the regression that used traditional debt as the dependent variable and BABs as an additional dependent variable. Finally, note that Tables 19 and 20 only differ in the inclusion of an additional California Dummy in all three regressions in Table 20 to check if its offers of these two types of bonds were distinctive from all other states.

Highly relevant to the purpose of this report, we found that after controlling for other expected causal factors, California did offer more BABs than all other states. Realizing that the average amount of BABs issued by all states was \$441.28 per capita, we found California's use at between \$165.98 and \$177.84 greater. Though the inclusion of the California Dummy variable did not drastically alter the results calculated for other explanatory variables and we will thus refer to the non-CA Dummy results in Table 19 in our further explanation.

In Table 19, in column four, take note of the statistically significant regression coefficient of -0.207 calculated for Traditional Long Term Bonds Per Capita that were issued between 2008 and 2010. This indicates that for every dollar of this type of bond used per capita, the use of BABs per capita between 2009 and 2010 declined by about \$0.21. We have found statistical evidence of the expected substitutability between the two types of bonds, but not at a level that can be considered one-for-one.

³⁰ Note that these instrumental variables are not included in the reduced form Traditional Long Term Bonds Per Capita regression previously run because they are highly correlated with the included Real Gross State Product Per Capita and thus would introduce severe multicollinearity into the regression. The respective simple correlation coefficients between this included measure of income in the state and the instrumental variables are Percentage Households with Income 75 to 99K (0.55), Percentage Households with Income 100 to 124K (0.63), Percentage Households with Income 125 to 149K (0.60), Percentage Households with Income 150 to 199K (0.59), Percentage Households with Income 200K+ (0.57), Percentage Households with Wealth greater than 1000K (0.57), Dummy if No State Income Tax (0.22), Highest Marginal Income Tax Rate (-0.14), Taxable Income Value that Highest Marginal Income Tax Paid (0.09).

Table 19: Bond Regression Results (2008 to 2010, or 2009 to 2010)

Dependent Variables Explanatory Variables	Traditional Long Term Bonds Per Capita	Build America Bonds Per Capita	Build America Bonds Per Capita (Endogenous Traditional Bonds PC*)
Constant	-5.438 (1616.695)	874.802 (831.698)	511.354 (957.149)
Traditional Long Term Bonds Per Capita (Endogenous)	Not Included	Not Included	-0.207* (0.116)
Real Long Term Debt PC* (100 \$s)	29.042*** (5.976)	7.983*** (1.956)	14.200*** (4.046)
Percentage Pop Age 65 Plus	-104.515* (56.758)	-55.296** (20.930)	-71.560*** (21.997)
Percentage Pop Public K-12 Enrolled	18.861 (37.757)	-3.235 (39.378)	16.931 (43.925)
BRH Liberal Citizen Ideology	21.108** (8.118)	-2.814 (2.123)	1.856 (3.756)
Real Gross State Product PC (1000 \$s)	19.735 (12.694)	7.590*** (2.499)	11.850*** (4.603)
Fed Intergovernmental Revenue PC or Per Student (1000 \$s)	0.176 (0.220)	-0.121** (0.046)	-0.083 (0.071)
State Fiscal Balance as Percentage of Expenditure	-7.825* (4.337)	-3.166** (1.302)	-.4915*** (1.810)
Unemployment Rate	-81.274 (51.714)	-20.796 (19.601)	-35.843* (20.937)
Limit Debt Issue by Amount	456.981*** (162.728)	34.523 (58.201)	138.39 (87.299)
No Mandatory Revenue or Spending Limit	51.436 (166.065)	32.022 (65.180)	42.333 (69.325)
Poor Roads Percentage	10.452 (7.037)	3.754* (2.014)	5.492* (2.564)
Observations	50	50	50
R-Squared	0.807	0.697	0.493

Standard errors are robust for intra-group correlation among a state, relaxing the usual requirement that observations be independent. That is, the observations are independent across states but not necessarily within a state across years.

