The Issuance of State and Local Debt during the United States' Great Recession*

Ronald C. Fisher, Ph.D.

Professor
Department of Economics
Michigan State University

Robert W. Wassmer, Ph.D.

Chairperson and Professor
Department of Public Policy and Administration
California State University, Sacramento

October 19, 2011

*Prepared for presentation at the Washington Commission on State Debt Meeting, October 21, 2011, SEATAC.

A Regression Model of Determinants of State and Local Debt Issuance

We utilize bond issuance data from 2008, 2009, and 2010 obtained through personal correspondence with an analyst at Thomas Reuters (TR).[1] This data included information on new bond issues for these years classified by type of government that issued them. Using these categories, we aggregated them together to form three broad categories for our analysis: State Debt Issues, Local Debt Issues, and State/Local Debt Issues. State Debt Issues consists of the TR categories of higher education, state authority, and state. Local Debt Issues consists of local the TR categories of local authority, municipal, and county. State/Local Debt Issues includes them all. In these aggregations, Build America Bond (BAB) issues are lumped together with the more traditional bond issues made by state and local governments. We create a fourth category to account for the issuance of BABs alone. We then recalculated all four of these measures into real 2009 dollars (accounting for inflation and deflation that occurred over this period), and divide by state population (to account for scale effects) in the respective year. The result is the four state-based dependent variables used in our regression analyses: (1) Real State Debt Issues PC (per capita), (2) Real Local Debt Issues PC, (3) Real State/Local Debt Issues PC, and (4) Real BAB Debt Issues PC. Regressions using the first three as dependent variables utilize a pooled data set that contains each of the 50 states observed over three years for a total of 150 observations. Since the issuance of BABS only occurred during the latter half of 2009 and for all of 2010, we chose to lump the 2009 half-year issuance together with the 2010 full-year issuance. This regression will use only a single cross section of the states for a total of 50 observations.

We begin with the simple relationship that desired debt in period "t" (D_t), is equivalent to debt already accumulated 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):

[1]See http://thomsonreuters.com/products_services/financial .

$$D_{t,i} = D_{t-1,\,i} + B_{t,\,i} - R_{t,\,i} \qquad (1);$$

where,

i = 1, 2, 3, …50 states,

t = time periods under consideration.

The data we have collected represent different forms of B_t in equation (1) above. Solving for B_t in this equation yields:

$$B_{t,i} = D_{t,i} - D_{t-1,i} + R_{t,i} \qquad (2).$$

Data on the total amount of previous debt in a state (D_{t-1}) is available from the United States *Census of Governments* for 2007.[2] For comparability with our bond issuance data, this is gathered under the variable name Real Total 2007 Debt 1000$s PC by placing it in thousands of 2009 real thousands and dividing by the relevant state's 2007 population.

The explanatory factors that remain in equation (2) include desired debt plus bond retirement ($D_t + R_t$) in period "t". Since we have no way of knowing desired debt in a period, and information on bond retirements by state is not easily obtained in a publicly available and comparable data set, we assume that D_t can be accounted for by the four general causal factors discovered earlier in our review of the literature of what is expected to drive differences across states in borrowing. We also assume that differences in R_t across the states can be accounted for differences in borrowing costs. Equation (3) accounts for this reasoning.

$$D_{t,\,i} + R_{t,\,i} = f\,(\text{Demographics}_{t,\,i}, \text{Politics}_{t,i}, \text{Economics}_{t,\,i}, \text{Institutions}_{t,i}, \text{Borrowing Costs}_{t,i}), \qquad (3);$$

where,

$\text{Demographics}_{t,\,i} = f\,(\text{Perc Pop Public K-12 Enroll}_{t,\,i}, \text{Perc Pop Change 2000-10}_{i})$,

$\text{Politics}_{t,\,i} = f\,(\text{BRH Liberal Citizen Ideology 2008}_{i})$,[3]

[2] See http://www.census.gov/govs/estimate/historical_data_2007.html#state_local .
[3] See Berry *et al.* (1998). Updated date provided through personal communication.

