The Impact of Open Enrollment on School Bond Voting

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Abstract

A market for student enrollment was created in Michigan when the majority of school operating funds moved to a per-pupil foundation allowance formula (circa 1994) and districts were allowed to enroll nonresident students (circa 1996). Now over 80% of Michigan school districts participate in open enrollment, with several districts having over 20% of their student population consist of nonresident children. This study draws upon publicly available data to estimate a series of logistic regressions to identify the association between open enrollment and local voting behavior with regards to local property tax bonds used to fund capital improvements and in some cases operating expenses. Results indicate that as the percentage of nonresident students in a district passes 10%, the less likely a local property tax bond will pass.

Keywords: school choice, school bonds, open enrollment, empirical study

The Impact of School Choice on School Bond Voting

In 1994, the funding mechanism for school operating expenditures in Michigan shifted from being primarily based on local property tax revenue to a state-wide per-pupil allowance funded largely through an increase in the state sales tax. Although this policy shift (voted upon by Michigan residents) was primarily designed to significantly reduce property tax burdens (which it did) and help equalize school funding (which it did, to an extent), it inadvertently created a demand for student enrollment growth as a mechanism to increase school revenues. Additionally, since 1996 districts have been allowed to enroll nonresident students when open seats are available. This policy shift, primarily designed to allow students in underperforming school districts to exit. as well as to drive educational innovation and effectiveness through market competition, ultimately created a new supply of students through open enrollment.

This market for student enrollment was further fueled by stagnant per-pupil funding allowances and a declining K-12 student population across the state over the over the past decade, thus leading districts to try to compensate for fewer resources by increasing student enrollment through participation in open enrollment. In 2012, over 80% of Michigan districts participated in open enrollment, though only approximately 5% of students used the opportunity to attend school in a public school district outside of their designated resident district (though there is an upward trend in participation). At the same time, there were over 25 districts whose nonresident enrollment was at least 500 students which represented 15% or more of the total student enrollment, including 11 districts with 30% or greater nonresident enrollment (largely, but not exclusively, in urban areas) (Addonizio & Kearney, 2012). Thus, for at least some districts, a significant percentage of students, and therefore state revenue, was attributed to the enrollment of nonresident students.

Although local operational funding was largely centralized at the state level based primarily on a per-pupil foundation allowance, funding for capital improvements and in some circumstances additional operating funds are still generated through local property tax revenues, particularly through the issuance of voter approved bonds. Although researchers have shown varying impacts of school inputs on student outcomes (e.g., Card & Krueger, 1998; Hanushek, 1986), researchers have shown that districts' capital stock is significantly associated with student academic achievement (e.g., Jones & Zimmer, 2001). Additionally, a Citizen's Research Council (2005) report indicated that there was approximately $9 billion in unmet capital needs across Michigan schools, which has increasingly been cited in challenges to the constitutionality of school funding systems (Palmer, 2006). Therefore, local property taxes continue to provide an important stream of financing for local school systems in Michigan and most other states.

There has been extensive and valuable research on predictors of the passage of school bonds, most recently by Bowers and Lee (2013) and Ingle and colleagues (2013), but as a whole this research has failed to theoretically or empirically account for the potential impact that open enrollment policies have on the likelihood that a school bond would be passed by voters. Specifically, they have not adequately addressed questions regarding local residents' willingness to tax themselves to increasingly fund education for "other people's children". For example, researchers have continually examined the relationship between the percentage of individuals who are 65 years of age or older, or who do not have children, and the likelihood that a bond passes (e.g., Berkman & Plutzer, 2005; Glass, 2008; Zimmer, Buddin, Jones, & Liu, 2011), often reporting conflicting results. Yet even those variables do not fully capture the essence of issues revolving around the sense of community and open enrollment, as even those who do not have children currently in the local school system may feel a connection to local public institutions.

This study therefore builds upon previous studies by examining the relationship between student mobility associated with open enrollment and support for local schools as evident in school bond votes. More specifically, this work seeks to identify the association between the percentage of nonresident student enrollment and the probability that a local property tax bond passed - testing the assumption that residents are less likely to vote to tax themselves to educate nonresident students. Therefore, grounded in a conceptual framework derived from the conceptualization of community engagement in civic affairs (Putnam, 2001), the findings from this study have implications for residents' commitment to funding local public schools in times of increased mobility through open enrollment which ultimately may impact the quality of education provided.

School Choice Policy

Overview

The emergence of school choice as an idea in good standing was one of the most important developments in K-12 education policy in the U.S. during the 1990s. It also marked a shift in public attitudes or perceptions, given the popular rejection of vouchers and tuition tax credits during the prior two decades. This newfound support for school choice was prompted by two new concepts and choice mechanisms: charter schools and interdistrict school choice, sometimes referred to as "open enrollment."[1]

The general concept of the charter school has been examined in a large and growing research literature (e.g., Allen & Gawlik, 2009; Buckley & Schneider, 2007; Bulkley, 2004; Chubb & Moe, 1990; Hill, Pierce & Guthrie, 1997; Miron & Nelson, 2002; Reyes, Wagstaff & Fusarelli, 1999; Wohlstetter, Wenning, & Briggs, 1995). A state charter school program provides

[1] "Open enrollment" is also used to refer to intradistrict school choice programs (see, for example, Goldhaber and Eide (2002).

families with public alternatives to the traditional district schools, with differing mechanisms for governance and finance, including the financing of school capital projects. Interdistrict choice programs, in contrast, involve movement of students across local district boundaries *within* the traditional public school structure. As such, these open enrollment programs do not alter school governance or finance, but simply expand school attendance boundaries so students are not bound to their local neighborhood or district schools.

The first state open enrollment law was adopted by Minnesota in 1987. By 2008, the number of states with interdistrict open enrollment programs had grown to 42. Of these, 19 state programs were mandatory for local districts and 23 were voluntary (Witte, Carlson & Lavery, 2008). In essence, open enrollment severs the link between household and school location. In so doing, these programs hold potential to attenuate the socioeconomic and racial stratification of students, allowing students to cross boundaries of local districts that segregate households along these lines. On the other hand, interdistrict choice could exacerbate such segregation by race and class as families further sort themselves without having to change their place of residence and impair local support for community schools in the process. One implication of this theoretical possibility, that interdistrict school choice may alter voter support for local school bond referenda, in tested empirically in this study.

Arguments for school choice. Advocates of open enrollment and other choice programs, including charters, vouchers, and tuition tax credits, generally assert that the resulting competitive pressures exerted on schools will improve the productivity of the education system as a whole (e.g., Friedman, 1955; Chubb & Moe, 1990; Hoxby, 2000, 2002). That is, competition among schools will benefit not only those students who actively choose to participate in these programs, but also those who remain in their traditional, neighborhood schools. This argument,

which emphasizes the private rather than public or civic benefits of education, rests on the notion that traditional public schools enjoy a monopoly over students living in their attendance areas and that monopolies, protected as they are from competition, do not respond to consumer preferences. Choice advocates further assert that if public funds follow the student, a market-based choice program will cause good schools to prosper and grow, while bad schools will either improve or close (see, for example, Hoxby, 2000).

