

Which School Districts Qualified for Federal School Facility Funding under the American Recovery and Reinvestment Act of 2009? Evidence from Ohio

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ABSTRACT

The American Recovery and Reinvestment Act of 2009 (ARRA) allocated \$11 billion per year for 2009 and 2010 for qualified school construction bonds (QSCBs) for America's schools. From a historical perspective, this program is a broad transformation of the federal role in school facility funding. This study examined factors associated with federal allocations to school districts in Ohio, asking the following questions: What demographic and finance characteristics of Ohio school districts are associated with an increased likelihood of qualifying for a QSCB? Did school districts with greater need qualify? We found that Ohio districts that had previously deferred participation in the state's capital funding program (typically unable to raise the local share) were strongly associated with an increased likelihood of QSCB qualification ($p < .001$), thus providing an opportunity for these districts to overcome local voter reticence of additional taxes and address school construction and renovation needs with the availability of lower-interest-rate borrowing over a shorter period of time. Higher poverty rates were associated with an increased likelihood of receiving QSCB awards, but marginally so ($p < .10$). Our findings suggest that QSCB qualification may have helped to address the equity concerns raised in the prior literature.

INTRODUCTION

School facilities in the United States are funded overwhelmingly by local property taxes (Plummer, 2006). Critics, scholars, and nonprofit organizations alike have called attention to inefficiencies in construction, management, and maintenance of public school buildings (Brunner and Rueben, 2001; Center for

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Green Schools, 2013; Vander Ark, 2013), even suggesting that the delivery and ownership of school buildings be decoupled. There are also those who claim that federal funding is a means of overcoming the inequities that result from a system based on local property taxes and is the best way to avoid the recalcitrance of state legislatures in addressing those inequities (Biddle and Berliner, 2002; Crampton, 2003; Filardo, Cheng, Allen, Bar, and Ulsoy, 2010; Filardo and O'Donnell, 2010; Wood, Thompson, and Crampton, 2012). Baird (2008) has called for rethinking how best to promote the goal of school funding equity through federal funding, especially given the national emphasis on accountability and persistently uneven student outcomes. Baird (2008) also has claimed that federal dollars have been too few and too weakly targeted to lead to significant redistributions.

Others (Berry and Howell, 2007; Cohen and Delisle, 2011; Jones, 2011; Klein, 2011) decry a larger federal role, pointing out the lack of any constitutional provision for federal government involvement in school facilities, as well as claiming that local school boards are more careful with the funds because they are subject to the scrutiny of local voters (Wood, Thompson, and Crampton, 2012). Rice (2004) framed the debate as a trade-off between equity, which is achieved more easily through the policies and actions of larger political units, and economic efficiency, which is associated with strong local control of school funding. Recent research also suggests that intergovernmental politics can get particularly complex when costs are shared across all levels of government—federal, state, and local (Venters, Hauptli, and Cohen-Vogel, 2012).

The “Great Recession” (Temin, 2010) has seen the expansion of the federal role in school facility funding in an effort to stimulate local economies through school renovation and construction. The American Recovery and Reinvestment Act of 2009 had three goals: create employment opportunities and save existing jobs, spur economic activity and growth, and ensure governmental accountability and transparency. The legislation allocated \$11 billion per year for 2009 and 2010 for the new construction and renovation of America’s traditional public and charter schools. The funding was distributed to states based in part on the Title I allocation formula, but once the allocations were received, states were free to distribute the funds how they saw fit. Another portion of the funds was reserved for the 100 largest urban school districts in the country. The federal support for school facilities consisted of interest subsidies on qualified school construction bonds (QSCBs) sold by local education agencies (LEAs). The ARRA funds would pay the interest on bonds sold by the LEAs in the form of federal tax credits for the buyers of the bonds. The program targeted “shovel ready” projects within the LEAs. The Hiring Incentives to Restore Employment Act of 2010 (HIRE, PL 111-147) authorized the federal government to use a direct-pay structure option for QSCBs in which the LEA can issue taxable bonds and receive an interest

subsidy from the U.S. Treasury. These direct payments must be the lesser of (a) “the amount of interest payable under such bond on such date” or (b) the tax credit rate for nontaxable municipal bonds that the district would have received had they been issued that way. The goal of the direct-pay structure was to make the bonds interest free for the districts, to the extent possible (cf., PL 111-147, Sec 301).