*Instruments used: Percentage Households with Income 75 to 99K, Percentage Households with Income 100 to 124K, Percentage Households with Income 125 to 149K, Percentage Households with Income 150 to 199K, Percentage Households with Income 200K+, Percentage Households with Wealth greater than 1000K, Dummy if No State Income Tax, Highest Marginal Income Tax Rate, Taxable Income Value that Highest Marginal Income Tax Paid

Table 20: Bond Regression Results with CA Dummy (2008 to 2010, or 2009 to 2010)

Dependent Variables Explanatory Variables	Traditional Long Term Bonds Per Capita	Build America Bonds Per Capita	Build America Bonds Per Capita (Endogenous Traditional Bonds PC*)
Constant	-20.036 (1654.567)	887.049 (833.947)	557.310 (934.241)
Traditional Long Term Bonds Per Capita (Endogenous)	Not Included	Not Included	-0.187* (0.114)
California Dummy	-82.854 (330.975)	177.838** (87.933)	164.982* (102.500)
Real Long Term Debt PC* (100 \$s)	29.033*** (6.048)	7.994*** (1.983)	13.619*** (4.195)
Percentage Pop Age 65 Plus	-105.190* (57.353)	-53.275** (20.470)	-68.137*** (20.174)
Percentage Pop Public K-12 Enrolled	19.175 (38.429)	-3.600 (40.194)	14.673 (43.860)
BRH Liberal Citizen Ideology	21.101** (8.239)	-2.757 (2.151)	1.464 (3.578)
Real Gross State Product PC (1000 \$s)	19.839 (13.003)	7.367*** (2.467)	11.238*** (4.319)
Fed Intergovernmental Revenue PC or Per Student (1000 \$s)	0.177 (0.223)	-0.121** (0.048)	-0.086 (0.069)
State Fiscal Balance as Percentage of Expenditure	-7.920* (4.474)	-2.970** (1.365)	-4.566** (1.889)
Unemployment Rate	-80.234 (53.809)	-23.155 (19.481)	-36.600* (20.313)
Limit Debt Issue by Amount	450.474** (177.323)	47.973 (59.594)	140.98 (88.210)
No Mandatory Revenue or Spending Limit	53.385 (169.340)	28.402 (66.088)	37.992 (68.165)
Poor Roads Percentage	10.775 (7.974)	3.100 (2.121)	4.720* (2.641)
Observations	50	50	50
R-Squared	0.807	0.702	0.525

Standard errors are robust for intra-group correlation among a state, relaxing the usual requirement that observations be independent. That is, the observations are independent across states but not necessarily within a state across years.

*Instruments used: Percentage Households with Income 75 to 99K, Percentage Households with Income 100 to 124K, Percentage Households with Income 125 to 149K, Percentage Households with Income 150 to 199K, Percentage Households with Income 200K+, Percentage Households with Wealth greater than 1000K, Dummy if No State Income Tax, Highest Marginal Income Tax Rate, Taxable Income Value that Highest Marginal Income Tax Paid

Referring to only the “reduced form” regression in Table 19 that includes only exogenous explanatory variables, we offer in Table 21 the statistically significant elasticities calculated from these results. For a variable whose values are continuous in nature, elasticity represents the percentage change in the respective bond value for a one percent increase in the causal variable (calculated at the average values for both the causal and dependent variable). For the dummy variable (Limit Debt Issue by Amount), the elasticity represents the expected percentage change in bond value given that the dummy takes on a one value.