By this reasoning, advocates of school choice see potential for substantial educational gains for minority and low-income children who traditionally attend low-performing schools. Some research suggests that support for school choice does indeed vary by racial/ethnic group and with the quality of available public schools. A 1993 survey of Michigan residents revealed greater support for a proposed open enrollment plan among Detroit residents, particularly lower-income minority students and those less supportive of their neighborhood schools (Lee, Croninger & Smith, 1994).

Counterarguments. Open enrollment and other school choice initiatives have been criticized on the grounds that they may compromise the public purposes of schools, particularly those involving civic participation and social cohesion. The idea that schools should contribute to equality of social, economic, and political opportunities for all, regardless of differences in race or class implies that all students have access to a common educational experience, not one determined by the vagaries of individual or family preferences (Levin, 1991, 2002; Fiske & Ladd, 2000; Gill, Timpane, Ross, & Brewer, 2001). Open enrollment could impair social cohesion and regard for community if schools and parents are concerned not only with school quality, but also in the characteristics of the student body. That is, if parents select schools on the basis of the socioeconomic or racial profile of the school enrollment and schools have some

ability to influence their applicant pool, for example, by selective advertising or social networking, then open enrollment could increase stratification and impair school and community relations (Epple & Romano, 2000; Ladd, 2002; Rothstein, 2006).

Critics of school choice assert that open enrollment can impair the quality and cohesion of schools and communities that lose students to competitors. First, more motivated students and parents may be more likely to actively choose their schools and enroll outside their local community, leaving their less motivated counterparts concentrated in the less attractive schools. These schools and communities would then become increasingly less capable of competing in the educational marketplace as their positive peer influences exit. Further, as revenue declines in tandem with enrollments but operating costs do not, the declining enrollment districts are forced to cut programs and services, triggering further losses (Fiske & Ladd, 2000).

Indeed, interdistrict choice programs may undermine local voter support for school millages in both sending and receiving districts. Parents whose children attend schools in other districts may be less inclined than parents of local enrollees to support local tax referenda. At the same time, voters in districts with large numbers or proportions of nonresident students may be similarly disinclined to support local millage referenda, choosing not to support the children whose parents would avoid paying the tax.

Effects of Interdistrict Choice

In comparison with the volume of research on vouchers, charter schools and intradistrict choice, the literature on interdistrict school choice is relatively scant. A study of well-established open enrollment programs in Minnesota and Colorado finds that students tended to leave districts with higher proportions of low-income and low-achieving students and enroll in districts with greater concentrations of middle-class and higher-achieving students (Witte, Carlson & Lavery,

2008). More generally, Goldhaber and Eide (2002) cite evidence that competition arising from public school choice programs improves school efficiency (i.e., the use of school resources to the best advantage of students) and note that to the degree that minority and poor children tend to be enrolled in inefficient public schools, they would disproportionately benefit from school choice. They also note, however, that most of our evidence on the effects of public school choice comes from intradistrict programs, which have been around much longer than cross-district schemes.

Student sorting effects. Prior to about 1990, school choice for families in the U.S. consisted almost exclusively of choosing the school district in which to live or sending children to private school. Accordingly, much of the research on school choice examined residential choice, sometimes referred to as "Tiebout" choice or "voting with one's feet" (Tiebout, 1956).[2] Clotfelter (1999) finds evidence of student sorting by race and class across districts, but Hoxby (2000) and Alesina, Baqir, and Hoxby (2000) conclude that more student sorting occurs within districts across schools. Urquiola (2005), examining the effects of school district concentration and competition in U.S. metropolitan areas, finds that competition among school districts does contribute to student stratification, but adds that this observed sorting may also reflect residential segregation patterns unrelated to schools and school district boundaries.

The introduction of interdistrict choice and charter schools in the 1990s created new avenues for student sorting. First, households may differ in their interest and ability to exercise these new options. Choosing households may enjoy higher socioeconomic status than nonchoosers, raising the possibility that white students, more academically able students, and

[2] Economist Charles Tiebout, in a seminal 1956 article, "A Pure Theory of Local Expenditures," described a mechanism by which individuals choose their community of residence on the basis of that community's combination of taxes and services. If there are many localities to choose from, each with a unique tax/service package, individuals will be able to select their most preferred package in the same manner as they buy goods and services in the private market. Tiebout's analogy with private markets implies that resources may be allocated efficiently in the public sector, just as in the private sector, a proposition that had been dismissed by most economists.

students from families with more educational resources will leave their local school. This hypothesis is supported by considerable research evidence (e.g., Lee, Croninger, & Smith,1996; Armor & Peiser, 1998; Witte, 2000). Second, active choosers may sort themselves as well, along lines of race and class. Research is relatively scant on this question, but Weiher and Tedin (2002) find that race is a good predictor of school choice outcomes. Analyzing the choices of 1,006 charter school households, the authors find that whites, African-Americans, and Latinos transfer into charter schools where their groups comprise between 11 and 14 percentage points more of the student body than the traditional public schools they are leaving. Further, the vast majority of choosing households transfer their children into schools with *lower* performance on the state achievement test than the schools they exited.

Interdistrict Choice in Michigan

The Michigan legislature approved an interdistrict open enrollment program in 1997. Dubbed "schools of choice," the legislation required all local school boards to announce whether or not they would accept nonresident students in their schools. For students crossing district boundaries, revenue would follow. The enrolling district would receive the lesser of the per pupil foundation allowance of the district of residence and the enrolling district, along with all categorical aid for which the transfer student was eligible. Choice was initially limited to within intermediate school districts (generally counties) and when the number of applicants exceeded available places in a district, enrollees would be selected by lottery. Michigan expanded the program in the following year, first, to include contiguous local districts outside the intermediate district and then to include all local districts in any contiguous intermediate district.

Impacts in Michigan. Following passage of the interdistrict choice legislation, many Michigan school districts saw an opportunity to increase their operating revenue. By the

program's second year, 45 percent of districts were accepting nonresidents and by the fifth year, fully 80 percent of Michigan's districts had signed on. Statewide open enrollment counts, however, were modest in the program's early years, with nonresident enrollments rising from 7,836 in 1997 to 33,506 in 2001, about 2 percent of Michigan's K-12 enrollment (Cullen & Loeb, 2003).

Examining the first two years of the program, Arsen, Plank, and Sykes (2000) found participation highest in rural and central-city districts. Participation was much lower in suburban districts and lowest of all in high-income districts and districts with growing resident enrollments. These findings are not surprising. While the fiscal effects are unambiguously positive for a district enrolling nonresidents to fill otherwise empty desks, districts with stable enrollments and balance sheets have little incentive to enroll nonresidents and risk adverse peer effects, real or perceived. Put bluntly, local boards of education may fear that without the authority to screen applicants, the district runs some risk of enrolling "undesirable" students, including low achievers, children with behavioral issues, or racial minorities.[3] Arsen, Plank, and Sykes (2000) also find that transferring students were moving to districts with higher family incomes, higher standardized achievement test scores, and lower proportions of minority students than their home districts. For rural districts as a group, student outflows were roughly offset by inflows, while central cities sustained an average 0.7 percent enrollment loss. For some urban districts, however, the net loss of students and revenue was much larger.