The Qualified Zone Academy Bond (QZAB) program from the 1990s provided bond holders of facility construction debt with federal tax credits from a very restricted range of low-wealth school districts (Sielke, 2001; Wood, Thompson, and Crampton, 2012). Other than the QZAB program, which was fairly small, the federal government has provided little to no federal involvement in school facility funding and construction, leaving this aspect of schools up to states and districts under the 10th Amendment to the U.S. Constitution (McCarthy, Cambron-McCabe, and Eckes, 2014). The QSCB program is a radical departure from previous federal policy because it is the first time federal policy has taken such a significant role in school facility funding.

The interim report of the 21st Century School Fund (2010) provided a preliminary analysis of the impact of the ARRA on the equity of school facilities in recipient states by comparing federal allocations for large, urban, high-poverty districts to state allocations for smaller districts. The report stated that only 32 of the 100 largest districts even took part in the QSCB program (21st Century School Fund, 2010). In those 32 districts, an average of 50% of students were eligible for free and reduced-price meals, versus 32% of the students in the 134 smaller LEAs receiving funds. Yet the average bond amount in the 32 large districts was \$378 per pupil, versus \$1,769 in the smaller districts who participated. This study goes beyond the TCSF report by focusing on a single state, Ohio, and analyzing which specific variables were correlated with receiving an award. The study asks the following primary research question: Which district demographic and school finance variables were related to qualifying for QSCB allocations in Ohio?

LITERATURE REVIEW

Researchers (e.g., Duncombe and Wang, 2009; Plummer, 2006; Wood, Thompson, and Crampton, 2012) and governmental agencies (e.g., U.S. Government Accounting Office, 1995) acknowledge that the planning and funding of school facilities are predominantly local responsibilities, typically funded by means of bonds paid for by local property taxes. Sielke (2001) noted that state sources of revenue have tended to support operating expenses more so than capital outlay. Scholars (e.g., Arsen and Davis, 2006; Brunner and Rueben, 2001; Duncombe and

Wang, 2009) have called attention to the lack of spending and the distribution of these limited resources on capital outlay. The inequities in resource distribution for school facilities across state education financing programs have been subject to litigation, which challenge the constitutionality of local funding (Plummer, 2006). At the state level, Duncombe and Wang (2009) found significant variation across states in the equity of their finance systems for capital outlay as well as evidence that lump-sum project grants are associated with greater equity than states with matching grants and states with no building aid. At the local level, Arsen and Davis (2006) documented large variations in the conditions and age of school facilities across local communities in Michigan, finding that school facility quality is related to local property wealth.

With the exception of Sielke (2001) and Duncombe and Wang (2009), little research has been done on the design of state capital assistance programs and their impact on capital-outlay distribution. As such, there is limited research and theory to inform our study of factors associated with a recent policy development—the allocation of qualified school construction bonds (QSCBs) through the ARRA. With the propensity of school facilities to be funded locally, and evidence that suggests the condition of school facilities is associated with local property wealth, researchers have sought to understand the factors associated with local education authorities' success in pursuing local support of school construction bonds, tax levies, and school budgets. Studies undertaking predictive models using longitudinal data are particularly rare when it comes to these phenomena. In the studies that do exist, researchers have largely focused on the relationship between district demographics and district locales (Bowers and Lee, 2013; Bowers, Metzger, and Militello 2010a, 2010b; Ehrenberg, Ehrenberg, Smith, and Zhang, 2004; Gradstein and Kaganovich, 2004; Ingle, Johnson, Givens, and Rampelt, 2013; Ladd and Murray, 2001; Poterba, 1997). Analyses of school construction bond issue outcomes have received intermittent attention from scholars (Beckham and Maiden, 2003; Piele and Hall, 1973; Sielke, 1998; Zimmer and Jones, 2005). Recent scholarship has started to address this paucity of research (Bowers and Lee, 2013; Bowers, Metzger, and Militello, 2010a, 2010b; Ingle, Johnson, Givens, and Rampelt, 2013, Shober, 2011; Silverman, 2011). Silverman examined voting results for school district budgets in the state of New York for 2003–2010, finding that larger districts were more likely to vote for local property tax increases, whereas districts with larger minority populations, larger overall growth in school budgets, and higher voter turnout were associated with a decrease in the likelihood of passage. Drawing from panel data from four states (California, Colorado, Minnesota, and Wisconsin), Shober (2011) sought to answer whether school choice options (i.e., charter schools and magnet schools) increase the likelihood of school districts' raising revenue via school budget

referenda; Shober found that the number of charter schools was associated with an increase in the likelihood of passage, while the number of magnet schools was not.

The aforementioned studies have examined mainly demographic factors and residential housing patterns associated with local approval of school construction bonds, school budget referenda, and approval of district budgets. Given the larger federal role in school facility funding as a result of the creation of the QSCB program, this shift in policy offers a unique opportunity to study how federal interest rate subsidies interact with local school bond politics in Ohio. We will show that Ohio is a state that has a history of strong local control, aging school facilities, and litigation.

