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Do School District Bond Guarantee Programs Matter?

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Abstract

The State of Washington enacted a school district bond credit enhancement program in 1999. Oregon did the same in 1998. I use data from the National Center for Education Statistics for a representative sample of states in order to examine whether or not these programs increased the likelihood that school districts in Washington and Oregon issued bonds. I isolate the programs' impact in Washington and Oregon through difference-in-differences analysis to control for other variation in the data in ten other representative states during the same time period. The results suggest that state-level school district bond guarantee programs increase the likelihood of district bond issues.

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I. Introduction

Do school district bond guarantee programs matter? Many school districts engage in capital projects, which can include new schools, additions, renovations, equipment purchases, etc. They require a significant amount of upfront investment. Districts usually pursue this type of investment through bond issues. Any bond issued by a municipal (local) authority is referred to as a "municipal bond," and a majority of bonds issued by school districts are General Obligation Bonds (GO) and voter-approved. GO bonds require municipalities to pledge their full taxing authority and tax revenues as collateral to repay bondholders. They often require the municipality to pledge a property tax to meet debt service requirements.

The typical format is for school districts to pursue bond insurance on their own with a private insurer. However, several states have introduced different types of state-run bond insurance programs, including Washington in 1999, and Oregon in 1998. These programs are the source of my identification, as I use data from the National Center for Education Statistics for a representative sample of states in order to examine whether or not these programs increased the likelihood that school districts in Washington and Oregon issued bonds. I isolate the programs' impact in Washington and Oregon through difference-in-differences analysis to control for other variation in the data in ten other representative states during the same time period. The results suggest that state-level school district bond guarantee programs increase the likelihood of district bond issues.

I begin with a background and literature review in section II, followed by my empirical strategy in section III, data in section IV, results in section V, and conclusion in section VI.

II. Background and Related Literature

School districts, as well as any entity that considers issuing bonds, must decide whether or not to have their bond issue rated. There is a typical cost-benefit analysis that is at least briefly considered by school district finance officials. There is no uniform list of reasons why a district should or should not pursue a rating, as Gist (2009) suggests that bond raters appear to evaluate a wide range of information during the rating process. Ratings provide a number of benefits to both the school district and prospective bondholder. They provide valuable independent analysis of the district's financial condition to help sell municipal bonds on the primary market. Ratings are necessary to attract non-local or institutional investors, as state and federal law restricts their investments to "investment-grade" securities (Harris 2003).

However, not all school districts will benefit from paying a fee to have their bond rated. Mary H. Harris and Vincent G. Munley (2002) note that school district size may be an advantage in a bond rating process, as rating agencies clearly take the ability of a district's population to pay taxes into account. If district size matters, then a smaller district that believes there is a high likelihood that the bond will receive an unfavorable rating may forgo the process, thereby missing the opportunity to receive institutional investors' dollars. The benefits may not

outweigh the costs for some districts. Another possibility is that a district that does not expect to have many non-local investors interested in its bond issue may not need the external validity and approval of a rating issued by an agency in order to generate appeal amongst local investors. These local investors may already know enough about the district's reputation, financial condition, and characteristics to judge whether or not they are interested in its bond issue on their own.

Poorly performing school districts may also struggle to obtain a favorable rating. D. Denison, W. Yan, and Z. Zhao (2007) use an ordered probit maximum likelihood model show that districts that improve the percent of students passing standardized tests and increase the number of students admitted to college increase their probability of getting a higher bond credit rating.

However, even if the school district fears receipt of an unfavorable rating from a rating agency, district officials may decide to go ahead and seek a bond rating anyway. From 1991-1993, the average rating fee was $7,000, and national statistics show Moody's and S&P rate the majority (58 percent) of rated bonds (Harris 2003). If the district's fears are confirmed, they then have the option to purchase bond insurance. Bond insurance represents an additional expense to the district, adding on to a potentially expensive bond-issue process. Those districts that do purchase bond insurance almost always receive an upgrade to the highest rating, as the private insurance agency guarantees the district's debt obligation for a fee to the school district. Insurance premiums involve an assessment of the districts' financial condition and risk of default (Harris 2003). Todd Ely (2012) finds

evidence that bond insurance premiums rose dramatically following the 2007-2008 fiscal crisis, even when controlling for widening credit spreads and changes in the underlying credit quality of issuers. With this in mind, some school districts that would benefit from purchasing insurance may not be able to do so. This fact inspires my research question, as the implementation of a state-level bond issue guarantee changes the landscape for school districts that decide against private insurance.