With the exception of 2001-02, when the rate remained flat, statewide participation in Michigan's interdistrict choice program rose each year since its inception through 2010-11, and this steady growth persisted through periods of both growth and decline in Michigan's total K-12

[3] A 2006 study by the Harvard Civil Rights Project identifies Michigan as one of four states with the highest levels of black segregation in its public schools (Orfield & Lee, 2006).

enrollments (Addonizio & Kearney, 2012). Statewide participation rates are presented in Table 1.

[insert Table 1 about here]

These totals, while showing steady annual growth statewide, conceal the very uneven impact of interdistrict choice across Michigan school districts. While the majority of local districts are largely unaffected by the program, many districts in Michigan's metropolitan areas are significantly impacted, either enrolling substantial numbers of nonresidents, losing large numbers of residents to neighboring districts, or both. In 2008-09, 28 districts enrolled at least 500 nonresidents, with their nonresident percentages ranging from 15.1 to 56.9 percent. Seventeen of these districts are located in Michigan's tri-county Detroit metropolitan region (Addonizio & Kearney, 2012).

Interdistrict choice and local millage voting. Unlike a charter school program, an interdistrict public school initiative lacks any supply-side strategy to encourage new school creation. Rather, interdistrict choice is a zero-sum game in which the gains of the winners are offset by competitors' losses. And for those local communities on the losing side of the ledger, more than money may be lost. As families withdraw their families from the local public schools, the bonds between families and community may be weakened, along with support for local public schools. Such diminished support could take the form of lower voter approval rates for local district tax referenda.

Of course, possible effects are not straightforward. For example, to the extent student outflow is an expression of serious dissatisfaction with local schools, as opposed to sheer delight over newly found school options, parents of transferring students may have opposed local school tax referenda in any event. On the other hand, such parents may have supported a referendum in

an effort to improve local schools from which there is no escape. For local districts with net inflows, theoretical impacts are also ambiguous. Local voters may resent the presence of "free riders," who would benefit from local capital investments while avoiding the associated tax burden.

Public School Capital Funding and Bond Referenda

In recent years, concern has been growing in the U.S. over the quality of our public school infrastructure and the ability or willingness of states and localities to ensure that all children have access to an adequate school building (Plummer, 2006). A study by the National Center for Education Statistics (NCES) in 2000 finds that three-quarters of schools in the U.S. reported that repairs, renovations, and modernizations were needed to bring their school buildings up to good condition (NCES, 2000). More recently, school finance litigation across the states has cited inequities in school facilities when challenging the constitutionality of state school funding systems (Plummer, 2006).

The Problem in Michigan

The financing of public school facilities is particularly problematic in Michigan, where the cost of unmet public school capital needs has been estimated at $8.9 billion (Arsen et al., 2005). About one-fourth of this need was identified in five low-income, central-city school districts. It is hardly surprising that the greatest unmet needs are in Michigan's most property-poor districts. Michigan is among only 12 states that provide no aid to local school districts for capital projects.[4] School districts must finance capital projects from local resources: cash reserves, building and site sinking funds, or, most commonly, the sale of long-term general obligation bonds. In the case of sinking funds or bond sales, the local district must rely

[4] The other states are Idaho, Illinois, Indiana, Iowa, Louisiana, Nebraska, Nevada, North Dakota, Oklahoma, South Dakota, and West Virginia (Duncombe & Wang, 2009).

exclusively on local property taxes to directly finance their school construction projects or cover debt service payments. In the absence of any equalization aid from the state, property-poor districts face exceptionally high tax burdens when servicing bonds.

The sole form of state assistance for school capital spending is provided through a loan program wherein eligible districts can borrow from the state to help service their outstanding bonds. This state assistance, however, does not become available until a district's taxpayers are paying 13 mills to service their bonds and because these loans must be repaid to the state, eligible districts must continue to levy a 13-mill rate until the loan is repaid.

The absence of state grant support for local school construction and renovation exacerbates disparities among Michigan's local school districts. Duncombe and Wang (2009), using two different measures of funding inequality, rank Michigan 39th and 40th, respectively, among 48 states. Further, because of Michigan's interdistrict school choice program, property-rich districts are able to finance new school construction with relatively low property tax rates and then advertise their new or enhanced facilities to increase their enrollments and operating revenue by attracting residents of less affluent districts, who then sustain corresponding revenue losses. It is possible, of course, as noted above, that high proportions of nonresident students could detract from local taxpayer support for school millage referenda. Accordingly, this research will estimate the impact of Michigan's interdistrict open enrollment program on the passage of bond referenda in Michigan's local school districts.

Passing a School Bond Measure and Student Mobility

Research on school bond passage has focused on several key variables, including resident population characteristics (e.g., age, income status, and race/ethnicity), student characteristics (e.g., race/ethnicity), district characteristics (e.g., long term indebtedness, employee costs) and

bond characteristics (e.g., amount, number of times proposed) (Bowers, Metzger, & Militello, 2010; Bowers & Lee, 2013; Ehrenberg, Ehrenberg, Smith, & Zhang, 2004; Glass, 2008; Ingle et al., 2013; Ladd & Murray, 2001; Sielke, 1998; Zimmer et al., 2011; Zimmer & Jones, 2005). Recent articles by Bowers and Lee (2013) and Ingle and colleagues (2013) provide extensive reviews of the extant research on predictors of school bond passage, so rather than rehash the quality of work which has already been published we focus specifically on issues related to related to school choice and school funding which has thus far been under-researched.

As such, there have been relatively few studies which has given direct focus to issues of school choice and voter preferences for supporting school bond passage, though what work has been done has interesting implications for practice and research. For example, using data from California, Colorado, Minnesota, and Wisconsin, Shober (2011) examined the association between enrollment in charter and magnet schools and school bond referenda. Shober (2011) posited that school districts which offered residents more options through charter schools and/or magnet schools may increase voters' willingness to support school bond referendums. Subsequently, Shober (2011) reported that while the number of charter schools in a district was associated with an increased likelihood of bond passage, the number of magnet schools was not.

While Shober (2011) theorized that a district's willingness to expand choice options may be a way to gain support from voters, the findings may suggest that increased competition from charter schools may push voters to pay for upgrades to facilities in order to maintain or increase student enrollment numbers in the face of external competition. In other words, the finding may suggest that in a market for student enrollment, communities may be more willing to fund capital improvements in order to establish school systems which are more attractive to resident

consumers. From this study, it is not clear whether or not nonresident students were populating the charter and magnet schools within the given districts.

Additionally, in many places such as Michigan, only a small fraction of charter schools are chartered by traditional school districts, with the majority being chartered by institutions of higher education; thus charter schools largely operate in direct competition with traditional school districts thus drawing students out of traditional public school systems. Therefore, the study by Shober (2011) did not fully account for open enrollment across districts through choice programs, as districts openly recruit students from outside their boundaries.

In another study, Ehrenberg and colleagues (2004) utilized panel data from 380 school districts in New York, which included data from 1985-86 to 1996-97, to identify predictors of passage of local school budgets (admittedly different than school bond issues). Although a limited measure of school choice, the researchers reported that the rate of private school attendance within a district was negatively associated with voter approval of local school budgets, even after controlling for other resident characteristics such as race, income, and education. This suggests that in the wake of increased choice residents are less likely to financially support local school districts through higher taxes, particularly if a significant amount of local resources (as measured by tuition) are being spent in other schools.