THE OHIO SCHOOL FACILITY FUNDING CONTEXT

Ohio's troubled and often-litigated school finance system is well documented (Alexander and Alexander, 2009; Edlefson and Barrow, 2001; Hunter, 2000; Maxwell and Sweetland, 2008; McKinley and Phillis, 2008; Murphy, 1983; Porter, 2010). The public school financing system in Ohio has been found in violation of the state constitution for not providing a "thorough and efficient system of education" (Ohio Constitution, Article VI, §2) and the Ohio General Assembly was directed to create an entirely new school-financing system as a result of the *DeRolph* litigation (Superfine, 2008). The plaintiffs in the original school funding case filed a motion seeking a conference to address the various state officials' compliance with the four previous court orders (*DeRolph v. State*, 1-4). The state requested a writ of prohibition, which the Ohio Supreme Court granted, finding that the requested conference was an attempt to require judicial approval for proposed remedies before the remedies were enacted.

Despite much political and legal wrangling, the case remains dormant (Alexander and Alexander, 2009). Ohio school districts continue to find themselves too often seeking additional tax revenue in order to compensate for inflation and increased education costs. The state of Ohio continues to struggle with providing an adequate education to school children. Although numerous scholars, research studies, and reports have highlighted the need to equalize funding of public education, state legislators appear unwilling to prioritize education spending and equalization. Indeed, legislators have delayed the implementation of school finance recommendations. The "thorough and efficient" education system clause of the Ohio Constitution remains out of reach. In the series of *DeRolph* school funding cases, the Ohio Supreme Court ruled that the state funding system was unconstitutional, and their final verdict indicated that they would not consider further challenges in the *DeRolph*

litigation. Thus, the Ohio school finance system seems doomed to remain “perpetually unconstitutional” (Maxwell and Sweetland, 2009, §2.28). Rebell (2012) noted that the Ohio Supreme Court is evidence of growing institutional caution in order to avoid confronting other branches of government in times of strained state finances and stressed “the importance of courts fulfilling their constitutional responsibilities in times of fiscal constraint and to demonstrate feasible, prudent ways that they can do so” (p. 1976).

However, two results of the *DeRolph* litigation that improved equity were the creation of the Ohio School Facilities Commission (OSFC) and an increase in state capital funding available to school districts. Together these initiatives helped school leaders and policymakers prioritize construction projects. Not only did the state share of capital projects increase, but state funding was based on the school district’s percentile wealth rankings, so that wealthier school districts pay more of the local share of capital projects than poorer districts. Ohio has a record of attending to issues of school facilities as they relate to school district wealth. The OSFC has highlighted its work, stating that as of January 1, 2012, the OSFC has opened 919 new or renovated buildings and completely addressed the current facilities needs in 214 of Ohio’s school districts (OSFC, 2012). But as previously stated, states were given a wide degree of freedom in how to distribute the QSCB funds. Given this freedom, we asked, which districts qualified for QSCB allocations in Ohio? Were districts with higher poverty rates more likely to qualify? Were urban districts at a greater advantage than suburban or rural districts? Were districts that previously deferred participation in the state program more likely to qualify for QSCB funds than districts that were low priority for state assistance due to their district’s higher relative wealth or having previously had their facility needs met?

CONCEPTUAL FRAMEWORK

The notion of fiscal equity permeates the school finance literature. Wood (2007) justifies the quest for equity by arguing that states have the obligation to provide all students with an opportunity to learn. An educated citizenry benefits the students, their families, local communities, and the state. Moreover, state legislatures and their agents, the local school districts, must overcome naturally occurring differences in wealth across communities by taking steps to meet their obligation to educate all children (Wood, 2007). We sought to determine which district demographic and school finance variables were associated with the award of qualified school construction bonds and assess the impact of the federal program in improving the equity of school facility quality within the political and economic context of Ohio.