Economics $_{t,\,i}$ = f (Real Gross State Product PC $_{t,\,i}$, Real Federal Intergov Rev PC$_{t,\,i}$, State Fiscal Balance as Perc of Expend $_{t,\,i}$, Unemployment Rate $_{t,\,I}$, Per Poor Roads$_{t,1}$),

Institutions $_{t,\,i}$ = f (No Debt Limits$_i$, No Mandatory Rev or Spend Limits$_i$, No State Income Tax$_i$, Perc State/Loc Expend Local $_{t,\,i}$,

Borrowing Costs $_{t,\,i}$ = f (Real Total 2007 Debt 1000$s PC$_i$, Year 2009 Dummy$_i$, Year 2010 Dummy$_i$).

The specific explanatory variables chosen to represent the five general factors in equation (3) are similar to variables used in previous studies. We have taken a parsimonious approach to variable choice to avoid issues of multicollinearity and endogeneity. In addition, we include a Washington State Dummy variable that takes on a one when the observation in the data set is from this state and a zero otherwise. The regression coefficient on this explanatory variable effectively allows us to test whether this state has offered more or less of a particular bond issue after controlling for other factors expected to influence bond issues.

Table 1 offers a more detailed explanation of each variable and its source as calculated for the 150 observation regressions. The calculation of explanatory variables used in the 50 observation regression for BABs is the same as described in Table 1 except where separate years noted in the descriptions. For the 50 observation regression, where multiple year data was available for a specific explanatory variable, we only use the average of the 2009 and 2010 observations. Furthermore, Tables 2 and 3 offers descriptive statistics for all variables used in the respective 150 and 50 observation analyses.

Table 1: Variable Name, Description, and Source

Variable Name	Variable Description	Variable Source
Real State Debt Issues PC*	Higher education, state authority, and state bond issue categories added together by state in 2009 per-capita, real dollars for separate years 2008, 2009, and 2010	Personal correspondence with an analyst at Thomas Reuters
Real Local Debt Issues PC	Local authority, municipal, and county state bond issue categories added together by state in 2009 per capita real dollars for separate years 2008, 2009, and 2010	Personal correspondence with an analyst at Thomas Reuters
Real State/Local Debt Issues PC	Real State Debt Issues PC plus Real Local Debt Issues PC	Personal correspondence with an analyst at Thomas Reuters
Real BAB Debt Issues PC	Build America Bond Issues by state in 2009 per-capita, real dollars for partial year 2009 and full year 2010 added together	*The Bond Buyer*, www.bondbuyer.com
Perc Pop Public K-12 Enroll	Percentage of state's population enrolled in K-12 public school for academic years 2007/08, 2008/09, and 2009/10	*Digest of Education Statistics*, www.nces.ed.gov/programs/digest
Perc Pop Change 2000-10	Percentage change in state's population from 2000 to 2010	Calculated from 2010 Census data at http://2010.census.gov/2010census and 2000 Census data at http://www.census.gov/main/www/cen2000.html
BRH Liberal Citizen Ideology 2008	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	Personal correspondence with Richard Fording, political scientist at the University of Kentucky.
Real Gross State Product PC	Gross state product in 2009 per-capita, real dollars divided by population for each year for separate years 2008, 2009, and 2010	Gross state product from Bureau of Economic Analysis; Regional Economic Accounts, http://www.bea.gov/regional/gsp
Real Federal Intergov Rev PC	Federal Intergovernmental revenue shared with a state's state/local governments in 2009 per-capita, real dollars for specific years 2007, 2008, and 2009.	United States Census Bureau, *State Government Finances*, www.census.gov/govs/state
State Fiscal Balance as Perc of Expend	End of fiscal year state government budget balance as a percentage of that year's expenditure by state by state for separate fiscal years 2008, 2009, and 2010	National Governors Association, *The Fiscal Survey of the States*, http://nasbo.org/Publications/FiscalSurvey
Unemployment Rate	Average unemployment rate by state for separate years 2008, 2009, and 2010	Bureau of Labor Statistics, *Regional and State Unemployment Annual Averages*, http://www.bls.gov/schedule/archives/laus_nr.htm
Perc Poor Roads	Percentage of state's roads deemed in "poor or mediocre" condition in 2009	American Society of Civil Engineers, *Report Card for America's Future,* http://www.infrastructurereportcard.org/states
No Debt Limits	Dummy variable equal to one if a state in 2008 had no policy to limit debt service and/or no policy to limit authorized debt	National Association of State Budget Officers, *Budget Processes in the States*, Table 12, *http://nasbo.org/LinkClick.aspx?fileticket=AaAKTnjgucg=&tabid=80*
No Mandatory Rev	Dummy variable equal to one if a state in 2008	National Association of State Budget