Although the study by Ehrenberg and colleagues (2004) has implications regarding issues of open school enrollment and school financing, it does not adequately account for the new realities regarding competition for students and increases in student mobility across public school districts. More specifically, individuals who send their children to private schools likely spend a significant amount of money on tuition, thus reducing their willingness or ability to pay higher taxes. Additionally, this speaks more to the fact of transfer out of a particular local public school

system rather than addressing issues of nonresidents coming into a school system. The researchers did account for a measure of student mobility related to increases/decreases in total student enrollment (which was not statistically significant), but they did not account for the extent to which the percentage of enrollment were resident/nonresident students.

In a third study, Ingle and colleagues (2013) utilized data from Ohio (2007-2010) to estimate logistic regressions to identify the relationship between campaign expenditures and the passage of school levy referenda, while controlling for district and levy characteristics. Included in their controls was a measure of the racial differences between the resident population and the local school population. This measure speaks to an underlying assumption that residents who on average have different racial classifications than the student body would be less willing to support local bond measures. At the same time this measure does not directly speak to issues of open enrollment, as in many of these districts there may simply be an aging white population and a younger school-aged non-white population within the district boundaries. It should be noted though that the coefficient for this measure of racial difference between resident population and school enrollment was not statistically significant.

Although previous studies have identified several key predictors of school bond passage, collectively they do not fully account for the potentially real and perceived changing role a local community school has in providing education for local residents as well as students from neighboring communities. In other words, in an era of increased parent/student choice related to schooling options (both through open enrollment policies in traditional public schools and the expansion of charter school options), residents of a local community may feel less of an attachment to their local school system if they perceive it as not their own or as an essential part of their community.

A Framework of Community Support

This study is framed in an understanding that several factors identified in previous research predict the likelihood that a school bond measure will pass, but also in an understanding that educational reforms related to student mobility across district boundaries likely influences broad elements of community support for local schools. It has been shown that individuals are more likely to support their local public schools if they have a close relationship with a student in the local school system (e.g., child or grandchild) (Fletcher & Kenny, 2008; Tedin, Matland, & Weiher, 2001), and it has also been shown that individuals are more likely to support local schools if they perceive that "good" schools provide a private benefit in the form of increased home value (Hilber & Mayer, 2009). Additionally, some individuals are likely to support local schools out of a sense of civic obligation or pride and a belief that the local schools produce public goods for the local community. This work is grounded in an understanding that communities are marked by not only varying levels of financial capital and preferences for spending that capital, but also social capital which relates to civic engagement and support for public institutions (Putnam, 2001). Thus support for local schools, expressed through the passage of bond proposals, is not only an expression of an individual's private interests but also an expression of community engagement with an institution thought to produce both private and public benefits for the local community.

We theorize that individuals within a community which experiences relatively high levels of nonresident enrollment in the local schools likely view the school system as "less local", which would then relate to their personal and civic connection to the local school, all else equal. Thus, any social capital held by community members may not necessarily include or be extended to nonresident students within the school system. Because community residents cannot separate

out financial support for resident students versus nonresident students in the local school system (as a proxy for both their private and civic based interests), they may disengage from further supporting the local schools through higher taxation. Furthermore, local residents may perceive that they do not fully capture the public benefits from the local school system if the local system serves a large number of nonresident students. Lastly, it is not clear what impact open enrollment has on housing values, but one could speculate that if the nonresident student population is poorer on average than resident students it may negatively impact perceptions of the local community in general.

In addition to implications open enrollment policies have with respect to communities' attitudes regarding support for educating nonresident students, such policies allow local residents to disengage from the local school by sending their students elsewhere (in addition to other routes such as parochial or charter schools). Specifically, individuals who actively choose to send their children to a public school outside of their local district may be even further inclined to provide less support to the local system. This logic follows findings with regards to communities with large private school enrollments and their support for local public schools (Ehrenberg et al., 2004).

Therefore, following this general framework, we expect that a community's support for their local public school system is influenced by issues of open enrollment and student mobility both in and out of a local district. Specifically, we tested the following hypotheses:

H1: As the percentage of nonresident students increases in a district, the less likely it is that voters of that district will pass a school bond measure.

H2: As the percentage of resident students who attend school in another district, the less likely it is that voters of that district will pass a school bond measure.

Methods of Data Collection and Analysis

For this study we drew upon publicly available data from the State of Michigan. Specifically data on school bond votes, student enrollment, and district characteristics were collected from from the Center for Educational Performance Indicators, Michigan Department of Education, and the Department of Treasury and included data from 2000-01 to 2011-12. Additional data on resident characteristics was accessed through the US Census Bureau website. As shown in Table 2, there were 802 school bond elections across 360 districts held during this time period and were the focus of the research.

[insert Table 2 about here]

Analytic Approach

To test our first hypothesis (H1) concerning the association between the percentage of nonresident students in a district and the likelihood of a school bond vote passing, we estimated the following logistic regression using SAS (9.2) software:

$$\ln\{P[M_t = 1] / 1\text{-}\ P[M_t = 1]\} = \theta_0 + \theta_1 N_t + \theta_2 A_t + \theta_3 V_t + \theta_4 F_t + \boldsymbol{\theta'_5} P_t + \boldsymbol{\theta'_6} S_t + \theta_7 E_t + \boldsymbol{\theta'_8} Y + e \quad (1).$$

This model predicts the odds that a school bond passed in a district between 2000-01 and 2011-12 school years (M_t) as a function of the proportion of students in a district who were nonresident (i.e., received) (N_t), controlling for the amount of the bond requested (A_t), whether another school bond was voted upon in that district in the same year (V_t), state per-pupil foundation allowance (F_t), population characteristics of district residents (e.g., property wealth and percent school aged) (P_t), student characteristics (e.g., race, free/reduced priced lunch eligibility, percent

proficient on the third-grade state reading test) (S_t), total student enrollment (E_t), and a dummy variable for each year (Y) with the 2000-01 school year as the reference variable (error term assumed to follow a Bernoulli distribution).

To test the second hypothesis (H2), we estimated a similar logistic regression but replaced N_t with the percentage of resident students who did not attend the local traditional public school system (R_t):

$$\ln\{P[M_t = 1] / 1\text{-}\ P[M_t = 1]\} = \theta_0 + \theta_1 R_t + \theta_2 A_t + \theta_3 V_t + \theta_4 F_t + \boldsymbol{\theta'_5} P_t + \boldsymbol{\theta'_6} S_t + \theta_7 E_t + \boldsymbol{\theta'_8} Y + e \quad (2).$$

Lastly, we estimated a third model using the stepwise function to estimate the best fitting model given the data available.

There was missing data that we had to contend with, specifically with regard to measures of student achievement. The State of Michigan does not report out percent proficient when the number of students for a specific test (grade/subject) is below 10, therefore five cases were dropped due to missing data with respect to measures of student achievement. All other missing data was assumed to be missing at random, therefore any case that contained missing data was dropped from the analysis. The final sample size of bond votes used in the regression analysis was 742. There were some differences in mean measures of some of the variables for cases included and excluded in the analysis. With respect to focal variables, cases included in the analysis contained bond votes that were less likely to have been passed and included districts that had higher numbers of districts where over 20% of students were nonresidents.