There are four categories of state-level bond credit enhancement programs. The first is State Guarantee Programs, where states pledge their full faith and credit to qualified school district bonds. The second is State Aid Intercept/Withholding Programs, where the district's state-level revenue is diverted to bondholders in the event of faulty debt servicing. The third is State Appropriation Programs, where state funds are used to resolve any shortage of district funds to service debt. The fourth and final category is State Fund Programs, where dollars from constitutionally created state funds are used to resolve any shortage of district funds to service debt. Some of these programs involve a direct link between the state's rating and the district bond issue's rating, while others do not. Table A1 in Appendix A displays the various types of programs in each state in my dataset, as well as their implementation year.

My paper focuses on Oregon and Washington's State Guarantee Programs, where the state pledges its full faith and credit behind qualified district bonds. It is important to note that my question simply examines whether or not state-level

school district bond guarantee programs increase the likelihood that a school district will issue bonds. There is some evidence that districts that pass bond issues through the referendum process are rewarded with an immediate increase of housing prices. It suggests that parents value improvements in other types of school output such as safety and facility quality that might not be captured by test scores, even after controlling for demographic changes (Cellini et. al 2008). This evidence suggests that public opinion positively values capital spending. However, while a wide range of literature examines whether or not capital projects or increased spending in general improve student outcomes, this paper does not. It simply examines whether or not state-level bond guarantee programs have any effect on a school district's propensity to issue bonds – a simple question that is not often found in the literature.

III. Empirical Strategy

Do state-level school district bond guarantee programs have any effect on a school district's propensity to issue bonds? To answer this question, I could take one of two approaches: I could focus on the bond rating improvements obtained through the credit-enhancement program, or I can look for data on bond issues, regardless of their rating. I chose the latter approach, as most credit enhancement programs and bond insurance agencies automatically improve the bond issue's rating (Harris 2003).

If a state creates a school district bond guarantee program, I can look at changes in district behavior with regards to bond issues before and after this state-

level policy change. However, any conclusions from this data alone, local to the state where the policy change occurred, will simply suggest correlation but not causation. To overcome this limitation, I examine variation in school district bond issues inside and outside of the state where the policy change occurred, before and after the introduction of the bond guarantee program. Ideally, I would use as large of a sample of school districts as possible – one idea is to gather data for all 50 U.S. states. However, this idea runs into a few issues, as education climates vary by state.

With this concern in mind, I decided to use a representative sample of 12 U.S. states. This list is drawn from research conducted by Mary Harris (2001), as she explains how these 10 states are a representative sample of different education system structures, policies, and environments, in different regions of the country. For example, her selection of states is made in light of different referendum requirements, debt limit policies, the varying independence of school districts, voting majority definitions, and various capital state funding practices. The 10 states are: Arizona, Georgia, Illinois, Kansas, Kentucky, Louisiana, Nebraska, New Jersey, New Mexico, and Oregon. I add Texas and Washington to the sample, as a majority of the remaining school district bond literature uses Texas data, and I use Washington as one of my two sources of identification. Texas is large in size and has a school district bond credit enhancement program (state permanent fund). It also adopted standardized testing earlier than most states. Although California is a larger state than Texas with regards to population, California's public education

system is subject to unique and unrepresentative circumstances due to the *Serrano* court decision.

Table A1 in appendix A lists various types of state-level school district bond issue credit enhancement programs within my list of sample states. As mentioned earlier, only Oregon and Washington have bond guarantee programs, where the state pledges its full faith and credit to qualified school district bonds. These programs are the source of my identification, as opposed to credit enhancement programs that fall into other categories, such as those that divert state aid intended for schools to bondholders in times of financial trouble. However, I also account for the 2002 enactment of a credit enhancement program in New Jersey with an additional dummy variable, even though it is structured differently than a bond guarantee program. Kentucky's 2004 program only applies to Universities, and therefore has no impact on my estimates.

If the number of school districts that issue bonds after the introduction of a bond guarantee program increases, after controlling for unobserved variation through an analysis of a representative sample of states, this suggests that the bond guarantee program changes the financial possibilities for school districts and increases their propensity to raise funds for capital projects through bond issues. If the number of school districts that issue bonds after the program's introduction falls with the controls included, then the bond guarantee program likely has a negative effect on a district's propensity to raise funds through bond issues.

