The Journal of
Regional
Analysis
& Policy

JRAP 47(2): 154-163.

More Money for Schools: Education Tax Referenda's Rural-Urban Divide

Anita Yadavalli[*], Brigitte S. Waldorf[#], and Raymond J.G.M. Florax[#+]
[*]*National League of Cities – USA,* [#]*Purdue University – USA,*
[+]*VU University Amsterdam – The Netherlands*

Abstract: School districts propose education tax referenda to attain funding additional to their state-allocated funds. This research examines educational finance across public school districts to understand the mechanisms that influence the proposal and approval of such referenda. The focus is on how these mechanisms operate differently in rural and urban settings. The results suggest that few school districts take advantage of educational tax referenda, with rural school districts being more likely to do so than urban school districts. School districts that do choose to propose a referendum will very likely gain voter approval. We find also that racial diversity, competition from private schools, and school district size operate differently in urban and rural settings.

1. Introduction

Public school finance in the United States is complex and inequitable. The U.S. Constitution does not delegate the power over education to the federal government, thus leaving education to the individual states. According to the National Center for Education Statistics, the U.S government provides less than 10 percent of funding for kindergarten to grade 12 (K-12), whereas the bulk of funding comes from state and local governments. At the state level, governments collect income and sales taxes to fund education, whereas local governments often resort to property taxes.

The educational funding structure generates stark disparities between rich and poor places. People's locational choices thus become a crucial factor for how well their children's education is funded and thus reflect their preferences for public spending on education. As an alternative to the implied "voting with their feet" (Tiebout, 1956), school districts may propose referenda to obtain additional funds through property taxes.

Not all school districts take advantage of educational tax referenda. This paper asks what factors influence the decision to propose such referenda and what factors impact voters' approval. The primary focus is on rural-urban differences, for three reasons. First, due to their typically small sizes, per pupil costs of rural schools exceed the national average. Less well-funded rural school districts must judge whether to keep their schools running. In fact, the threat of consolidation is a much discussed topic in rural areas. Second, many rural communities lose their young population to urban areas (Gibbs, 2005; Partridge et al., 2009), leaving behind the older and often less-educated residents in an aging housing stock. As the property wealth of a community dictates the amount of property taxes generated, rural areas' selective depopulation limits the property tax revenues and ultimately increases the funding gap between rural and urban school districts. Third, using education referenda to make *in situ* adjustments

to the bundle of public goods can be an important rural development instrument. After all, there is evidence that valuations of locations vary across the life-course (Whisler et al., 2007) and former residents return to preserve social ties to family and friends (McGranahan et al., 2010). For returnees with children, school funding adjustments will strongly influence their return decision if they demand good schools for their offspring.

The literature on referenda proposals in the U.S. is rich (Romer et al., 1992; Muir and Schneider, 1999; Balsdon et al., 2003; Ehrenberg et al., 2004; Holcombe and Kenny, 2008; Brunner and Ross, 2009) but has neglected educational finance in rural areas.[1] This paper is a response to the neglect and contributes to the literature by addressing rural-urban differences in both the propensity to propose tax referenda and the likelihood of approval. We identify factors influencing referenda proposal and voter approval probabilities and assess how they shape rural-urban differences. Drawing on median voter theory, voters' demographic and economic attributes and their differential impact in urban and rural areas play a pivotal role.

In the empirical analysis we use school district data from Illinois, Indiana, and Michigan during the period 2010 to 2013. The results suggest that few school districts take advantage of educational tax referenda, with rural school districts being more likely to do so than urban school districts. For those that do choose to propose a referendum, approval rates are high. Moreover, the results suggest that racial diversity, competition from private schools, and school district size are identified as the salient variables affecting referenda proposal and approval as well as rural-urban variations thereof.

The paper is arranged as follows. Following this introduction, the second section provides the background on the conceptual framework and practice of education referenda in the United States. The empirical study is presented in the third section, with subsections on data, model, and results. The paper ends with a summary and conclusions.