The design of this study was guided by a conceptual framework (see Figure 1) that outlines factors potentially related to which Ohio school districts qualified for QSCB allocations. As previously stated, research studies have indicated that school facility funding is predominantly a local concern, and there is wide variation in the quality of school facilities, with higher quality facilities being associated with higher local property wealth. Furthermore, there has been limited federal involvement in school facility funding and construction prior to ARRA. As such, we turned to the existing research literature on school facilities planning and factors predicting district success in pursuing school construction bonds, levies, and approval of school budgets to guide our selection of variables in the model (see Table 1). At first, these may seem unrelated—after all, Ohio QSCB qualification was determined at the state level rather than the local level. However, qualifying for QSCB funds does not guarantee that the district will see its school facilities plan come to pass. Unless voters had previously approved a school construction bond with a longer maturity and higher interest that could be replaced with a shorter-maturity, lower-interest QSCB, there remains the hurdle of qualifying school districts being able to raise a critical mass of local support for the facilities project as evidenced by a majority of voters approving the local bond issue at the polls. Given the goals of the policy noted previously, one would hope that an analysis of which districts qualified for QSCB would reveal that wealthier and less diverse suburban districts were less likely to qualify for QSCB funds. Likewise, one would hope that districts that have already had their facility needs addressed would be less likely to qualify in favor of those districts that have previously chosen to defer participation. QSCB could thus provide an opportunity for heretofore unsuccessful districts to proceed with their plans for facilities.

Broadly, the factors in our model include district characteristics and district finance characteristics. District characteristics include factors such as the

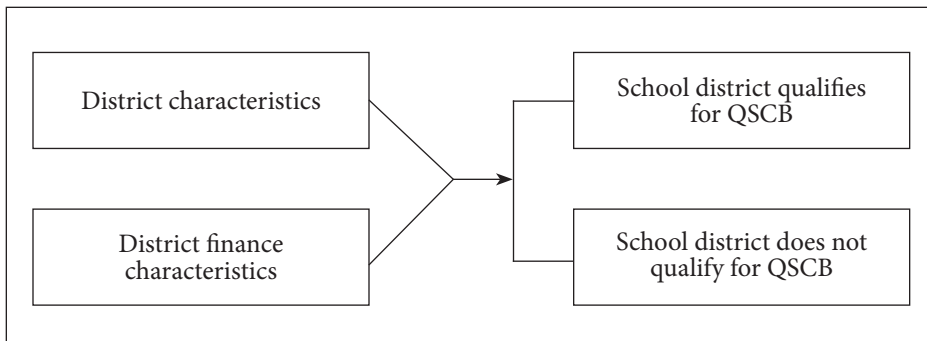


Figure 1. Conceptual Framework

Table 1. Variables in the Model with Their Grounding in the Literature

	Variable	Grounding in the Literature
District characteristics	Student demographics <ul style="list-style-type: none"> • Average daily membership • Race percentages • Free/reduced meals percentages • Special education percentages 	Bowers and Lee (2013); Bowers et al. (2010a, 2010b); Ehrenberg et al.(2004); Priest and Fox (2005); Shober (2011); Silverman (2011)
	District type (rural, suburban, urban)	Bowers and Lee (2013); Bowers et al. (2010a, 2010b); Ehrenberg et al.(2004); Shober (2011)
	Median income	Bowers and Lee (2013); Bowers et al. (2010a, 2010b); Gradstein and Kaganovich (2004); Ladd and Murray (2001); Lambert et al. (2009); Poterba (1997); Shober (2011); Tedin, Matland, and Weiher (2001)
District finances	Assessed property value per pupil	Arsen and Davis (2006); Ladd, 1975.
	% public utility tangible valuation	Beckham and Maiden (2003); Bowers and Lee (2013); Bowers et al. (2010a, 2010b); Ladd (1975); Piele and Hall (1973); Shober (2011); Sielke (1998); Silverman (2011); Zimmer and Jones (2005).
	% business valuation	
	Per-pupil revenue from one mill	Fischer (2006); O'Brien et al. (2005)
	Local tax effort	
	Total expenditures per pupil	
Master facility plan status		

percentage of minority students, average daily membership, district urbanicity (e.g., urban, rural, suburban), and program enrollments (e.g., percentage of students in poverty). This study also examined school district finance characteristics (e.g., assessed property value per student) and their relationship to qualifying for QSCB funds.

DATA SOURCES

In this study, we drew upon a panel of state administrative data consisting of all Ohio school districts in 2009 and 2010 ($N = 1,218$), their demographic/finance characteristics, and whether they were awarded QSCB allocations.

ANALYTICAL STRATEGY

Following the recommendations of Cohen, Cohen, West, and Aiken (2003), quantitative analysis consisted of simple descriptive analysis and binomial logistic regression testing independent variables on a dichotomous outcome (0 = not approved for QSCB; 1 = approved for QSCB). The model used is as follows:

$$Y_{dj} = \alpha + \beta_1 D_{dj} + \beta_2 F_{dj} + \epsilon_{dj}$$

such that:

Y_{dj} = QSCB allocation (dichotomous), where $P(Y = 0)$ is the probability that district d does not qualify for a QSCB in year j and $P(Y = 1)$ is the probability that it does

D_{dj} = A vector of district variables of district d in year j

F_{dj} = A vector of finance variables of district d in year j

ϵ_{dj} = Error term assumed to be independent and logistically distributed across districts and time

VARIABLES IN THE MODEL

District Characteristic Variables

The following district variables were included in the models:

Average Daily Membership. This is the total number of public students residing within a school district's boundaries.