or Spend Limits	had no policy to limit it taxes and/or no policy to limit expenditures	Officers, *Budget Processes in the States*, Table 13, *http://nasbo.org/LinkClick.aspx?fileticket=AaAKTnjgucg=&tabid=80*
No State Income Tax	Dummy variable equal one if a state in 2008 had no statewide income tax	The Tax Foundation, *State Individual Income Tax Rates*, http://www.taxfoundation.org/taxdata/show/228.html
Perc State/Loc Expend Local	Percentage of a state's total state and local expenditure that is spent at the local level for specific years 2007, 2008, and 2009.	United States Census Bureau, *State Government Finances*, www.census.gov/govs/state
Real Total 2007 Debt 1000$s PC_i	Total state and local debt in 2009 per-capita, real thousands of dollars for 2007	United States Census Bureau, *State and Local Government Finances*, http://www.census.gov/govs/estimate/historical_data_2007.html#state_local

*PC (Per Capita) with Population from U.S. Census *American Fact Finder*, http://factfinder.census.gov .
Real dollars measured in 2009 constant dollars based upon the Bureau of Labor Statistics Consumer Price Index for all U.S. urban consumers at www.bls.gov/data

Table 2: Variable Descriptive Statistics for 150 Observation Regressions

Variable Name	WA Mean	Mean	Standard Deviation	Minimum	Maximum
Real State Debt Issues PC	664.23	607.94	409.74	0	2,202.93
Real Local Debt Issues PC	400.30	402.25	271.16	0	1,642.51
Real State/Local Debt Issues PC	1,064.53	1,003.09	500.89	53.19	3,841.18
Perc Pop Public K-12 Enroll	15.72	15.99	1.44	13.39	21.63
Perc Pop Change 2000-10	14.09	9.86	7.21	-0.55	35.15
BRH Liberal Citizen Ideology 2008	70.06	61.34	17.44	25.23	91.85
Real Gross State Product PC	50,384.26	45,747.46	8,980.53	31,980.40	72,757.67
Real Federal Intergov Rev PC	1,399.69	1,767.32	685.58	933.15	5,188.17
State Fiscal Balance as Perc of Expend	3.6	10.03	19.88	-7.50	159.20
Unemployment Rate	8.13	7.49	2.38	3.1	14.00
Perc Poor Roads	33.0	32.6	13.82	11.0	78.0
No Debt Limits	0	0.40	0.49	0	1
No Mandatory Rev or Spend Limits	0	0.42	0.50	0	1
No State Income Tax	1	0.20	0.40	0	1
Perc State/Loc Expend Local	54.51	50.20	9.37	21.11	66.45
Real Total 2007 Debt 1000$s PC_i	86.68	61.33	17.44	25.23	91.85