2. Background

We turn to median voter theory (Hotelling, 1929; Downs, 1957) to shed light on rural-urban differences in proposing and approving tax referenda for school financing. Given that choices and preferences can be placed along a one-dimensional continuum, the opinion held by the median voter will, according to the theory, be the outcome. Despite critique and scrutiny (see, e.g., Romer and Rosenthal, 1979), median voter theory has been successfully used to understand voters' majority decision-making behavior (Borcherding and Deacon, 1972; Bergstrom and Goodman, 1973; Inman, 1978; Holcombe, 1989; Turnbull and Chang, 1998; Balsdon et al., 2003; Gerber and Lewis, 2004).

In the case of educational tax referenda, people vote for or against a referendum based on the highest utility that they derive from public education expenditures, given their income constraints. Voters make decisions to accept or reject referenda proposals after weighing the costs against the benefits associated with "better" education measured via such measures as class sizes, test scores, and graduation rates. Voters also decide the fate of referenda based on their self-interest and perceptions of the benefits of well-funded schools. Namely, they vote for tax referenda if they believe that well-funded schools can better aid students and society (Tedin et al., 2001). Zimmer et al. (2011) found that voters who perceive education as an investment are more likely to support referenda.

Casting referendum approval as a function of voter preference distribution implies that predicting the voting result is equivalent to identifying the median preference. The literature suggests that a range of characteristics drive voters' preferences for public education spending and thus, collectively, influence the position of the median voter. Of course, voter outcomes are also based on voter turnout, which tends to be high for emotionally charged issues (Cebula, 2008). Note that in the case of school district officials choosing to propose a tax referendum, the voter preference distribution plays an indirect role in that school district officials base their choice on a preconceived notion of the determinants that typically influence voter outcomes.

Pivotal among the attributes influencing voters' preferences are income and educational attainment. Voters at the extreme ends of the income distribution have little incentive to support additional spending on public schools; the very rich choose private schools for their children and the poor prefer low taxation in favor of consumption (Corcoran and Evans, 2010). Voters with median incomes thus are likely to prefer and benefit most from increased school fund-

[1] Based on a survey by Arnold et al. (2005), school finance issues in rural areas surface only in discussions of school consolidation.

ing. The higher the median income of the voting population, and similarly the higher the educational attainment, the more likely it is that the median voter values excellence of public schools.

Also of importance, and explored extensively in the literature, is the effect of voters' racial composition. Rubinfeld et al. (1987) found that blacks are more supportive of spending on public education than whites. However, Button (1993) examined the voting behavior of blacks and whites and concluded that some of the racial difference can be accounted for by the influence of age on voter turnout. Tedin et al. (2001) showed that older whites typically vote against, whereas older voters of other races tend to vote in favor of school bond issues.

Literature specific to the effect of age on referenda outcomes focuses on the elderly. As they typically have fixed incomes and no school-age children, the expectation is that a strong presence of older voters tends to lower local expenditures on schooling. The empirical evidence is, however, mixed. Fletcher and Kenny (2008) found that the presence of elderly in a community causes a negligible drop in school spending. Hilber and Mayer (2009) argued that the negative relationship between older voters and education expenditures only holds for locations where school spending is not strongly related to housing values. In contrast, Rosenbaum and Button (1989) found that for the state of Florida the older population is hardly active in local politics and thus does not necessarily strengthen an anti-tax mentality. Deller and Walzer (1993) found that communities with a larger population of retirees are just as likely to support increased property taxes for education as communities with a smaller presence of retirees. Finally, Plutzer and Berkman's (2005) study draws attention to the important distinction between age and cohort effects. They showed that educational spending has increased remarkably and that each new generation is often more supportive of educational spending than its predecessor.

Less attention has been paid to how school district attributes, such as administrative organization and funding level, influence voters' preference distribution. Exceptions are the studies by Penska (1996) and Tedin et al. (2001) that focused on the impact of the proposed tax increase amount. They found that voters are more willing to support small rather than large tax increases. Whether a school district has a private school alternative is also an important contextual variable. Epple and Romano's (1996) study suggests that the presence of private alternatives to public services affects the median voter.