Percentage of Ethnic Minority Students. This is the aggregate percentages of the total number of non-White students as a percentage of total students within the district.

Percentage of Students in Poverty. This is the percentage of students as a percentage of total students within the district who are living in poverty. This measure, which is also referred to as the economic disadvantage percentage, consists of students who are known to be eligible to receive free or reduced-price lunch, students who have not submitted an application for free or reduced-price lunch or who have not been directly certified as eligible but reside in a household in which a family member (e.g., sibling) is known to be eligible for free or reduced-price lunch via an approved application or through direct certification, students who are known to be recipients of or whose guardians are known to be recipients of public assistance, and students whose parents or guardians have completed a Title I student income form and meet the income guidelines specified.

Percentage of Students with Limited English Proficiency. This variable shows the percentage of public school students who are identified as limited English proficient (LEP) students—those students whose native language is not English, and whose current limitations in the ability to understand, speak, read, or write in English inhibit their effective participation in a school's educational program.

Percentage of Students in Special Education. This variable represents the percentage of public school students in a district who have an individualized education plan (IEP) due to a handicapping condition and therefore require special assistance.

Rural, Urban, or Suburban. The State of Ohio has a typology of districts. These are as follows:

0 = Island/college corner

1 = Rural/agricultural—high poverty, low median income

2 = Rural/agricultural—small student population, low poverty, low to moderate median income

3 = Rural/small town—moderate to high median income

4 = Urban—low median income, high poverty

5 = Major urban—very high poverty

6 = Urban/suburban—high median income

7 = Urban/suburban—very high median income, very low poverty

We aggregated these district typologies, such that types 1, 2, and 3 were aggregated into rural districts; types 4 and 5 were aggregated into urban districts; and types 6 and 7 were aggregated into suburban districts, thus creating dummy variables. Island/college corner districts are atypical school districts and were not included in the analysis.

Median Income. This variable represents the median income of the residents of the school districts as reported by the Ohio Department of Taxation based on residents' tax returns.

District Finance Variables

The following district finance variables were included in the models:

Assessed Property Valuation per Pupil. This variable is the total unadjusted assessed property valuation for tax year divided by the average daily membership (ADM).

Public Utility Tangible Valuation as Percentage of Total. This variable represents the percentage of total assessed property valuation in a district that is identified as public utility tangible.

Business Valuation as Percentage of Total. This variable represents the percentage of the total assessed property valuation in a district that is identified as business property. Business property in this context is the combination of all non-

residential/non-agricultural real estate and all general and public utility tangible properties.

Per-Pupil Revenue Raised by One Mill. This variable is a measure of property wealth that shows the ability of a school district to generate revenue from a one-mill increase in property tax rates. For this calculation, the total assessed property valuation is divided by total ADM.

Local Tax Effort. This variable is an index that seeks to reflect the extent of the effort residents of school districts make in supporting public elementary and secondary education. According to the Ohio Department of Education, calculating the local tax effort index is a four-step process. First, the ratio of any school taxes (income and/or class 1 property) to federal adjusted gross income is calculated at the district and state levels. In the second step, the median income of the districts' residents is divided by the statewide median income to get a ratio of the district to the state median income figures. In the third step, the district ratio calculated in the first step is divided by the ratio calculated in the second step to measure the effort in the context of ability to pay. In the final step, the ratio calculated in the third step is divided by the statewide ratio calculated in the first step to determine the relative effort index in the context of the state as a whole.

Total Expenditures per Pupil. This variable represents the total expenditures within a district on administration, building operations, instruction, staff support, and pupil support divided by district ADM.

Master Facility Plan Status. The Ohio School Facilities Commission categorizes Ohio school districts on the condition of school facilities (construction and renovations) and priority and eligibility for state share of funding. The categories are as follows: (1) all necessary construction and renovation work in the district has been completed (complete); (2) construction and renovation work is ongoing (ongoing); (3) the district has been offered state funding, but has either chosen to defer participation at this time and/or was unable to raise the required local share (deferred); (4) the district is participating in the Expedited Local Partnership program in anticipation of state funding (anticipating); and (5) the remaining districts are low priority for state assistance due to their district's higher relative wealth. These five categories were, in turn, dummy coded. We combined categories 1 and 5 into one dummy variable (low priority), which served as the referent group.