I develop a model to evaluate the effect of Washington and Oregon's school district bond guarantee programs, according to the following specification:

Equation 1:

$$BondIssue = \alpha(BondIns)_{it} + \lambda(NJQBP) + \phi(\vec{X}) + \delta_t + \gamma_i + \varepsilon_{it}$$

My dependent variable, BONDISSUE, is a binary outcome variable of 0 or 1, where 1 represents a district bond issue, and 0 represents no issue. My first independent variable is BONDINS, a dummy variable equal to 1 for all Washington school districts from 1999 - 2009 and Oregon school districts from 1998 - 2009, and 0 for all other states and years. This uniquely identifies the policy change that serves as my identification. I expect BONDINS to be positively correlated with BONDISSUE because the state-level school district bond guarantee programs in Washington and Oregon simplify the bond issue process and improve financial opportunities for school districts in an intuitive and theoretical interpretation. The other dummy variable, NJQBP, simply accounts for the existence of a state fund program in New Jersey from 2002 – 2009 for all school districts in the state.

The third independent variable is a vector X, that includes PWHITE, which is equal to the percent of enrolled students whose race is "white," ENROLL, equal to the total number of enrolled students in the district, LTE - an acronym for local tax effort represented by local revenue per student divided by per capita personal income (both components adjusted for inflation), INGVTPP - an acronym for inter-

governmental revenue per pupil or total per pupil revenue to each district from state and federal sources (adjusted for inflation), and GROSSDEBT, equal to long and short term debt outstanding at the end of the year divided by ENROLL (adjusted for inflation). I expect PWHITE to be positively correlated with BONDISSUE, as I assume a majority of school districts that issue bonds are in strong financial standing and of higher quality. I use PWHITE to proxy for this expectation. I anticipate a positive correlation between ENROLL and BONDISSUE, as Harris (2003) suggests that larger districts receive higher ratings due to a perceived larger tax base, population, and tax revenue generation ability. I expect LTE and INGVTPP to be negatively correlated with BONDISSUE, as districts with higher local tax revenues likely have less need of additional revenue, and districts with large amounts of state and federal aid likely have less need of alternative sources of additional revenue. Lastly, I anticipate a negative relationship between GROSSDEBT and BONDISSUE, as I imagine that districts with high amounts of outstanding debt will acknowledge the likelihood that this financial position will be penalized through the bond ratings they may receive on a new issue.

There are also dummy variables for each year (δ_t), which are dummies for all years of sufficient data (excluding the first year, 1997) across all observations and variables from 1998-2009: $\delta_1(1998) + \delta_2(1999) + \ldots + \delta_{12}(2009)$. I also include district fixed effects (γ_i) to impose time-independent effects for each district that could be correlated with the independent variables. By using fixed effects, I am

able to incorporate difference in differences analysis into my evaluation of this policy change in Oregon and Washington.

I estimate equation 1 using two different econometric frameworks. First, I use OLS in model I with a linear probability model.[1] The second framework (model II) involves a maximum log-likelihood model. Both the OLS and Logistic regressions are modeled using fixed-effects. This controls for between-district variation, and allows me to isolate the within-district variation in whether or not a district issued bonds. All results are reported in Appendix B.

IV. Data

Ideally, data used to answer this question include a) whether or not school districts issued bonds in a large sample of years before and after Washington and Oregon's policy changes b) some demographic variables c) some financial variables, especially those that concern the district's ability to raise revenue in other ways or its receipt of large amounts of revenue from other branches of government and d) some economic variables, such as household income for the town each school district is in.

I obtained a majority of my data from the National Center for Education Statistics, a division of the U.S. Department of Education. I also retrieved per capita personal income by county and GDP deflator data from the Bureau of Economic Analysis. I used the GDP deflator to adjust several figures for inflation,

[1] In unreported regression results, I then use this the same linear probability model with standard errors clustered by state, to ensure robustness and to identify the variation at the state-level. It is not evident that clustering significantly improved the results – if anything, it strengthens BONDINS' impact on BONDISSUE, whereas we would expect clustered standard errors to result in a weaker effect. The standard errors did not change much with clustering.

as I compare them over time. Additionally, I calculated some variables used in the final regression using the retrieved NCES data. Sufficient data exists across all variables of interest for 1997-2009. Per capita personal income (used in LTE) is by county, not by town - this is one limitation of the dataset.

Summary statistics for the variables used in all regression analyses are displayed below in table A2 of appendix A. Figure 1 in Appendix A displays the mean of the binary BONDISSUE variable for the two states of interest and the rest of the states in the sample from 1997-2009. It appears that the program had a slightly lagged effect on the probability that school districts issue bonds. Further research could examine the decline after 2003.

V. Results

I estimate equation 1 using two different econometric frameworks. First, I use a linear probability model (OLS). The second framework involves a logit model. Results for the OLS panel regression (model I) are displayed in Table B1 in Appendix B. These coefficient results suggest that Washington and Oregon's bond guarantee programs (BONDINS) increase the probability of a district bond issue by almost 77 percent (I divide the estimated coefficient of 0.0686 by the sample mean of 0.0895). This is consistent with my expectation that the bond guarantee programs result in a positive increase in the likelihood that a school district in Washington or Oregon issues bonds.