Table 21: Statistically Significant Elasticities from Table 19

<i>Cell Values Represent Respective Statistically Significant Elasticities</i>	Traditional Long Term Bonds Per Capita	Build America Bonds Per Capita
Real Long Term Debt PC (100 \$s)	0.53	0.97
Percentage Pop Age 65 Plus	-0.47	-1.65
BRH Liberal Citizen Ideology	0.43	--
Real Gross State Product PC (1000 \$s)	--	0.77
Fed Intergovernmental Revenue PC or Per Student (1000 \$s)	--	-0.46
State Fiscal Balance as Percentage of Expenditure	-0.03	-0.07
Limit Debt Issue by Amount	15.49	--
Poor Roads Percentage	--	0.28

There are a few things to pay attention to in the above findings. First, though the direction of influence for each explanatory variable is the same for each type of bond where it is statistically significant, the magnitude of influence (in percentage terms for a one percent increase in an explanatory variable) is about double or more for BABs than for traditional bonds.

Within a state, state and local governments issued fewer bonds if they had a greater percentage of elderly, greater federal revenue sharing, and the state's fiscal condition was stronger. An older population is more likely to value the present more than the future (due to the increased uncertainty as you age that you will be alive at some future point), and thus be less inclined to support bond issues that finance projects whose payoff extend into the future. Furthermore, if a state received greater outside revenue or possessed a greater fiscal surplus, it is more likely to be able to fund capital projects with these sources and thus less likely to need to issue bonds.

Alternatively, these regressions show that a state is more likely to have issued state and local debt the greater a state's starting debt, the more liberal its citizens in political ideology, the greater its gross state product per capita, if it has found it necessary to put a debt limit in place, and the greater its roads are in poor shape. The positive relationship between starting debt and bonds issued in a following period after is likely measuring the long-term proclivity for a state to use debt, and hence the greater need to replace its use with new bond issues. Higher income generating states are also likely to have greater public capital needs to support the private industry generating the income and thus more likely to use bonds. Such states may also be encouraged by a greater financial ability to pay off this additional debt. The nearly three-fourths of the states that have a debt limit in place also issue debt at a nearly 16% greater rate than states that do not. We have therefore found that such limits are not effective at reducing bond issues for these states below those that do not have them, but are in place in states that have a greater tendency to use debt. Finally, since bond financing is a highly appropriate source of funding for road repair and construction, it is not surprising that states with a greater need for such are more likely to use it.

Summary of Bond Conclusions from Descriptive and Regression Findings

In this section of this report on the burden of public debt in California, we have explicitly looked at the issuance of new debt between 2008 and 2010 for all state and local governments by state, and for traditional long-term debt and a new form of Build America Debt. Tabular comparisons have shown that California's use of these two forms of debt in per capita terms between 2008 and 2010 placed it in the top 10% of all states. Only Utah and New York issued more BABs per resident than California, and New York, Connecticut, and Massachusetts only issued more traditional debt per resident. Not only were these amounts high in per-capita terms, but they were also high in comparison to other states when looking at bonds issued between 2008 and 2010 compared to total state and local long-term debt in 2007. The ratio value of 1.14 and 1.53 calculated respectively for traditional bonds and BABs placed California in the upper 22 percent and 12 percent of all 50 states in these issues.

Regression analyses of this same bond data also yield interesting findings:

- After **controlling for demographics, politics, economics, institutions, and borrowing costs** expected to influence borrowing activity across the states; **California still issued more Build America Bonds than other states. This separate California effect not found for the recent issue of traditional long-term debt.**
(This is based upon regression findings in Table 20.)
- State and local governments consider Build America Bonds and traditional long-term bonds as substitutes. **For every one dollar per capita use of traditional bonds issued between 2008 and 2010, the use of BABs decreased by \$0.21.**
(This is based upon regression findings in Table 19.)
- The **responsiveness of BABs to demographics, politics, economics, institutions, and borrowing costs, that are thought to influence their issue, is about twice than that found for traditional long-term bonds.**
(This is based upon elasticities calculated from regression findings in Table 19.)
- Within a state, **state and local governments issued fewer bonds if they had a greater percentage of elderly, greater federal revenue sharing, and the state's fiscal condition was stronger.**
(This is based upon elasticities calculated from regression findings in Table 19.)