Table 3: Variable Descriptive Statistics for 50 Observation Regression

Variable Name	WA Value	Mean	Standard Deviation	Minimum	Maximum
Real BAB Debt Issues PC	920.23	441.28	305.09	11.39	1,055.69
Real Traditional Debt Issues PC	2,790.66	2,507.43	888.43	914.14	5,069.53
Perc Pop Public K-12 Enroll	15.62	15.91	1.44	13.59	21.05
Perc Pop Change 2000-10	14.09	9.86	7.21	-0.55	35.15
BRH Liberal Citizen Ideology 2008	70.07	61.34	17.44	25.23	91.85
Real Gross State Product PC	50.196.97	45,679.28	8,916.50	32,412.89	68.946.62
Real Federal Intergov Rev PC	1,455.36	1,824.41	684.72	1,061.11	4,479.53
State Fiscal Balance as Perc of Expend	1.65	8.95	21.36	-6.20	143.15
Unemployment Rate	9.45	8.59	2.0	4.1	13.25
Perc Poor Roads	33	32.6	13.82	11.0	78.0
No Debt Limits	0	0.40	0.49	0	1
No Mandatory Rev or Spend Limits	0	0.42	0.50	0	1
No State Income Tax	1	0.20	0.40	0	1
Perc State/Loc Expend Local	54.51	50.20	9.37	21.11	66.45
Real Total 2007 Debt 1000$s PC_i	86.68	61.33	17.44	25.23	91.85

Regression Results

Tables 4 and 5 offer the results of the regression analyses just described. In Table 4 are the three sets of results for the 150 observation regressions that use Real State Debt Issues PC, Real Local Debt Issues PC, and Real State/Local Debt Issues PC as the dependent variables. We use the STATA data analysis package to estimate these pooled sampled regressions using Random Effects GLS Estimation with robust standard errors. Since we have a large number of explanatory variables that do not vary over the three 50 state cross sections of data, we could not try a Fixed Effects estimation process. Table 5 contains two sets of regression results that use the 50 observations, single cross section data set, and the Real BAB Debt Issues PC variable as its dependent variables. What is different about the two is that the first regression is estimated in the same manner as the three estimated for all forms of debt issuance, while the second adds the possibility that the amount of real Build America Bond debt issues per capita in 2009 and 2010, is also a function of the amount of traditional bond issues per capita between 2008 and 2010. That is, did a state that offered more Real Traditional Debt Issues PC over this period offer more or less Build America Bond issues. In economic terms, this second regression form in Table 5 offers a direct test of whether the two forms of debt issue were substitutes or compliments, and the degree of this substitutability or complementarity.

In running this test we recognize that the amount of Real Traditional Debt Issues PC must be considered simultaneously determined with Real BAB Debt Issues PC. Thus, our use of a Two-Stage Least Squares (TSLS) regression estimation technique that requires the finding of additional instrumental variables that are expected to influence the offering of the endogenous variable in the regression (Real Traditional Debt Issues PC), but not the dependent variable (Real BAB Debt Issues PC). To find these, we utilize the reasonable theory that a state's subnational

governments are more likely to offer more traditional debt issues the greater the income tax benefits that residents in the state enjoy from earning interest on these offerings. Benefits to a state's residents come in the form of the additional income tax deductibility in a state that has an income tax, at a higher rate of taxation, at a more progressive rate structure, and has more high income citizens more likely to pay the state's higher income taxes. Understanding this, a state's policymakers are likely to offer more of this traditional debt, the greater that it benefits the state's citizens.[4] This logic works well for satisfying the requirement that these instruments do not influence the dependent variable which measure a state's offering of BABs because the interest earned on holding this form of debt by a state's citizens does not enjoy such tax-free status.

[4] Note that these instrumental variables are not included in the previously run regressions because they are highly correlated with the included Real Gross State Product PC and thus would introduce severe multicollinearity. 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), Households in Thousand with Wealth greater than 1000K (0.57), Highest Marginal Income Tax Rate (-0.14), and Taxable Income Value that Highest Marginal Income Tax Paid (0.09).