Quantifying the Robustness of the Inference

Although we control for several school and community related factors thought to predict the likelihood of a school bond vote passing, there are likely omitted variables that are significantly associated with the focal predictor variables and the outcome variable. Therefore any inferences that could be made from estimating the regressions could be threatened by omitted variable bias. To address this fact, we drew upon the work of Frank (2000) and Kelcey (2009) to quantify the robustness of the inferences gleaned from the results with respect to concerns about omitted confounding variables (see Appendix A for details).

Construction of Variables

The outcome variable of interest is a dichotomized variable indicating the result of a bond vote (0 = failed/1 = passed). For the focal predictor variables, the number of students in a district who were received (i.e., nonresident students) and sent (resident children attending a school outside of their resident district) were gathered from the Office of State Aid and School Finance, Michigan Department of Education. The percentage of children received was calculated by dividing the number of students received by the total student enrollment. The proportion of children sent from a district was calculated by dividing the number of resident children sent by the total number of school aged children in a district (gathered from the US Census Bureau). This is an imperfect measure as a number of those considered "sent" to a neighboring district because many were enrolled in a private or charter school, but this still represents a measure of how many resident children did not attend the local traditional public school system.

In one set of analysis, continuous variables for percentage of children received and sent were used as the focal independent variables. In subsequent analysis, dummy variables were

used for specific percentile ranges based on initial analysis of the data and based on theoretical assumptions regarding the association between the focal independent variables and outcome variable: 0-5%, 6-10%, 11% or greater. In the analysis the 0-5% range was the omitted reference category. Table 3 provides descriptive information for all of the variables included in the analysis.

[insert Table 3 about here]

Results

Table 4 shows the results from estimating Model 1 with percentage of nonresident students in the district measured as a continuous variable. As shown, the coefficient for the percentage of nonresident students was negative but not statistically significant by traditional standards ($p = 0.25$), thus we fail to reject the null hypothesis that there is no relationship between this focal predictor variable and the likelihood that a bond vote passed. The coefficient for whether or not another bond vote occurred in the same school year was negative and statistically significant ($p < 0.01$), indicating that on average if a district floated multiple bond proposals in the same school year it reduced the likelihood that a bond vote would be passed, *ceteris paribus*. The coefficient for percentage of students eligible for free/reduced priced lunch was also negative and statistically significant ($p < 0.01$), suggesting that voters in school districts that served higher percentages of poor students were less likely to pass a bond vote. As expected, the coefficient for the amount of the bond proposal was negative and statistically significant ($p < 0.01$) though relatively small in magnitude, while the coefficient for total student enrollment was positive and statistically significant ($p < 0.05$), though also relatively small in magnitude. The year dummy variables were not reported in the tables to conserve space, but it should be

mentioned that the coefficients for the years 2003-04, 2005-06, and 2006-07 were all negative and statistically significant ($p < 0.05$, $p < 0.10$, and $p < 0.05$ respectively).

[insert Table 4 about here]

Table 5 shows the results from estimating Model 2 with percentage of resident children educated outside of the local traditional school district measured as a continuous variable. Similar to Model 1, the coefficient for this focal variable of interest was negative but not statistically significant ($p = 0.22$), thus once again we fail to reject the null hypothesis. The coefficients for amount of the bond, whether or not another bond vote occurred in the same school year, percent of students eligible for free/reduced priced lunch, and total student enrollment all were in the same direction as in Model 1 and were similar in magnitude and statistical significance.

[insert Table 5 about here]

Given the results from the first stage of analysis, the models were re-estimated but with categorical focal predictor variables. Table 6 shows the results from re-estimating Model 1 but with the percentage of nonresident students in the district measured as categorical binary variables (0-5% as the reference variable). The coefficient for percentage of nonresident students ranging from 6-10% was not statistically significant, but the coefficient for the measure over 10% nonresident students was negative and statistically significant ($p = 0.05$). Specifically, in a district with a nonresident student population of greater than 10%, the probability that a school bond passed was reduced by approximately 13 percentage points, *ceteris paribus*. The coefficients that were statistically significant when Model 1 was estimated with the continuously measured focal variable remained in the expected direction and statistically significant.

[insert Table 6 about here]

Table 7 shows the results from re-estimating Model 2 but with the percentage of resident students educated outside of the district measured as categorical binary variables (0-5% as the reference variable). The coefficients for categorical focal predictor variables were not statistically significant by traditional standards, though in the expected direction. Again, the coefficients that were statistically significant when Model 2 was estimated with the continuously measured focal variable remained in the expected direction and statistically significant.

[insert Table 7 about here]

Finally, we re-estimated Model 1 with categorical focal variables using a stepwise procedure ($p < 0.05$ threshold for entry and retention in the model) to improve model fit. As shown in Table 8, the coefficient for the measure of greater than 10% nonresident students remained negative and approximately the same magnitude, but is now statistically significant at a higher threshold ($p < 0.01$). Through the stepwise process, this model represents the best fitting model given the data.

[insert Table 8 about here]

Robustness of Inference

Although we controlled for many known predictors of school bond vote passage, there are other predictors of school bond vote passage that we were not able to measure or include in the analysis. Therefore, there could be bias in the estimates due to unobserved confounding variables (Morgan & Harding, 2006; Rosenbaum, 2002; Shadish, Cook, & Campbell, 2002). In order to quantify the robustness of our inference with respect to omitted confounding variables, we drew upon Kelcey's (2009) method to quantify how much impact an unobserved confounding variable would have to have in order to invalidate our inference regarding the

relationship between the percentage of nonresident students (over 10% nonresidents) and school bond voting (see Appendix A for details).

Based on the results presented in Table 8, the impact of an omitted confounding variable would have to be greater than 0.25 to invalidate our inference. In terms of correlations, a confounding variable would need to be correlated with the measure of the percentage of nonresident students and the measure of school bond vote at a magnitude of 0.50 or greater to invalidate our inference.

Discussion

The work presented here is grounded in an understanding that communities vary in their levels of both financial and social capital, and they also vary in the extent to which they enact that capital to support local public schools. We hypothesized that districts that are marked by a significant percentage of nonresident students could be penalized by local residents in the extent to which they would approve the issuance of school bonds to fund various school improvements. We also hypothesized that communities who were also marked by high levels of sending resident children to schools outside of the local public school system would also be less willing to financially support local schools. The findings we presented support the first hypothesis, but fail to support the second hypothesis. As a whole though, the findings provide interesting implications for policymakers, practitioners, and researchers.

State Policy Supporting Open Enrollment

The purpose of this study was not to critique the value of open enrollment policies in promoting educational opportunities for students or measure the impact such policies have on student achievement. Rather we were concerned with the impact such policies have on overall investment in public education and local communities continued support for local school

systems. At the state level, most of the focus of school financing revolves around issues related to the per-pupil funding allowance and attempts at decreasing the gap between the top and bottom of the variation in foundation allocations. Yet issues of local funding streams cannot be ignored as many districts struggle to balance yearly budgets and continually grapple with the unmet capital needs for building and technology maintenance and upgrades.

Therefore, if open enrollment policies have the potential to disrupt local financial support for local schools, then the state may need to rethink the ways in which it funds public education, and more specifically modify the rules that govern how state-level funding is used (e.g., operating funds versus capital expenses). In this sense, issues related to open enrollment and local funding cannot be divorced from larger issues related to the passage of Proposal A, particularly with respect to what level of centralization is appropriate for funding public education and what role local property taxes should play in generating revenue for schools.