Missing entirely from the literature is a focus on rural-urban differences. We argue that there are three fundamental reasons why the propensity of a rural school district proposing and subsequently approving an education tax referendum differs from that of an urban school district. First, rural-urban differences can be due to compositional disparities with respect to one or more of the attributes influencing the median voter. Indeed, residents of rural areas have different socioeconomic and demographic characteristics than their urban counterparts. On average, rural residents are less diverse and older than their urban counterpart and have less education and income, but they often own large amounts of taxable farm land. Second, even after controlling for such compositional differences, rurality *per se* may be a source of the median voter difference between rural and urban areas. That is, characteristics that differentiate urban from rural life—high anonymity, high density, and a fast pace of daily life—can shift the urban median voter away from the the rural median voter. Finally, rural-urban disparities may be shaped by differences in how one or more of the median voter-influencing attributes operate in a rural versus an urban setting. In a rural setting, for example, older voters may be more supportive of education spending than in a more anonymous urban setting.

3. Empirical analysis

The empirical analysis includes school districts in three Midwestern states—Illinois, Indiana, and Michigan—during the four-year period 2010 to 2013. The three states share several features such as a large supply of agricultural land, a strong manufacturing sector, and a mixture of rural and urban areas, including the large Chicago, Detroit, and Indianapolis metropolitan areas as well as numerous small towns and rural counties. Illinois has the biggest public school enrollment with about two million students in the 2012/13 school year, followed by Michigan with about 1.5 and Indiana with about one million enrolled students. Moreover, the three states represent different school finance systems. While expenditures per student are similar to the national average, they vary in the sources of their revenue receipts. In Illinois local funding accounts for almost two thirds of the revenue receipts, in Michigan state funding is the dominant source, and Indiana takes on a middle position

(see Table 1). All three states use local ballot measures to authorize school districts to impose taxes to fund the operation, improvements, maintenance, or other expenses of the district. In Illinois and Michigan, educational referenda practices have a longer tradition than in Indiana, where referenda were introduced in 2008 after Indiana radically altered its school finance approach.

Table 1. School finance, 2012-2013 estimates.

		Revenue Receipts				Expenditure per enrolled student [$]
	Enrollment	Total [$1,000]	% federal	% state	% local	
Illinois	2,083,996	27,224,959	13.6	20.5	65.9	12,927
Indiana	1,042,018	11,852,727	9.2	56.4	34.4	11,129
Michigan	1,543,573	15,024,192	13	68.3	18.7	13,686
Comparison across all 50 States		Average	10.1	45.8	44.2	11,068
		Minimum	NJ (3.1%)	IL (20.5%)	HI (2.2%)	AZ ($6,949)
		Maximum	OK (19.2%)	VT (87.6%)	IL (65.9)	VT ($19,752)

Source: National Education Association (NEA) 2013.

3.1. Data

The tri-state region has 1,675 school districts,[2] about half of them located in Illinois, 32 percent in Michigan and 17 percent in Indiana. The National Center for Education Statistics (NCES) categorizes school districts as belonging to a city, suburb, town, or rural area. We collapsed the four-way distinction into two categories whereby city, suburb and town location are collectively defined as urban. This yields 764 rural districts and 911 urban districts.[3]

Referenda information for Illinois and Michigan was manually transcribed from the online data source *Ballotpedia* (Lucy Burns Institute, 2013). For Indiana, the data were provided by Indiana University's Center for Evaluation and Education Policy. We define a dummy variable *propose* that takes on the value 1 if the district ever proposed a referendum during the four-year period.[4] In rural districts 23.4 percent ever proposed a referendum, compared to only 18.2 percent in urban districts (Table 2). Conditional upon ever proposing a referendum, the dummy *pass* takes on the value 1 if at least one of the referenda passed. Among the 345 districts that ever proposed a referendum, 82.9 percent had at least one referendum approved by voters. Pass rates were slightly but not significantly higher in rural than in urban districts. The variable *tax* is the proposed tax increase (minimum increase if more than one referendum was proposed), averaging 1.04 percentage points in rural districts and only 0.78 percentage points in urban districts.