- A state is more **likely to have issued state and local debt the greater a state's starting debt, the more liberal its citizens in political ideology, the greater its gross state product per capita, if it has found it necessary to put a debt limit in place, and the greater its roads are in poor shape.**

(This is based upon elasticities calculated from regression findings in Table 19.)

VI. WHAT DOES THIS ALL MEAN FOR CALIFORNIA'S DEBT LOAD?

This project set out to answer some very specific questions asked by the California Debt and Investment Advisory Commission (CDIAC) for the benefit of state and local policymakers. We reproduce those questions below and offer answers based in the material previously discussed in this report.

Compared to the previous research, what has this research contributed to our knowledge of debt burdens?

Before the completion of this report, the overall debt of United States subnational governments had not received a recent careful examination. As discussed in the literature review of the regression portion of this report, no such studies exist beyond the 1990s. More recent academic research has focused on narrower issues, such as the impact of explicit debt and spending limits, on alternative fiscal issues such as the sustainability of public employee pensions, and the short-run impact of economic shocks to debt issuance. Accordingly, this research offers three major contributions. First, it provides information about the trends in overall state and local debt in all states during the most recent decade. Second, this research provides new and specific information about the borrowing behavior of state and local governments during the recent Great Recession (2008 to 2010). The analysis examines use of traditional non-taxable bonds as well as the Build America Bonds that were an option during 2009 and 2010 as part of the federal government's stimulus program. Third, our analytical research examining state debt choices and borrowing behavior offers information about the important social and economic factors influencing state and local debt and borrowing decisions. On this latter issue, this research supports the work in the 1990s showing that changes in public school enrollment have an important demographic, political, economic, and institutional influence on the offering of

subnational debt in the United States. This is not surprising given that public education is by far the largest service provided by state and local governments and accounts for about 35% of overall state and local spending throughout the United States.

In addition, the research contained in this report offers an updated understanding of the relative debt position of each state and thus permits any state to compare its debt to other states. Although the focus in this report is California, the research provides the information for any state to consider its circumstances.

How should the state legislature and local governing boards evaluate the rising debt loads?

Conceptually, the assessment of subnational debt levels can occur by examining affordability, optimality, or comparability. Affordability involves comparing debt levels to the magnitude of the economy or to the size of the government budget, either currently or via a forecast future. Optimality recognizes the tie between debt and investment in public capital. The issue is whether government is investing in the quantity and quality of public capital desired by residents and financing the appropriate share of that cost with debt. Comparability involves evaluating debt by comparing to other “similar” governments, allowing for important differences in circumstances.

Our chosen application of the comparability method to the use of subnational debt by California state and local governments does not suggest that its aggregate level of public debt is especially problematic up to 2007. The application of this statistical method to analyzing state and local government debt and comparing governments in California to those in other states does suggest that governments in California relied relatively more on debt for public purposes than one might expect compared to other states. However, much of the growth in debt over the 15 years from 1992 to 2007 seems related to growth in enrollment in public primary and secondary

schools, suggesting that the increased debt corresponds to increased investment in public education facilities. And even with these levels of outstanding debt, the annual interest cost of the debt was taking a declining share of state and local budgets.

Following the start of the recent Great Recession, governments in California did increase their borrowing in 2009 and 2010 compared to the historical pattern and relative to most other states. A combination of traditional non-taxable bonds and Build America Bonds accomplished this increase. Although many state-local governments increased borrowing during these years, California government was particularly aggressive especially with Build America Bonds. During a recession, subnational governments often incur new debt as part of antirecession programs designed to reduce unemployment through the building and repair of public infrastructure. This clearly has occurred in California as part of the federal government stimulus offered during the Great Recession.