Table 2. Descriptive Statistics for Ohio School Districts, 2009–2010

Variable	N	Min.	Max.	Mean	SD
ADM	1,218	194.36	65,263.70	2,916.20	4,858.03
% minority	1,218	.11	99.85	11.67	17.09
% White	1,218	.15	99.89	88.33	17.09
% poverty	1,218	.00	99.97	20.24	21.55
% special education	1,218	6.29	25.52	13.32	3.03
% LEP	1,218	0	19.92	.88	1.78
Rural	1,218	0	1	.56	.50
Urban	1,218	0	1	.19	.39
Suburb	1,218	0	1	.25	.43
Median income	1,218	17,208.00	71,150.00	32,912.55	7,501.15
Assessed prop. value per pupil	1,218	45,025.03	721,611.96	134,634.37	64,853.04
% pub. utility tangible valuation	1,218	.00	18.16	1.42	1.94
% business valuation	1,218	3.01	82.60	22.15	11.45
Per-pupil revenue from one mill	1,218	45.03	721.61	134.60	64.84
Local tax effort	1,218	.26	2.98	1.01	.31
Total expenditures per pupil	1,218	6,926.00	21,190.67	9,687.25	1,735.41
Low priority	1,218	0	1	.55	.497
Facility plan ongoing	1,218	0	1	.22	.416
Deferred	1,218	0	1	.17	.379
Anticipates state funding	1,218	0	1	.05	.218

DESCRIPTIVE ANALYSIS

Turning first to our descriptive analysis of all Ohio districts in 2009 and 2010 (see Table 2), one can see that the ADM across the state was 2,916. Approximately 88% of all Ohio students were White, and approximately 20% of students were living in poverty. Over half of the school districts in Ohio are rural. A quarter of the districts are suburban, and the remaining districts are urban. The median income across all districts was approximately \$33,000.

Also provided in this table were select district finance variables, including the status of districts' master facility plans, a variable rarely examined in the past literature. Just over half of the school districts are lower in priority, having previously met their facility needs or being higher in relative wealth. In 22% there was ongoing construction and renovation work, compared to 23% of non-qualifying districts. However, 17% of qualifying districts had been offered state funding, but chose to defer participation, having not raised the required local share of revenue. Approximately 5% of the districts were participating in the Expedited Local Partnership program in anticipation of state funding.

Table 3. Descriptive Analysis of Qualifying Districts and Non-Qualifying Districts

Variable	Qualifying Districts n = 111	Non-Qualifying Districts n = 1107
	Mean	Mean
ADM	3,152.31	2,892.53
% minority	11.87	11.65
% White	88.13	88.35
% poverty	23.55	19.90
% LEP	.78	.89
% special education	13.14	13.34
Rural	.45	.57
Urban	.20	.19
Suburb	.35	.24
Median income	34,408.09	32,762.60
Assessed prop. value per pupil	158,061.39	132,242.60
% pub. utility tangible valuation	1.09	1.46
% business valuation	22.69	22.09
Per-pupil revenue from one mill	149.67	133.09
Local tax effort	.99	1.01
Total expenditures per pupil	10,181.33	9,637.71
Low priority	.55	.55
Facility plan ongoing	.10	.23
Deferred	.31	.16
Anticipates state funding	.05	.05

We now turn our attention to the descriptive comparison of qualifying districts and non-qualifying districts (see Table 3). The ADM and percentage of students living in poverty is slightly larger for qualifying districts in comparison to non-qualifying districts. Median income for qualifying districts is \$34,408, compared to \$32,763 for non-qualifying districts. Assessed property value per pupil, per-pupil revenue from one mill, and total expenditures per pupil are also larger for qualifying districts than non-qualifying districts. Although rural school districts made up the majority of both qualifying and non-qualifying districts, the percentage of suburban districts was higher among qualifying districts than non-qualifying districts. As to master facility plan status, only 10% of qualifying districts had ongoing construction and renovation work, compared to 23% of non-qualifying districts. However, 31% of qualifying districts had been offered

state funding, but chose to defer participation. This is in comparison to 16% of non-qualifying districts.