Demographic and socio-economic school district variables were taken from the American Community Survey (ACS) five-year estimates 2007 to 2012 and include the percentages of nonwhite residents (*nonwhite*), 65 and older residents (*age65+*), and residents with at least a bachelor's degree (*college*), as well as the 2011 median family income (*income*, measured in $1,000). Compared to urban districts, the rural districts are older, more white, and less educated and have a lower medium income. Noteworthy are the particularly wide rural-urban education and income gaps in the subsample of referenda-proposing districts: the urban percentage of college-educated residents is seven percentage points higher and the urban median income is $3,564 higher than in rural districts. Finally, school district attributes were collected from NCES statistics. On average, rural school districts have fewer enrolled students (*enroll*, measured in thousands) and fewer administrators (*admin*), receive less revenue per student (*revenue*, measured in $1,000), and have fewer private schools (*private*) than urban districts.

[2] We excluded school districts with fewer than 25 students.

[3] We also analyzed the data using a continuous measure of rurality (Waldorf, 2006). The results do not differ from those using the dummy variable and are available from the authors.

[4] Only five percent of the school districts had proposed more than one referendum during the four-year study period.

Table 2. Summary statistics.

	School districts in IL, IN, and MI						
	All (*n*=1,675)		Rural (*n*=764)		Urban (*n*=911)		Rural-Urban
	Mean	Std.Dev.	Mean	Std.Dev.	Mean	Std.Dev.	Difference
propose	0.206	0.405	0.234	0.424	0.182	0.386	0.052**
Voter Attributes							
nonwhite	11.373	15.943	7.196	11.009	14.875	18.413	-7.679**
pop65+	14.930	4.448	15.510	4.945	14.443	3.921	1.066**
college	21.473	13.272	18.891	10.648	23.638	14.788	-4.747**
income	54.367	18.581	53.295	16.608	55.266	20.051	-1.971**
School District Attributes							
enroll	2.699	10.611	1.059	1.264	4.074	14.200	-3.016**
admin	3.647	9.337	2.015	1.533	5.015	12.422	-3.000**
revenue	11.861	3.224	11.259	2.844	12.366	3.432	-1.107**
private	1.541	2.249	0.653	1.635	2.285	2.418	-1.632**
Fixed Effects							
IN	0.170	0.376	0.185	0.388	0.158	0.365	0.026
IL	0.510	0.500	0.448	0.498	0.563	0.496	-0.115**
MI	0.319	0.466	0.368	0.483	0.279	0.449	0.089**
	Selection: School districts that ever proposed a referendum						
	All (*n*=345)		Rural (*n*=179)		Urban (*n*=166)		Rural-Urban
	Mean	Std.Dev.	Mean	Std.Dev.	Mean	Std.Dev.	Difference
pass	0.829	0.377	0.844	0.364	0.813	0.391	0.031
Voter Attributes							
nonwhite	8.721	11.151	5.785	6.279	11.886	14.046	-6.101**
pop65+	14.875	4.649	15.801	5.319	13.877	3.55	1.924**
college	21.529	12.658	18.173	8.541	25.148	15.164	-6.975**
income	51.667	14.413	49.949	10.963	53.519	17.229	-3.570**
School District Attributes							
enroll	2.646	3.357	1.229	1.039	4.174	4.220	-2.945**
revenue	11.155	2.878	10.960	3.371	11.367	2.219	-0.407
private	1.284	1.848	0.497	0.932	2.133	2.187	-1.636**
tax	0.916	0.828	1.039	0.838	0.783	0.799	0.256**
Fixed Effects							
yr 2010	0.235	0.424	0.201	0.402	0.271	0.446	-0.070
yr 2011	0.267	0.443	0.235	0.425	0.301	0.461	-0.066
yr 2012	0.342	0.475	0.385	0.488	0.295	0.458	0.090*
yr 2013	0.157	0.364	0.179	0.384	0.133	0.340	0.046
IL	0.081	0.273	0.050	0.219	0.114	0.319	-0.064**
IN	0.133	0.340	0.101	0.302	0.169	0.376	-0.068*
MI	0.786	0.411	0.849	0.359	0.717	0.452	0.132**

*** p < 0.05; * p < 0 .1 * for test on rural-urban difference being significantly different from zero.*

3.2. Model

Voter approval of a referendum is conditional upon the referendum being proposed. Table 2 shows that the subsample of school districts proposing referenda differs from the overall sample. The resulting selection bias is well known but has previously not been addressed. Ehrenberg et al. (2004), for example, recognized the non-random nature of school district decisions to propose referenda but did not account for selection bias.