Furthermore, when interest costs fall governments react by appropriately incurring new debt or refinancing old debt. According to the *Bond Buyer Index*, average municipal bond interest rates on 20 year, general obligation debt declined from 5.07% in January 2009 to 4.21% in December of that year. So, governments in California took advantage of the low borrowing interest rates during those years and the incentive provided by the relatively large federal government subsidy with Build America Bonds. Aggregate borrowing by the state and local governments in California did decrease in 2010 compared to 2009. Given the modest level of debt and annual interest costs in state-local budgets in California in 2007, the higher borrowing during these two years may not be a long-run concern if borrowing returns to its traditional, long-term pattern. The decrease in borrowing in 2010 and the end of the Build America Bond program suggests that this may be the case, but continued monitoring seems prudent.

Under what circumstances should California governments determine they are issuing “too much,” “too little,” or the “right amount” of debt?

Based on the previous discussion, debt is “too high” if debt levels (or interest costs) increase substantially in comparison to the economy in that jurisdiction (residents’ incomes, for example) or compared to the government’s revenue. Debt may be “too high” if it is substantially different from comparable governments without a clear and appropriate explanation. Ultimately, debt is “too high” if it is being used to finance public facilities or services that are unsupported by residents. In such a case, residents may be unwilling to support the taxes or fees necessary to repay the debt.

Although the analysis in this report does not suggest that these circumstances apply in California in aggregate for different forms of total state and local debt, it is not feasible in this report to examine the situation for every separate local government in the state. However, individual jurisdictions can undertake similar evaluations of their specific circumstances using the same techniques employed here.

How are California state and local debt burdens likely to change in the future?

The analyses in this report suggests that public debt levels have grown over time and are influenced to varying degrees by K-12 public school enrollment, federal aid, and some political/institutional factors. Therefore, these underlying factors determine changes in debt levels in the future. For instance, if the population of school-age children grows substantially or if additional federal aid supports new public capital investment then subnational debt levels in California are likely to increase. Forecasting future debt levels depends on forecasts of these underlying determining factors. In addition, governments in California were relatively large issuers of Build America Bonds. The option for these federally subsidized bonds expired in

December 2010, so unless Congress reinstitutes this program, one incentive for state and local government borrowing no longer exists.

How should government debt managers discuss debt loads with their governing boards?

First, debt managers should monitor and report on both the total magnitude of debt and the magnitude of interest payments on the debt relative to the government's revenue. Because debt incurs over a period of years, primarily to finance public capital projects that persist and provide benefits over many years, the appropriate examination of debt and interest costs relative to revenue should focus on long-run trends rather than the levels in any single year.

Second, debt managers at the level of individual governments should tie new debt issues and existing aggregate debt to the specific projects financed by that debt. In that way, governing boards can not only monitor the aggregate level of debt and interest costs, but also evaluate whether increases in debt and interest costs are associated with specific capital investments supported by voters/taxpayers. Clearly, an increase in debt to finance new education or transportation facilities desired by taxpayers is a positive, rather than a matter of concern.

Is it practical to evaluate debt loads in the context of an entity's operating budget?

Yes, that is one common method of evaluating debt levels, but it alone usually provides an incomplete perspective. It seems prudent for governments to monitor debt levels and annual interest payments relative to the magnitude of revenue. If the debt level (or interest payments) of a subnational government increases substantially relative to its annual revenue, that should be a warning of future fiscal constraints that will require additional revenue and/or reduced spending. We call attention to the observed increase in state debt issues in 2009 and 2010 as something to monitor in this regard.

However, taking only this perspective is incomplete because it does not consider the inherent cause of the change in debt relative to revenue. In certain circumstances, increases in debt relative to revenue are expected and/or appropriate. For instance, debt-to-revenue ratios increase during periods of recession or economic downturn. Revenue may decline or grow slowly because of the decline in economic activity, whereas past fiscal decisions determine past debt levels. Indeed, the data in this report illustrate this trend nationally. In addition, debt-to-revenue ratios may increase if circumstances in the jurisdiction change that warrant increased public investment. A redirection of government spending toward public facilities – new or improved transportation facilities, or new or renovated school facilities – implies an increase in debt relative to revenue (unless the financing for the facilities is entirely through current taxes). Thus, evaluating debt levels solely in comparison to annual government revenue is not always appropriate.