Table 4: 150 Observation Regression Results

Explanatory Variable / **Dependent Variable**	**Real State Debt Issues PC** (Mean=$607.94) [WA Mean = $664.23]	**Real Local Debt Issues PC** (Mean=$402.25) [WA Mean = $400.29]	**Real State/Local Debt Issues PC** (Mean=$1,003.09) [WA Mean = $1,064.53]
Constant	-834.19 (628.11)	98.16 (378.20)	-1,077.22* (551.92)
Washington State Dummy	**-135.55** **(116.22)**	**-223.39***** **(82.04)**	**-338.40***** **(103.96)**
Dummy 2009	104.16 (102.11)	147.40** (74.57)	253.32* (140.167)
Dummy 2010	45.91 (85.48)	166.45*** (54.95)	189.73** (92.95)
Perc Pop Public K-12 Enroll	70.88** (31.39)	-23.22 (20.05)	57.09** (26.22)
Perc Pop Change 2000-10	-2.50 (6.36)	10.56** (3.77)	7.44 (7.27)
BRH Liberal Citizen Ideology 2008	6.01** (2.40)	-0.99 (1.54)	6.22** (2.60)
Real Gross State Product PC	0.0144*** (0.0049)	-0.0031 (0.0027)	0.0129*** (0.0049)
Real Federal Intergov Rev PC	0.0819 (0.0719)	0.0149 (0.0457)	0.1057 (0.0854)
State Fiscal Balance as Perc of Expend	-7.736*** (2.15)	1.46 (1.15)	-6.25*** (1.81)
Unemployment Rate	-18.05 (21.22)	-25.69* (13.66)	-43.86* (24.30)
Perc Poor Roads	0.6250 (2.439)	-0.0963 (1.5281)	0.7723 (2.2309)
No Debt Limits	-45.66 (64.91)	-55.81* (33.81)	-90.19 (69.09)
No Mandatory Rev or Spend Limits	-108.00 (75.89)	-25.33 (50.68)	-130.75 (87.90)
No State Income Tax	-14.76 (112.52)	-79.14 (72.09)	-82.50 (111.75)
Perc State/Loc Expend Local	-16.15*** (4.37)	10.92*** (2.86)	-3.62 (4.01)
Real Total 2007 Debt 1000$s PC_i	3.36 (2.06)	6.15*** (1.53)	8.45*** (2.89)
R-Squared	0.669	0.696	0.639

***Indicates statistical significance of regression coefficient at greater than 99 percent confidence in a two-tailed test. ** indicates greater than 95 to 99 percent confidence. * indicates greater than 90 to 95 percent confidence.

Table 5: 50 Observation Regression Results

Explanatory Variable	**Real BAB Debt Issues PC (Using Endogenous Real Traditional Debt Issues PC^)** (Mean=$441.28) [WA = $920.23]
Constant	-1,949.52** (793.34)
Washington State Dummy	**-184.04 (162.87)**
Real Traditional Debt Issues PC	-0.2845** (0.1336)
Perc Pop Public K-12 Enroll	98.89** (41.72)
Perc Pop Change 2000-10	0.6291 (6.5899)
BRH Liberal Citizen Ideology 2008	2.68 (3.69)
Real Gross State Product PC	0.0199*** (0.0058)
Real Federal Intergov Rev PC	-0.0331 (0.0723)
State Fiscal Balance as Perc of Expend	-6.94*** (2.38)
Unemployment Rate	-6.14 (20.16)
Perc Poor Roads	5.85*** (2.18)
No Debt Limits	-137.43* (81.04)
No Mandatory Rev or Spend Limits	155.58** (64.09)
No State Income Tax	162.95** (71.80)
Perc State/Loc Expend Local	-8.57* (4.73)
Real Total 2007 Debt 1000$s PC_i	15.37*** (3.84)
R-Squared	0.619

***Indicates statistical significance of regression coefficient at greater than 99 percent confidence in a two-tailed test. ** indicates greater than 95 to 99 percent confidence. * indicates greater than 90 to 95 percent confidence.

^Instruments used and source: 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+ [all previous from *United States Statistical Abstract*, 2009, Money Income of Households, http://www.census.gov/compendia/statab/2009/cats/income_expenditures_poverty_wealth/household_income.html ; Households in Thousand with Wealth greater than 1000K [State Millionaires, 2006, http://www.netstate.com/states/tables/state_millionaires_household.htm], Highest Marginal Income Tax Rate, Taxable Income Value that Highest Marginal Income Tax Paid [all previous from The Tax Foundation, 2009, *State Individual Income Tax Rates*, http://www.taxfoundation.org/taxdata/show/228.html].