Results for the logistic regression (model II) are displayed in Table B1 in Appendix B. Coefficients are instead reported as an "odds-ratio." Odds represent

the expected number of "successes" for each "failure." Districts with the Washington and Oregon state-level bond guarantee programs available were 86 percent more likely to issue bonds.

The linear probability model (model I) estimates a slightly smaller effect of BONDINS than the logistic regression (model II). It is difficult to compare the two models in detail, as ordinary least squares and logistic regression differ. For example, OLS requires homoscedasticity, while logistic regression does not. It appears that model II estimates a slightly larger effect, but regardless, both the OLS linear probability model and the logistic regression estimate a positive and significant effect of Washington and Oregon's bond guarantee programs on the propensity of school districts to issue bonds. This effect persists after controlling for unobserved underlying changes before and after the programs across a representative sample of ten other states. District size (as measured by school enrollment) does not seem to have a significant effect, nor does non-local revenue for the OLS model.

VI. Conclusions

I use two fixed-effect models (OLS and Logit) with the same specification to examine the impact of Washington and Oregon's school district bond guarantee programs on the likelihood that a school district issues bonds. I control for unobserved variation in a representative sample of ten other states before and after the program's inception in Oregon in 1998 and Washington in 1999. My analysis to estimate the effect of these bond guarantee programs involves difference-in-

differences analysis and suggests that the programs have a positive and significant effect on the likelihood that school districts issue bonds after their inception. The programs' positive and significant effect is robust across both the panel data OLS regression and the panel data logistic regression.

Future research could make use of district-level income data instead of county-level data. Additional research on these programs could also examine their effects on the actual ratings assigned to Washington and Oregon's school districts' bond issues. This would involve collecting rating data for each school district in each state before and after 1999 (1998).

Overall, my estimates suggest a positive outcome for school districts in Washington and Oregon, if the reader assumes that increased capital spending through bond issuance is a desirable outcome for school districts, in accordance with the evidence presented by Cellini et all (2008). Other states could use this finding to support the potential gains from a school district bond guarantee program – a state-level alternative to private bond insurance. Since most state-level bond insurance programs guarantee district voter-approved issues, they are likely more generous than private insurers, on average. Some may find this policy outcome desirable.

References:

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Appendix A:

Table A1: Various State Municipal Bond Programs in Sample States

Type	Year
State Guarantee Programs:	
Oregon School Bond Guarantee Program	1998
Washington School Bond Guarantee Program	1999
State Aid Intercept/Withholding Programs:	
Georgia State Aid Intercept Program	1991
Kentucky State Aid Intercept Program	1994
Kentucky State Aid Intercept Program for Commonwealth Universities	2004
State Fund Programs:	
New Jersey Additional State Aid Bonds Program	Pre-1990
New Jersey Fund for the Support of the Free Public Schools Program	1980
New Jersey Qualified Bond Program	2002
Texas Permanent School Fund Program	1983
Texas Higher Education Bond Program	1985

Sources: Standard & Poor's State Credit Enhancement Programs, November 2008. Stone & Youngberg Municipal Credit Group, March 2011

Table A2: Summary Statistics for All Variables

Variable	Obs	Mean	Std. Dev.	Min	Max
bondissue	62608	0.2047342	0.4035105	0	1
bondins	62608	0.0895572	0.2855487	0	1
njqbp	62608	0.0661257	0.2485037	0	1
pwhite	62608	0.6963163	0.295723	0	2.8
enroll	62608	2924.025	10115.27	1	477610
lte	62608	0.1599459	0.166088	0	5.107666
ingvtpp	62608	6442.476	5862.402	0	756720.9
grossdebt	62608	4643.033	6687.195	0	426343.5