At the heart of the state-level open enrollment policy is the desire to allow parents/students more choice, particularly for those who are designated to attend low performing schools. Yet such policies fit more broadly within policy issues related to creating a market for education, such as policies providing for the expansion of charter schools and online education. As such, these policies challenge the traditional form of education delivery - the one provided by local schools to local residents. If such policies fundamentally change people's conception of education delivery as a local affair, it also challenges the traditional modes of funding education through local property taxes. In a sense such policies focus largely on the private benefits of an education rather than on public goods (Labaree, 1997). Additionally, any public goods associated with public education are thought to be captured at the state or even national level, rather than

the local level. Therefore, theoretically speaking, it begs the question of why local funds are used to fund public education at all?

Local Adoption of Open Enrollment Policies

Because the majority of local school operating funds are derived from the state per-pupil foundation allowance, local school boards are provided a large incentive to participate in open enrollment when they have seats available. Open seats exist within districts due to the general decline in population (which greatly impacted districts across Michigan from 2000-2010), a decrease in the relative number of families within a district (characterized by many rural and inner-ring suburbs of Detroit for example), and the exodus of students out of a district by attending schools in neighboring districts (i.e., open enrollment), charter schools, or private schools. In the data set used for this analysis, there was a small yet statistically significant (r = -0.17, $p < 0.0001$) negative correlation between total district enrollment and the percentage of nonresident students which suggests that smaller districts on average are more likely to enroll nonresident students. Additionally, there was a small yet statistically significant (r = -0.23, $p < 0.0001$) negative correlation between the number of school aged children and the percentage of nonresident students which suggests that it is possible that as a community's population ages the local district seeks to fill their schools' capacity through enrolling nonresident students. Finally, there was a moderate and statistically significant positive correlation (r = 0.41, $p < 0.0001$) between the percentage of nonresident students in a district and the percentage of resident children who exited the local school system. This suggests that in some areas, local decisions to participate in open enrollment fuelled further district participation in open enrollment as neighboring districts competed for the now larger "local" population of students – those who lost

their own students sought to replace them with students from neighboring districts which fueled a continuous cycle of student mobility.

Ultimately the goal of participating in open enrollment is to fill seats and generate more revenue from the state, thus allowing local districts to maintain education programs. In a sense the goal of local participation in open enrollment is self-preservation and to avoid school closings, layoffs, and cuts to education programs. The findings though suggest that the policy of open enrollment as a means of increasing student enrollment (at least as the percentage of nonresident students in a district is over 10%) may come at a price of less investment in local schools by the resident population. The regular funding of capital improvements is not only related to direct capital needs of local districts, but may further be related to the growing competition between schools for student enrollment. In other words, districts with inadequate facilities not only are less likely to attract more students in this continually growing marketplace for students, but they also risk losing resident students to neighboring districts, charter schools, online schools, or private schools. This not only relates to the core function of schools – teaching and learning – but also to sports facilities and support for other extracurricular activities. No longer do parents need to physically re-locate to exit a school district, they can simply shop around for another publicly funded school which provides the facilities and services they are looking for.

Ultimately, what the key finding suggests though is that districts which are successful in attracting nonresident students may ultimately fall victim to their own success if in the long run they are not able to maintain and upgrade facilities. What the findings also suggest is that there is likely a tipping point related to the proportion of nonresident students that leads to disengagement by the resident population. In other words, at some point residents may feel that

too much of their money is going towards educating nonresident children rather than members of their own local community. One could hypothesize that this is particularly true when the nonresident students on average are of a different race or class than the average resident student, though that was beyond the scope of this study.

Districts often try to manage this dilemma by gaming the number of open seats that are available or by restricting open enrollment to specific grades, particularly early elementary grades. In other words many districts limit open enrollment to early elementary with the belief that those nonresident students/parents who enter the system can be enculturated to the local school and community, and it also helps local districts address any education achievement gaps that may have existed between resident and nonresident students coming from other school systems.

For most districts the issue of nonresident enrollment is likely relatively noncontroversial as the vast majority of districts who participate in open enrollment have a relatively low proportion of nonresident students. At the same time, in 2010-11, there were 192 districts in Michigan with 10% or more nonresident students, 55 districts with 25% or more, and 23 with 40% or more. In other words, approximately 35% of districts have 10% or more nonresident students. Therefore, the implications from this research are substantial given the capital needs of districts and the continued competition for students and state revenues. Ultimately local districts need to weigh the costs and benefits of increased nonresident enrollment, which will vary based on the characteristics of the local population and those of the nonresident students entering the local school system.

Limitations and Implications for Future Research

The research we presented here builds upon our understanding of predictors of passage of school bond votes, but also pushes us to dig deeper into the association between open enrollment and local community investment in local public schools. Additionally there are limitations in this current study which should be addressed through future research.

Building a framework. We propose that the framework we presented be furthered developed to guide research concerning the potentially changing dynamic of school-community relations, particularly expanding the conceptual understanding of the relationship between the marketization of education and community support for local schools. Although we focus specifically on community support in terms of willingness to vote yes on bond votes, the dynamics of school bond voting are complex given the general lack of knowledge of local- and state-level issues related to public education and funding, on top of relatively low voter turnout rates. Additionally, there are additional measures of community engagement with local public schools beyond financial support that should be considered. This speaks to the need to further develop the connection between local social capital (e.g., Putnam, 2001), the conceptualization of "local" schools in an era of increased marketization of education and student mobility, and the manifestation of that social capital through multiple avenues of support for local public schools. This more developed framework could then be used to guide additional data collection and analysis.

Future research. We hypothesized that the probability that a bond vote would pass would decrease as the percentage of nonresident students increased, but when we estimated the regressions using a continuous measure of percent of nonresident students there was no statistically significant association. We therefore created categories, theorizing that there were specific thresholds related to the proportion of nonresident students in a school system at which

community perceptions regarding their public schools begins to change. We did find a statistically significant association when the proportion of nonresident students was over 10%, but more work could be done to refine the breakdown of categories.

We did test out other categories, specifically 11-15%, 16-20%, and over 20%. We found a statistically significant association between proportions 11-15% and 16-20% (both related to approximately an 18 percentage point decrease in the probability that a bond vote passed) but interesting there was no statistically significant association for the category of over 20%. We believe part of the issue relates to the relatively few number of cases when we added more categories. For example, there were only 24 data points in our sample with a student population with over 20% nonresident students. Given the myriad of issues which impact a school bond vote this number of cases may be too small to accurately measure an association between proportion of nonresident students and voter preferences.

Ideally, one would want to look at trend data for individual districts to identify how variation in the proportion of nonresident students relates to the likelihood that a school bond vote passes. Through the use of multi-level modeling a researcher could identify the extent to which variation in school bond vote passage exists between districts and within individual districts. A complication arises though in gathering enough data given the fact that bond votes within individual districts are relatively rare and there would need to be enough variation in the nonresident student population overtime to measure any meaningful association. Given these limitations, in depth case studies of individual districts which have experienced significant changes in nonresident student enrollment may provide valuable insight into the conceptualization of the relationship between open enrollment and community support for local schools, even if the findings are not necessarily generalizable to the broader education system.