What are the likely impacts of such a requirement and what would be the technical and practical difficulties and costs associated with implementing such a requirement?

No one requirement relating debt to government budgets is likely to be feasible or appropriate for all subnational governments in California. Ultimately, public debt should reflect citizen desires and vary depending on economic and demographic circumstances. For instance, an area where population is growing quickly may want to incur debt to finance new public infrastructure. It can be expected that the debt-to-revenue ratio for local governments in such an area to be higher than in a different region where there is little or no new demand for investment in public infrastructure.

However, a complication of this issue occurs through the fact that the optimal method of funding public infrastructure investment may vary among different governments. Compare two governments that are going to make equal amounts of new capital expenditure. It might be

financially optimal for one government to finance all of that expenditure by issuing debt. In that way, future taxpayers in that jurisdiction will pay the costs for the new public capital investment. This practice might be particularly important and appropriate in a community where substantial turnover of the population is expected. Another jurisdiction might prefer to fund only half of the capital cost from debt, with the remainder coming from current taxes. This might be financially appropriate if the government has sufficient current balances or current residents enjoy much of the benefit of the capital investment.

The nature of the debt incurred also generates differences between governments. One important factor is the term length of the debt issuance. Between two jurisdictions that make equal capital expenditures, but use different debt terms (15 years as compared to 30 years, for example), the debt-to-revenue ratios could be substantially different. Similarly, there are important differences between general obligation and revenue bonds in terms of the ultimate claim on a government's revenue.

Therefore, any type of debt limit or restriction that relates debt to annual government revenue should consider these factors. Such practical difficulties make efficient uniform restrictions complicated to construct and administer.

Should the legislature consider providing more oversight of local debt loads? Should it require greater reporting of debt loads to state and local officials?

The largest increases in any of the forms of public debt in California from 1992 to 2007 were by school districts and by the state government. In contrast, debt issued by counties, municipalities, and special districts (other than schools) decreased from 64% of the total in 1992 to about 50% of the total in 2007. Therefore, debt incurred by local governments (except school districts) over this recent 15-year period increased at a much slower rate than debt incurred by the state government and by school districts.

Obviously, any individual or specific county or municipality could face economic or fiscal problems that would pose potential difficulty for its outstanding debt. Nevertheless, the overall perspective suggests that growth of debt by counties and municipalities has not been unusual or substantial in California since the early 1990s. Thus, a more extensive and broad-based oversight process that would apply to all local governments is likely not required. Rather, the debt trends suggest that if the legislature was to consider any new oversight mechanism, it should focus on school districts and on general-purpose local governments in severe fiscal distress. This focus could come in the form of requiring greater transparency to voters on past debt and the details of the requested debt issuance when it is asked for.

What important questions remain regarding debt burdens? Provide suggestions for further research.

The recent years of 2009 and 2010 were unusual for California subnational debt issuance in comparison to the 1992 to 2007 period because of the recession, federal stimulus funds whose receipt entailed the start of public infrastructure projects in part funded by more debt, the decrease in municipal interest rates, and the availability of Build America Bonds. The state and local governments in California reacted to these factors by borrowing during this period and increasing debt comparatively more than other states. However, aggregate borrowing by the state and local governments in California did ***decrease*** in 2010 compared to 2009, and the Build America Bond program ended in December 2010. Thus, one question is whether borrowing by California governments is returning to its long-term pattern or whether the relatively high borrowing levels seen in 2009 and 2010 continue in future years.

REFERENCES

Bahl, Roy and William Duncombe. "State and Local Debt Burdens in the 1980s: A Study in Contrast." *Public Administration Review*, Vol. 53, No. 1, January/February 1993.