INFERENCEAL ANALYSIS

Table 4 summarizes the findings of our model, which utilized binomial logistic regression. Given that research indicates a relationship between the number of median income, urbanicity, and poverty of a district, we ran multicollinearity

Table 4. Logistic Regression Analysis on the Probability That a District Qualifies for a QSCB

Variable	Coeff.	SE	Odds
Average daily membership	.000	.000	
% minority	-.011	.009	
% poverty	.013	.007	1.013~
% LEP	-.060	.049	
% special education	.006	.041	
Rural	-.381	.310	
Urban	.142	.388	
Median income	.010	.023	
Assessed prop. value per pupil	.003	.002	
% pub. utility tangible valuation	-.033	.080	
% business valuation	-.005	.012	
Per-pupil revenue from one mill	.001	.002	
Local tax effort	-.125	.385	
Total expenditures per pupil	.066	.081	
Facility plan ongoing	-.563	.366	
Deferred	1.022	.253	2.779***
Anticipates state funding	.019	.497	
Goodness of Fit			
No. of observations†	1218		
-2 log likelihood	693.980		
LR (20)	49.368		
Prob > chi ²	.000		
Cox and Snell R ²	.040		
Nagelkerke R ²	.087		
% correctly predicted	90.9		

Notes: ~Significant at .10

*Significant at .05

**Significant at .01

***Significant at .001

†Non-unique observation

diagnostics of the model by running simple correlations between predictor variables and looking at the standard errors of the predictor variables within the model (looking for excessively large standard errors). We also ran variance inflation factor analysis (VIF) for the predictor variables. Myers (1990) has stated that, “Though no rule of thumb on numerical values is foolproof, it is generally believed that if any VIF exceeds 10, there is reason for at least some concern . . .” (p. 369). This suggestion has been reiterated in more recently published statistical texts for the social sciences (e.g., Kutner, Nachtsheim, and Neter, 2004; Stevens, 2002). In our model, not one VIF of any variable exceeded 10.

In our logistic regression model, the dependent variable is dichotomous, set to zero for districts that did not qualify for a QSCB or one for those that did qualify for a QSCB. As a reminder, the interpretation of an odds ratio is done by comparing the odds before and after a change in an independent variable while holding other variables constant. For a change of one unit in X_1 , the odds are expected to change by a factor of $\exp(\beta_1)$, holding other variables constant. If $\exp(\beta_1)$ is greater than 1, then the odds are $\exp(\beta_1)$ times larger. Conversely, if $\exp(\beta_1)$ is less than 1, then the odds are $\exp(\beta_1)$ times smaller. A positive effect would be greater than 1, whereas a negative effect would be between 0 and 1. In using odds ratios, the effect of a change in X_1 is not dependent upon the level of X_1 or any other variable (Long, 1997; Menard, 2002).

For an indication of the models’ quality, we report four measures—the likelihood ratio chi-square test (LR), the probability of obtaining the chi-square statistic ($\text{Prob} > \chi^2$), a percentage of cases correctly predicted, and pseudo R-squared. The probability of obtaining the chi-square statistic is a p-value, which is compared to a critical value (.05) to determine whether the overall model is statistically significant. In the case of the percentage of cases correctly predicted, it is desirable to have this percentage be higher rather than lower. Lastly, the pseudo R-squared provides a further indication of the model quality (0–1; the higher the number, the higher the overall strength of the relationship). Unlike the R-squared utilized in OLS regression, which indicates the percentage of variance explained by the model, the pseudo R-squared compares the model’s log likelihood to the log likelihood of the model with only an intercept. If a model has a very low likelihood, then the log of the likelihood will have a larger magnitude than the log of a more likely model. Thus, a small ratio of log likelihoods indicates that the full model is a better fit than the intercept model. It should be noted that pseudo R-squared measures reflect and confound effect strength with goodness of fit. As such, these should be interpreted with caution (Long, 1997).

As shown in Table 4, two variables were correlated with the probability that a district qualified for a QSCB. The first was the percentage of students living in

poverty, which was marginally significant, suggesting that a percentage point increase in the number of students living in poverty may be associated with an increase in the likelihood of qualifying for a QSCB allocation (LogOdds = 1.013; $p < .10$). The only other significant factor was our dummy variable representing districts that had been offered state funding but had chosen to defer participation, typically the result of being unable to raise the required local share. The odds of receiving a QSCB allocation for deferred districts was 2.779 times as large as the odds for districts with low priority for state assistance due to higher relative wealth or already having construction/renovation needs met; this result was highly significant ($p < .001$).

For our model, the probability of obtaining the chi-square statistic was .000, suggesting that the overall model was significant ($p < .001$). In the case of the percentage of cases correctly predicted, our analysis indicated 90.9% predicted correctly. Lastly, pseudo R-squared statistics provide a further indication of the model quality (ranging from 0 to 1; the higher the number, the higher the overall strength of the relationship). We report both the Cox and Snell pseudo R-squared and the Nagelkerke pseudo R-squared. The former is the more conservative of the two. Our model produced a Cox and Snell pseudo R-squared of .040.