Additionally, this study only focuses on the State of Michigan; therefore future studies should consider other states and ideally multiple states. The complication here is that every state is different with respect to the ways in which public schools are financed (particularly the mix of state and local funding sources), and they all have different policies regarding resident and nonresident enrollment. Previous studies have highlighted how the choice of state may impact the findings regarding the predictors of school bond passage (e.g., Bowers & Lee, 2013; Bowers, Metzger, & Militello, 2010). Although our findings are not necessarily generalizable to other state contexts, they do offer insight into the potentially changing conception of community and community support for local public schools.

Conclusions

Despite the limitations of this study, we laid the groundwork for re-conceptualizing the relationship between open enrollment policies and local communities' willingness to support local public schools. As suggested, this has important implications for both local- and state-level policies regarding enrollment issues and issues of school finance. Public schools in Michigan (similar to many other states) continue to rely on the local tax base for key aspects of school financing, therefore to continue funding capital improvements local boards need the financial support of their communities. At the same time, the state has created great incentive to participate in open enrollment, and for some districts the need to fill open seats is extensive. As local boards continue to struggle with budget shortfalls and mounting capital needs, they need to further weigh their own communities' interest in supporting local public schools in the wake of increased student mobility in and out of districts.

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Appendix A

[insert Table A1 about here]

Appendix B

Given the wide range of variables shown to influence the likelihood that a school bond vote would pass, we sought to quantify the robustness of our inference with respect to omitted confounding variables. To do so, we drew upon the work of Kelcey (2009) and Frank (2000) to calculate an impact threshold for a confounding variable. The impact of a confounding variable on an estimated regression coefficient is defined as $r_{v\bullet y} \times r_{v\bullet x}$, where $r_{v\bullet y}$ is the correlation between a covariate, *v*, and the outcome, *y*; and $r_{v\bullet x}$ is the correlation between *v* and *x*, a predictor of interest (e.g., *x* is an indicator of percentage of nonresident students). As such, the product $r_{v\bullet y} \times r_{v\bullet x}$ encapsulates the relationship between the confounding variable and the outcome, as well as between the confounding variable and the predictor of interest.

Therefore, it is through this impact that multiple regression adjusts for covariates as in the following model for a correlation between *x* and *y*, partialling for *v*:

$$r_{x\bullet y|v} = (r_{x\bullet y} - r_{v\bullet y}\, r_{v\bullet x}) / ((1- r^2_{v\bullet y})\,(1- r^2_{v\bullet x}))^{1/2} \qquad (3).$$

As shown, any reduction in the partial correlation is attributed to $r_{v\cdot y} \times r_{v\cdot x}$ because the correlations in the denominator increase $r_{x\cdot y|v}$ relative to $r_{x\cdot y}$.

In order to identify the impact of an omitted confounding variable necessary to invalidate an inference, define $r^{\#}$ as a quantitative threshold for making inferences from a correlation (e.g., an effect size). In our application, $r^{\#}$ is defined by statistical significance ($t_{critical} = 1.96$). Although statistical significance is not sufficient for causal inference (Wilkinson et al., 1999), it is often the first threshold in a two-step procedure for making causal inferences. As put by Wainer and Robinson (2003), "[F]irst the likelihood of an effect (small *p* value) is established before discussing how impressive it is" (p. 25). Following this definition of $r^{\#}$, Frank (2000) demonstrates that any inference is invalidated if:

$impact > (r_{x \bullet y} - r^{\#})/(1- |r^{\#}|)$ (4).

Therefore, the quantity $(r_{x \bullet y} - r^{\#})/(1-|r^{\#}|)$ expresses the impact threshold for a confounding variable. In other words, if a confounding variable has an *impact* greater than $(r_{x \bullet y} - r^{\#})/(1-|r^{\#}|)$, the association between the focal predictor and outcome variable, given the confound ($r_{x \cdot y|v}$), would fall below the threshold ($r^{\#}$) for making a causal inference. This impact threshold quantifies the robustness of our inferences with respect to potential misspecification of the model.

Kelcey (2009) modified the strategy developed by Frank (2000) to be used for models with binomial outcomes. Specifically, following the work of Kelcey (2009), we solved for *k* (the impact factor) in the following equation:

$$z_{critical} = \frac{(r-k)\sigma}{\sqrt{\frac{1-2k-r-2rk}{n-q-1}}}, \qquad (5),$$

where the critical value was set to 1.96 (i.e., the 0.05 statistical significance level), *r* is the weighted correlation (using the Hessian weight) between the log odds of the bond vote passing and the percentage of nonresident students (over 10%), σ is the Pearson dispersion factor, *n* is the sample size, and *q* is the number of variables in the model (excluding the intercept). By taking the square root of the impact factor (k) we calculated the magnitude to which a confounding variable would need to be correlated with the bond vote and percentage of nonresident students to invalidate our inference. See Table B1 for further details.

[insert Table B1 about here]

Tables

Table 1

Statewide Open Enrollment

Year	Nonresident enrollment	Total enrollment	Nonresident as % of total enrollment
2000-01	33,506	1,720,335	1.95
2001-02	33,248	1,731,092	1.92
2002-03	39,800	1,750,631	2.27
2003-04	50,247	1,734,019	2.90
2004-05	57,671	1,708,585	3.38
2005-06	63,279	1,697,900	3.73
2006-07	66,673	1,678,480	3.97
2007-08	74,091	1,648,540	4.49
2008-09	76,650	1,615,371	4.75
2009-10	76,682	1,603,344	4.78
2010-11	84,459	1,560,154	5.41

Source: Michigan Department of Education

Table 2

District and Election Information

Year	Millage Votes	Districts
2000-01	110	71
2001-02	96	70
2002-03	76	56
2003-04	87	62
2004-05	52	44
2005-06	82	59
2006-07	49	38
2007-08	59	47
2008-09	44	38
2009-10	51	46
2010-11	48	40
2011-12	48	39
Total	802	610

Note: 360 unique district codes in the entire data set (2000-01 – 2011-12)

Table 3

Descriptive Information

Variable	Description	Mean	s.d.	Min	Max
Vote	Bond vote affirmative	0.59	0.49	0.00	1.00
Received	Percentage of nonresident students in district	0.06	0.07	0.00	0.43
Received0005	0-5% nonresident students in district	0.62	0.49	0.00	1.00
Received0610	6-10% nonresident students in district	0.19	0.39	0.00	1.00
Received10+	Over 10% nonresident students in district	0.19	0.39	0.00	1.00
Sent	Percentage of resident students attending school outside of the district	0.04	0.05	0.00	0.37
Sent0005	0-5% resident students attending school outside of the district	0.68	0.47	0.00	1.00
Sent0610	6-10% resident students attending school outside of the district	0.21	0.40	0.00	1.00
Sent10+	Over 10% resident students attending school outside of the district	0.11	0.32	0.00	1.00
Bond Amt	Amount requested in the school bond proposal in millions of dollars	30.28	43.84	0.48	500.54
Same Year	More than one school bond proposal was put forth for a vote in the same year	0.21	0.41	0.00	1.00