To address the possible bias, we model the proposal probability and the approval probability jointly using a two-stage sample selection design (Heckman, 1979). Both stages are specified as probit models. In line with the possible mechanisms shaping rural-urban differences as discussed in the second section, three specifications are tested. The first only includes voter attributes, school district variables, and state and year fixed effects; the second specification adds the rural dummy variable, and the third also allows for rural-urban differences in slopes by including interaction terms.

The linear predictors of the two stages are identical, with two exceptions. First, the variable *admin* only enters the proposal equation, thereby ensuring proper identification and avoiding multicollinearity issues. Choosing *admin* as the exclusion variable is justified by referendum approval not being expected to depend on administration size. Second, the tax rate increase (*tax*) only serves as a predictor variable for the approval probability. The model is estimated using Stata's *heckprobit* command, with robust standard errors clustered over states to avoid heteroskedasticity. Note that, although specified as a sample selection model, we do have an inherent interest in the first stage, and thus the two-stage set-up goes beyond the statistical correction for possible sample selection.

3.3. Results

Table 3 displays the estimation results for the three specifications. The estimations suggest that sample selection biases are not a severe issue. In all three models, the estimated correlation, $\hat{\rho}$, between unobserved determinants of the proposal and approval propensities are not significantly different from zero. Only in model 3 is the *p*-value close to the 10 percent significance level.

Table 3. Estimation results.

	Model 1	**Model 2**	**Model 3**		
			Rural	Urban	
	b (SE_b)	b (SE_b)	b (SE_b)	b (SE_b)	
Stage 1: Dep. Variable: *propose* (*n*=1,675)					
intercept	0.306	0.293	0.003	0.521	
	(0.195)	*(0.217)*	*(0.150)*	*(0.407)*	
rural		0.025			
		(0.097)			
nonwhite	-0.012**	-0.012**	-0.021**	-0.010**	#
	(0.002)	*(0.002)*	*(0.002)*	*(0.002)*	
pop65+	-0.029**	-0.030**	-0.034**	-0.037**	
	(0.001)	*(0.000)*	*(0.006)*	*(0.011)*	
income	-0.003**	-0.003**	-0.001	-0.003	
	(0.001)	*(0.001)*	*(0.001)*	*(0.002)*	
college	0.011**	0.011**	0.009	0.011	
	(0.005)	*(0.005)*	*(0.011)*	*(0.004)*	
private	0.013	0.014	-0.092**	0.053	#
	(0.022)	*(0.018)*	*(0.044)*	*(0.022)*	
enroll	-0.019	-0.018	-0.051**	-0.023	
	(0.052)	*(0.050)*	*(0.020)*	*(0.049)*	
revenue	0.020**	0.020**	0.046**	-0.007	#
	(0.003)	*(0.003)*	*(0.010)*	*(0.006)*	
admin	0.006	0.006	0.134**	0.005	#
	(0.025)	*(0.024)*	*(0.025)*	*(0.028)*	
IN	-1.101**	-1.101**	-1.437**	-0.784**	#
	(0.070)	*(0.068)*	*(0.016)*	*(0.116)*	
IL	-1.944**	-1.941**	-2.028**	-1.784**	#
	(0.034)	*(0.035)*	*(0.054)*	*(0.057)*	