Berry, William D., Evan J. Ringquist, Richard C. Fording, and Russell L. Hanson. "Measuring Citizen and Government Ideology in the American States, 1960 -93," *American Journal of Political Science*, Vol. 42, 1998, 327-48.

Berry, William D., Richard C. Fording, Evan J. Ringquist, Russell L. Hanson, and Carl Klarner. "Measuring Citizen and Government Ideology in the American States: A Re-Appraisal," *State Politics and Policy Quarterly*, Vol. 10, 2010, 117-35.

Baker, Bruce, Daniel Besendorfer, and Laurence J. Kotlikoff. "Intertemporal State Budgeting." National Bureau of Economic Research, NBER Working Papers: 9067, July 2002.

Brecher, Charles, Kurt Richwerger, and Marcia Van Wagner. "An Approach to Measuring the Affordability of State Debt." *Public Budgeting and Finance*, Vol. 23, No. 4, Winter 2003, pp. 65-85.

California State Treasurer, *Debt Affordability Report*, various years, <http://www.treasurer.ca.gov/publications> . Clingermayer, James C. and B. Dan Wood. "Disentangling Patterns of State Debt Financing." *The American Political Science Review*, Vol. 89, No. 1, March 1995, pp. 108-120.

Clingermayer, James and B. Dan Wood. "Disentangling Patterns of State Debt Financing," *American Political Science Review*, Vol. 89, 1995, pp. 108-120.

Ellis, Michael A. and D. Eric Schansberg, "The Determinants of State Government Debt Financing." *Public Finance Review*, Vol. 2, No. 6, November 1999, pp. 571-587.

Fisher, Ronald C. *State and Local Public Finance*. Mason, Ohio: Cengage South Western, 2007.

Hackbart, Merl H. and James Leigland. "State Debt Management Policy: A National Survey." *Public Budgeting and Finance*, Vol. 10, No. 1, Spring. 1990, pp. 37-54.

Kiewiet, D. Roderick and Kristin Szakaly. "Constitutional Limitations on Borrowing: An Analysis of State Bonded Indebtedness." *Journal of Law, Economics, & Organization*, Vol. 12, No. 1, April 1996, pp. 62-97.

Novy-Marx, Robert and Joshua D. Rauh. "The Liabilities and Risks of State-Sponsored Pension Plans." *Journal of Economic Perspectives*, Vol. 23, No. 4, Fall 2009, pp. 191-210.

Securities Industry and Financial Markets Association, U.S. Municipal Issuance, <http://www.sifma.org/research/research.aspx?ID=10806> .

Temple, Judy. "The Debt/Tax Choice in the Financing of State and Local Capital Expenditures." *Journal of Regional Science*, Vol. 34, No. 4, 1994, pp. 529 – 547.

Temple, Judy. "Limitations on State and Local Government Borrowing for Private Purposes." *National Tax Journal*, Vol. 46, No. 1, March 1993, pp. 41 – 52.

Trautman, Rhonda Riherd. "The Impact of State Debt Management on Debt Activity." *Public Budgeting and Finance*, Vol. X, No. X, Summer 1995, pp. 33-51.

The Bond Buyer. "Market Statistics,"
<http://www.bondbuyer.com/marketstatistics/#SemiannualandAnnualStatistics> .

U.S. Census Bureau. *State and Local Government Finance*,
<http://www.census.gov/govs/estimate> , various years.

U.S. Bureau of Labor Statistics. Consumer Price Index, <http://www.bls.gov/cpi/home.htm>, various years.

U.S. Department of Commerce, Bureau of Economic Analysis. National Economic Accounts Data, <http://www.bea.gov> , various years.

Wooldridge, Jeffrey. *Introductory Econometrics: A Modern Approach*. Cincinnati, OH: South-Western College Publishing, 2000.