Beginning with the regression results recorded in Table 4 for all state and local debt (Traditional and BABS) issued by year in 2008, 2009, and 2010, it is informative to first look at the explanatory factors found significant for the aggregate regression to see if the findings differ when disaggregated to the state or local level. Based on the year dummies, that measure the influence of the stated year to the excluded year of 2008, in 2009 over 2008 there was about $253 more Real State/Local Debt PC issued, while in 2010 about $190 more issued than in 2008. To place these increases in perspective, consider that the average real amount of this aggregate debt issue per capita was about $1,000 per year. A similar pattern emerged from the Real Local Debt Issues PC regression, but for this measure, more occurred in 2010 than 2009, relative to 2008. These changes over time, holding other explanatory factors constant, in part account for differences in the rates of refinancing that existed between the three years included in pooled data sample.

Percentage Population Change 2000-10 only exerted a significant influence on local debt issues. For every one percentage point increase in this measure, local issues went up by about $11 per capita from a mean of about $400. More politically "Liberal" states issued both more state debt and aggregate state/local debt with an increase of about $6 per capita in each for every one point increase in the zero (very Conservative) to 100 (very Liberal) scale used. From a mean value of about $46,000 per capita, every $1,000 increase in a state's gross state product per capita yielded a $14.4 increase in Real State Debt Issues PC and a lesser $12.9 increase in aggregate state and local debt issues per capita. A state in better fiscal shape, as measured by its end-of-year fiscal surplus as a percentage of its budget, offered less state debt issues and less state/local debt issues. For every one-percentage point increase in this measure of the fiscal strength of a state, it offered about $8 less state debt issues and $6 less state/local debt issues.

As perhaps expected, the health of a state's overall economy influenced its offering of local and state/local debt combined. We found that a one percentage point increase in the state's unemployment rate (an inverse proxy for its economic health), resulted in about a $26 decrease in local debt issues, and a $44 decrease in state/local debt issues. The regression coefficient that measured the expected influence of a state not having an income tax on its debt issues was negative in all three regressions in Table 4, but only significant in its influence on local debt issues. The percentage of a state's subnational (state and local) expenditure done at the local level – which exhibited a mean value of 50 percent – showed the expected influences. A one-percentage point increase in this measure lowered state debt issues per capita by about $16, and increased the equivalent at the local level by just under $11. Finally, the amount of overall real subnational debt per capita in a state in the year (2007) previous to the debt issue data examined exerted significant respective influences of about $6 ($8) increases in Real Local (State/Local) Debt Issuers PC for every thousand increase in them.

Observe Table 4's regression coefficients in red for an answer the important question of whether within the State of Washington, after controlling for the explanatory factors expected to influence the amount of debt issued, has issued more or less debt been than other states. These regression coefficients are negative, but only the values recorded for local debt and state/local debt combined are significantly different from zero (with a 90 percent degree of confidence). Thus, the appropriate interpretations are: (1) that Washington offered no more state debt than other states, (2) offered less local debt, and this resulted in (3) the entire state offering less combined state/local debt. The means of annual real local (state/local) debt issued across the states in per capita terms of about $402 ($1,003), put the expected reductions calculated for Washington being "Washington," of about -$223 (-$338) in perspective.

Perhaps of most interest in the regression results in Table 5 is the finding that a dollar increase in the use of real traditional debt per capita any time in years 2008, 2009, and 2010, resulted in a midpoint estimate reduction in real BAB debt per capita in 2009 and 2010 of about $0.28. With the confidence of being correct 95 percent of the time, this effect falls within a minimum expected reduction of $0.02 and a maximum reduction $0.55. This finding is important because it indicates that the institution of BABs did not entirely crowd out the issuing of traditional debt. If it had, the regression coefficient would be near negative one. Instead, the effect centered on -0.23; meaning that only about a fourth of BAB issues were substitutes for traditional debt. Thus, about three fourths of BAB issues in 2009 and 2010 occurred because the new bond issue program came into being. This is clear and policy relevant evidence that BABs did serve their desired purpose of encouraging greater state and local borrowing than would have occurred without them.