IMPLICATIONS FOR POLICY, PRACTICE, AND FUTURE RESEARCH

Researchers (e.g., Superfine, Gottlieb, and Smylie, 2012) have recently suggested that ARRA is an important historical development that expands the federal role in education and one that deserves more attention from researchers. From a historical perspective, the QSCB program is a sea change regarding the federal role in school facility funding. The legislation earmarked ARRA funds toward “shovel ready” projects within the LEAs. ARRA was the U.S. federal government’s response to the economic recession of the late 2000s. Given the purposes of ARRA (create and save employment opportunities, spur economic activity and growth, and ensure governmental accountability and transparency) and the political opportunity brought on by the financial stress of the Great Recession on school budgets, QSCB allocations to states through ARRA provided an opportunity to leverage federal resources in addressing historically intransigent school facility inequities within and across states (Rebell, 2012) through an additional means of financing school construction through tax credit bonds.

This study was not testing a specific existing theory. We worked here in the present study to bring factors from levy and school capital facility bond elections to bear on the issue. Our conceptual framework and subsequent analysis were

guided by extant research that has identified factors associated with voter approval of additional tax levies (for school construction bonds or operating levies) and school budget referenda. We sought to determine which district demographic and school finance variables were associated with the award of qualified school construction bonds in Ohio through the American Recovery and Reinvestment Act of 2009 and assess the impact of the federal program in improving the equity of school facility quality within the political and economic context of Ohio.

We found that, in the context of Ohio, there is some evidence to suggest that districts with higher poverty rates and districts that had previously been offered state facilities funding but deferred participation (typically because they have not been able to raise required local share) were associated with an increased likelihood of qualifying for QSCBs. In sum, our findings suggest that QSCB qualification may have helped to address the equity concerns raised in the prior literature, and the availability of ARRA funds in the years 2009 and 2010 represented an opportunity for these districts to *potentially* address school construction and renovation needs.

We say “potentially” because qualifying for a QSCB did not guarantee that the construction/renovation projects came to fruition in these Ohio districts. This study only examined factors associated with qualifying for QSCBs and not whether they were able to thereafter win local voter support for school construction/renovations, thus taking full advantage of this federal program. For QSCB-qualifying school districts without prior voter approval of school construction/renovation projects, QSCB may have served as a timely “carrot on a stick” to gain support from tax averse community members. Levy campaign committees and school district administrators would have to follow QSCB qualification with a campaign to seek voter approval of the required local share. These campaign committees—community volunteers and school district personnel (as private citizens)—would have to craft local campaigns cognizant of local political factors and strategies to match the district context (Ingle, Johnson, and Petroff, 2012). Doing so would increase the likelihood of success and overcome local voter reticence to an additional tax burden—even one with improved long-term savings through lower-interest rate borrowing over a shorter period of time. Future research should test whether qualifying for QSCBs under ARRA increased their likelihood of success at the polls or whether voter intransigence was too much to overcome in spite of federal financial incentives.

For fortunate districts that already had voter approval of a school construction/renovation project, qualification would mean revisiting the debt service previously communicated to community members. Depending on the

terms of the previously approved ballot initiative, QSCB qualification very well could generate project costs exceeding what voters approved in millage rates during the initial years of the voter approved levy, even though the long-term debt would be less under QSCB. We look forward to future work in this area that focuses on district changes to finance and built capital facilities. Future research also may want to conduct qualitative studies with school superintendents, school treasurers, and school board presidents from qualifying and non-qualifying districts to delve deeper into the process. How did district personnel respond to this opportunity? What internal factors and resources, such as time and staff for proposal writing, were present (or not) that facilitated the pursuit of federal funds?

In difficult economic times such as the Great Recession, policymakers (state, federal, and local) and everyday citizens are forced to look critically at their finances and expenditures. Rebell (2012) notes that, “although states have a continuing obligation to provide constitutionally mandated educational services, they are not precluded from reducing costs in times of fiscal exigency, provided that in doing so, they demonstrate how meaningful educational opportunities for all students will be maintained” (p. 1974). The QSCB allocations for school facilities through ARRA are evidence that it is not just state governments that are involved in the provision of a sound basic education. Of course, a federal role in education is not new, but QSCB is further evidence of the expanded role over time of the federal government in public education (McDonnell, 2005). It remains to be seen whether a shift in public opinion is on the horizon in regards to funding of public education, such that local communities are more supportive of federal funding of education rather than continuing to foot the lion’s share of tax revenue for expenditures such as school facilities. What is more certain is that educational facilities in Ohio (and other states) are an educational expenditure that involves multiple levels of government—local, state, and now federal too.

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