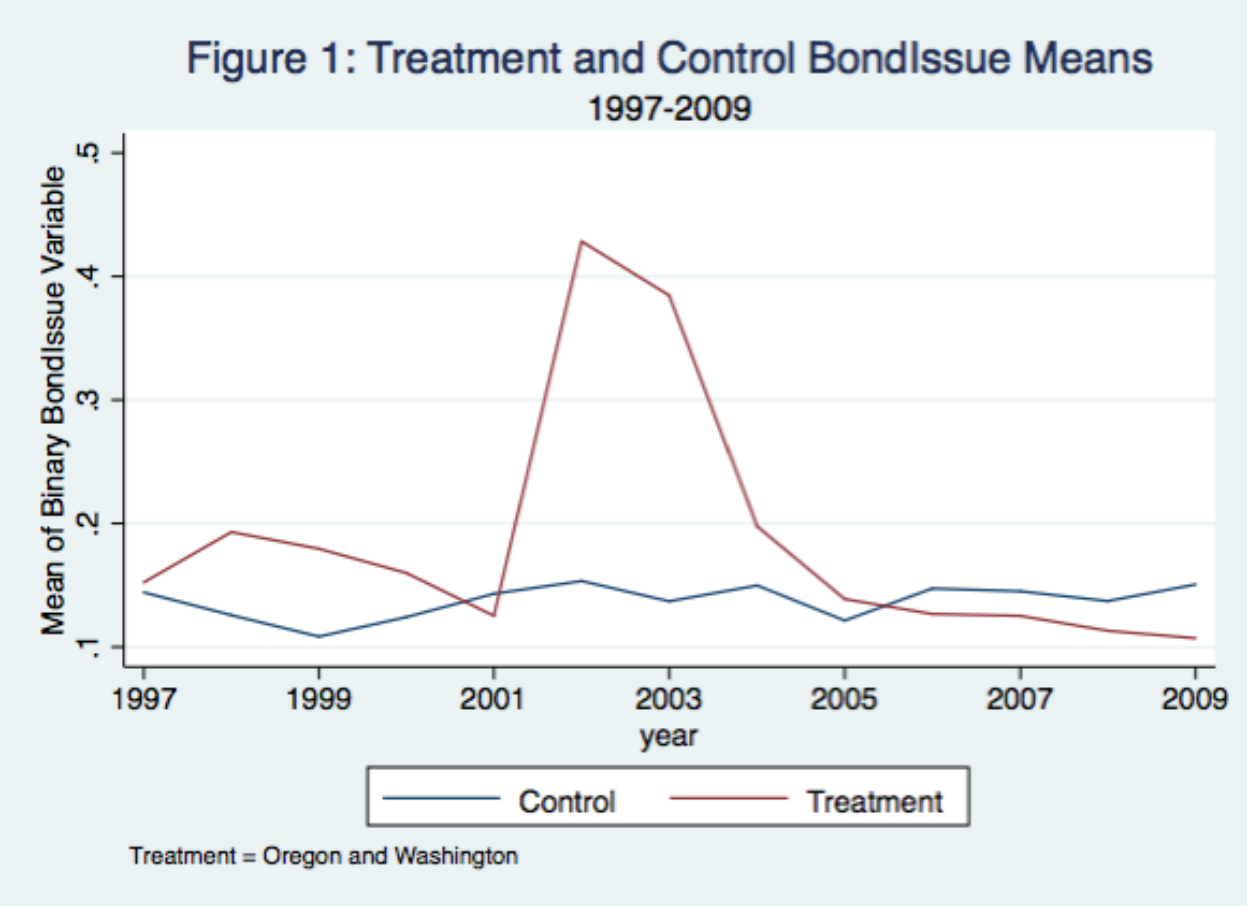
Figure 1: Treatment and Control BondIssue Means
1997-2009
Mean of Binary BondIssue Variable
.1
.2
.3
.4
.5
1997
1999
2001
2003
2005
2007
2009
year
Control
Treatment
Treatment = Oregon and Washington

Appendix B:

Table B1: Regression Results for Models I and II

	Model I (LPM)	Model II (Logit)	
	Coefficient	Coefficient	Odds Ratio
bondins	0.0686***	0.622***	1.863***
	(0.0142)	(0.108)	(0.202)
njqbp	-0.0539***	-0.476***	0.621***
	(0.00958)	(0.0935)	(0.0581)
pwhite	0.117***	1.698***	5.461***
	(0.0291)	(0.314)	(1.712)
enroll	0.00000171	0.0000189	1
	(0.00000149)	(0.0000125)	(0.0000125)
lte	-0.0520**	-1.049***	0.350***
	(0.0204)	(0.263)	(0.092)
ingvtpp	-1.25E-08	-2.49e-05***	1.000***
	(0.000000321)	(0.00000901)	(0.00000901)
grossdebt	1.54e-05***	0.000167***	1.000***
	(0.000000328)	(0.00000395)	(0.00000395)
Constant	0.0862***	N/A	N/A
	(0.0227)		
Observations	62608	45121	45121

Standard Errors in Parentheses

*** p<0.01, ** p<0.05, * p<0.1

Note: Difference in observations due to multiple positive outcomes within groups encountered in -*xtlogit*-. 1968 groups (17487 obs) dropped in Model II because of all positive or all negative outcomes.