Avg Hsev	Average home property value in thousands of dollars	114.41	49.29	7.56	387.20
Sch Age	Percentage of population that is school aged (5-17 years old)	0.18	0.02	0.06	0.24
Foundation	Per-pupil foundation allowance for state funding	6942.98	756.97	5700	10772
Minority	Percentage of students in district that are non-white	0.13	0.17	0.00	1.00
Lunch	Percentage of students in district that are eligible for free or reduced priced lunch	0.34	0.17	0.00	0.90
Read Prof	Percentage of students who were proficient on the 3rd grade state reading test (MEAP)	0.80	0.13	0.25	1.00
Enrollment	Total district student enrollment	3286	5006	59	88503

Table 4

Estimated Effects of Percent of Students Received (Continuous) on Bond Votes

Variable	θ	*SE* θ	*e* θ (odds ratio)	Wald Confidence Limit lower	upper
Intercept	-1.2974	1.9989	NA		
Received	-1.5254	1.3316	0.218	0.016	2.958
Bond Amt	-0.0082***	0.0031	0.992	0.986	0.998
Same Year	-1.1916***	0.1730	0.304	0.216	0.426
Avg Hsev	-0.0030	0.0024	0.997	0.992	1.002
Sch Age	0.9681	3.7212	2.633	0.002	>999.999
Foundation	0.0003	0.0002	1.000	1.000	1.001
Minority	0.2896	0.7336	1.336	0.317	5.626
Lunch	-2.0270**	0.8168	0.132	0.027	0.653
Read Prof	1.3480	1.2699	3.850	0.319	46.385
Enrollment	0.0001**	0.0000	1.000	1.000	1.000
	Intercept only	Intercept and covariates			
AIC	1027.259	961.393			

* p ≤ 0.10. ** p ≤ 0.05. *** p ≤ 0.01.

Table 5

Estimated Effects of Percent of Students Sent (Continuous) on Bond Votes

Variable	θ	*SE* θ	*e* θ (odds ratio)	Wald Confidence Limit lower	upper
Intercept	-1.2431	1.9963	NA		
Sent	-2.2184	1.8021	0.109	0.003	3.720
Bond Amt	-0.0080***	0.0031	0.992	0.986	0.998
Same Year	-1.1880***	0.1728	0.305	0.217	0.428
Avg Hsev	-0.0020	0.0024	0.998	0.993	1.003
Sch Age	1.2575	3.7120	3.517	0.002	>999.999
Foundation	0.0003	0.0002	1.000	1.000	1.001
Minority	0.1441	0.7159	1.155	0.284	4.698
Lunch	-1.6923**	0.8211	0.184	0.037	0.920
Read Prof	1.1936	1.2769	3.299	0.270	40.295
Enrollment	0.0001**	0.0000	1.000	1.000	1.000
	Intercept only	Intercept and covariates			
AIC	1027.259	961.167			

* p ≤ 0.10. ** p ≤ 0.05. *** p ≤ 0.01.

Table 6

Estimated Effects of Percent of Students Received (Categorical) on Bond Votes

Variable	θ	*SE* θ	*e* θ (odds ratio)	Wald Confidence Limit lower	upper
Intercept	-1.4194	2.0019	NA		
Rec0610	0.2224	0.2226	1.249	0.807	1.932
Rec10+	-0.6106**	0.2500	0.543	0.333	0.886
Bond Amt	-0.0082***	0.0031	0.992	0.986	0.998
Same Year	-1.2267***	0.1750	0.293	0.208	0.413
Avg Hsev	-0.0020	0.0024	0.998	0.993	1.003
Sch Age	0.7541	3.7499	2.126	0.001	>999.999
Foundation	0.0003	0.0002	1.000	1.000	1.001
Minority	0.3610	0.7286	1.435	0.344	5.984
Lunch	-1.9017**	0.8196	0.149	0.030	0.744
Read Prof	1.3315	1.2817	3.787	0.307	49.695
Enrollment	0.0001**	0.0000	1.000	1.000	1.000

	Intercept only	Intercept and covariates
AIC	1207.259	955.243

* $p \leq 0.10$. ** $p \leq 0.05$. *** $p \leq 0.01$.

Table 7

Estimated Effects of Percent of Students Sent (Categorical) on Bond Votes

Variable	θ	*SE* θ	*e* θ (odds ratio)	Wald Confidence Limit lower	upper
Intercept	-1.4332	1.9941	NA		
Sent0610	0.1247	0.2237	1.133	0.731	1.756
Sent10+	-0.1255	0.2908	0.882	0.499	1.560
Bond Amt	-0.0080***	0.0031	0.992	0.986	0.998
Same Year	-1.1776***	0.1728	0.308	0.220	0.432
Avg Hsev	-0.0023	0.0024	0.998	0.993	1.002
Sch Age	1.3399	3.7125	3.819	0.003	>999.999
Foundation	0.0003	0.0002	1.000	1.000	1.001
Minority	0.0994	0.7184	1.105	0.270	4.515
Lunch	-1.8455*	0.8202	0.158	0.032	0.788
Read Prof	1.3506	1.2711	3.860	0.320	46.613
Enrollment	0.0001**	0.0000	1.000	1.000	1.000

	Intercept only	Intercept and covariates
AIC	1027.259	963.999

* p ≤ 0.10. ** p ≤ 0.05. *** p ≤ 0.01.

Table 8

Estimated Effects on Bond Votes – Stepwise Function

				Wald Confidence Limit	
Variable	θ	*SE* θ	*e* θ (odds ratio)	lower	upper
Intercept	1.5185***	0.2486	NA		
Rec10+	-0.5966***	0.2153	0.551	0.361	0.840
Bond Amt	-0.0082***	0.0030	0.992	0.986	0.998
Same Year	-1.2781***	0.1698	0.279	0.200	0.389
Lunch	-1.7856***	0.5019	0.168	0.063	0.449
Enrollment	0.0001***	0.0000	1.000	1.000	1.000
Y0304	-0.7865***	0.2587	0.455	0.274	0.756
Y0506	-0.7128***	0.2602	0.490	0.294	0.816
Y0607	-0.8933***	0.3303	0.409	0.214	0.782
	Intercept only	Intercept and covariates			
AIC	1027.259	939.028			

* p ≤ 0.10. ** p ≤ 0.05. *** p ≤ 0.01.

Table A1

Comparison of Cases Included and Excluded in Analysis

Variable	Mean of Included	Mean of Excluded	Significane of Difference
Vote	0.53	0.67	**
Received	0.05	0.10	
Received0005	0.64	0.50	
Received0610	0.19	0.13	
Received10+	0.17	0.38	
Sent	0.04	0.05	
Sent0005	0.70	0.75	
Sent0610	0.19	0.00	
Sent10+	0.11	0.25	
Bond Amt	25.77	13.60	***
Same Year	0.40	0.52	*
Avg Hsev	113.59	100.36	
Sch Age	0.18	0.19	
Foundation	6884.77	6597.05	*
Minority	0.12	0.11	
Lunch	0.33	0.32	
Read Prof	0.80	0.71	***
Enrollment	3231.44	2056.40	***

*p $\leq$ 0.10. ** p $\leq$ 0.05. *** p $\leq$ 0.01.

Table B1

Robustness Indices For Logistic Regression Model

	description	Final Model
$z_{critical}$	level of significance	1.96
n	sample size	742
q	number of covariates	8
σ	Pearson dispersion factor	1.0152
|r|	weighted correlation	0.2208
k	impact factor	0.2501
r(y,cv); r(x,cv)	impact correlation	0.5001