Furthermore, states that used BABs to a greater extent exhibited a greater demand and/or need for the infrastructure projects they likely financed. This is exhibited by an approximate $99 increase in BABs use (from a real dollar per-capita mean of about $440) from a one percentage point increase in the percentage of a state's population attending public K-12 schools, and about a $6 increase in BABs use from a one percentage point increase in the state's roads deemed poor or mediocre by the American Society of Civil Engineers. If its citizens and policymakers consider a state's infrastructure, then it is also not surprising that a thousand dollar increase in a state's real gross state product resulted in about a $20 increase in Real BAB Debt Issues PC. States with a one-percentage point increase in their Fiscal Balance as a Perc of Expend issued about $7 less in BABs. Being in better fiscal shape may offer the indicator that such states have

covered their infrastructure investment needs in the past, and thus were less likely to need to use BABs in the present.

It is also clear from the regression findings in Table 5 that the institutions present in state exerted significant influences on Build America Bond use by subnational governments in a state. For instance, if a state controlled more of the total state and local expenditure in its boundaries, then more BABs issued. Perhaps this is because a larger state government had more of the needed financial sophistication to employ this new debt instrument. For every one-percentage increase in spending at the local government level, BAB use fell by about $9 per capita. Furthermore, states with no statutorily imposed debt limits used BABs less than states with them (about $137 per capita less). This may be due to it being easier for them to satisfy their debt issuance needs through traditional bonds. We also found evidence that state's with no statewide income tax were more like to use BABs (by about $163 more per capita) and states with no revenue or expenditure limits were also more likely to do the same (by about $156 more per capita). The causal explanation for this is not entirely clear. Perhaps the absence of an income tax reduced the availability of state funds for pay-as-you-go financing on infrastructure and increased the need for debt financing. Perhaps the states without any constraints on their fiscal activity felt more comfortable in taking on more BAB debt due to their greater likely ability to be able to pay for it.

Note again the significant regression coefficient on the Washington State Dummy explanatory variable in Table 5. Holding the other explanatory variables present in the regression coefficient, Washington State's subnational governments issued about 18 percent less BAB debt than other states. The 18 percent value results from dividing the expected Washington

State reduction of $184 by the mean amount of Build America Bonds issued in all states of $1,003.

Referring to only the Real State /Local Debt Issues PC regression in Table 4 and Real BAB Debt Issue PC regression in Table 5, we offer in Table 6 the statistically significant elasticities calculated from these results.[5] 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 explanatory and dependent variables). For a dummy variable, the elasticity represents the expected percentage change in bond value given that the dummy moves from a zero to one value.

Table 6: Statistically Significant Elasticities from Tables 5 and 6

Cell Values Represent Respective Statistically Significant Elasticities (Except for dummy variables where represents (respective regression coefficient / mean of respective dependent variable) x 100	**Real State/Local Debt Issues PC**	**Real BAB Debt Issues PC**
Washington State Dummy	-0.31	-0.42
Real Traditional Debt Issues PC	not used	-1.62
Perc Pop Public K-12 Enroll	0.86	3.57
BRH Liberal Citizen Ideology 2008	0.36	
Real Gross State Product PC	0.55	2.06
State Fiscal Balance as Perc of Expend	-0.06	-0.14
Unemployment Rate	-0.31	
Perc Poor Roads		0.43
No Debt Limits Dummy		-0.31
No Mandatory Rev or Spend Limits Dummy		0.35
No State Income Tax Dummy		0.37
Perc State/Loc Expend Local		-0.98
Real Total 2007 Debt 1000$s PC_i	0.49	2.13

One thing to pay attention to in the above findings is that though the direction of influence for each explanatory variable is the same for each type of debt issue where it is

[5]For a continuously measured explanatory variable, an elasticity represents the expected percentage change in a regression's dependent variable given a one percent change in a respective explanatory variable, holding all other explanatory variables constant. They are informative to look at because they are not unit dependent and thus offer a way of comparing the relative strength of one explanatory variable's influence to another's. For a dummy explanatory, an elasticity represents the expected percentage change in bond value given that the dummy takes on a one value.

statistically significant, the magnitude of influence (in percentage terms for a one percent increase in an explanatory variable) is double or more for BABs than for all bonds lumped together.

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-Apraisal," *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.