Table 3. Estimation results (continued**).**

	Model 1	**Model 2**	**Model 3**		
			Rural	Urban	
	b (SE_b)	b (SE_b)	b (SE_b)	b (SE_b)	
Stage 2: Dep. Variable: *pass* (*n*=345)					
intercept	0.488	0.307	1.018	0.785	
	(0.938)	(1.340)	(2.339)	(1.365)	
rural		0.106			
		(0.115)			
nonwhite	0.010	0.010	-0.032*	0.011	#
	(0.011)	(0.011)	(0.019)	(0.013)	
pop65+	0.026	0.025	0.005	0.007	
	(0.022)	(0.022)	(0.048)	(0.009)	
income	0.003	0.002	-0.026	-0.002	
	(0.021)	(0.021)	(0.033)	(0.016)	
college	0.019	0.020	0.160**	0.012	#
	(0.020)	(0.021)	(0.038)	(0.025)	
private	0.074**	0.083**	0.274**	0.019	#
	(0.018)	*(0.016)*	*(0.063)*	*(0.050)*	
revenue	-0.017	-0.017	-0.035	0.002	
	(0.020)	*(0.022)*	*(0.052)*	*(0.045)*	
enroll	0.013	0.016	-0.591**	0.049*	#
	(0.016)	*(0.019)*	*(0.157)*	*(0.028)*	
tax	0.440**	0.446**	0.770**	0.331**	#
	(0.106)	*(0.109)*	*(0.223)*	*(0.101)*	
yr2010	0.050	0.162	-0.003	0.291	
	(0.350)	*(0.626)*	*(0.511)*	*(0.758)*	
yr2011	0.091	0.199	0.303	0.400	
	(0.354)	*(0.414)*	*(0.477)*	*(0.503)*	
yr2013	-0.107	0.095	0.107	-0.192	#
	(0.507)	*(0.504)*	*(0.559)*	*(0.596)*	
IN	-1.295**	-1.339**	-1.231**	-1.360**	#
	(0.405)	*(0.405)*	*(0.561)*	*(0.567)*	
IL	-1.812**	-1.866**	-2.800**	-1.462**	#
	(0.629)	*(0.611)*	*(1.217)*	*(0.635)*	
$\hat{\rho}$	-0.268	-0.228	-0.328		
	(0.210)	*(0.254)*	*(0.189)*		
$\chi^2_{df=1}$	1.460	7.50	2.570		
p-value	0.227	0.386	0.109		

*** p < 0.05; * p < 0 .1 for H_o: $\beta = 0$. # p < 0.05 for H_o: $\beta_{rural} = \beta_{urban}$*

Proposing a Referendum

Turning first to the probability that a school district proposes a referendum (upper panel of Table 3), the estimations suggest that several of the voter and school attributes do play a role. The rurality effect in Model 2 is insignificant. Instead, rural-urban differences are manifested in slope differences of several voter and district variables. The interpretations below are thus based on Model 3.

Almost a quarter of the rural school districts ever proposed a referendum during the study period compared to only 18 percent among the urban districts (Table 2). Responsible for this difference are not only compositional differences but also rural-urban differences in how salient variables affect the probability of proposing a referendum. In both rural and urban districts, the probability is negatively correlated with the shares of nonwhite and elderly voters. However, for the *nonwhite* variable, the negative association is significantly stronger in urban than in rural districts. Interestingly, income does not matter at all, and voter composition by education is irrelevant in rural districts. On average, a very low share of rural district voters has a college education, only 18 percent, and there is comparatively little variation. In urban districts, however, the average presence of college

educated voters is much stronger, but there is also a much higher variation. Educational composition matters in urban districts, with proposals being more likely in districts with a large share of highly educated voters.

Moving on to the influence of school district variables on the proposal probabilities, the presence of private schools turns out to contribute most distinctly to rural-urban differences. Almost half of the school districts do not have private school alternatives available (*private* = 0). If private school alternatives are available, rural districts respond by referenda proposals becoming less likely. In urban districts, however, the results suggest that the presence of private schools is an incentive to propose school funding referenda, thus a strategy to face the competition. The stronger the competition, i.e., more private schools the district has, the higher the likelihood of a referendum.

The remaining district variables are only relevant for rural districts. Most notable and of relevance for the consolidation debates in many rural areas, smaller school districts are more prone to proposing a referendum than bigger districts. Moreover, high per-pupil revenue and large administrations make a district more likely to have a referendum.

Jointly evaluating rural-urban compositional differences (Table 2) and parameter differences (Table 3) suggests that the compositional differences are more important for the likelihood of proposing a referendum. For the average rural school district, the model estimates a 13.8 percent probability that a referendum is proposed. If the rural school district had the characteristics of the average urban district, the probability decreases by 2.7 percentage points. For the average urban district, the model estimates the probability to be 11.8 percent; when assigning average rural attributes to the urban district, the proposal probability increases by 3.2 percentage points. The estimated changes are much smaller when switching slope parameters rather than attributes. Assigning urban slopes to rural districts lowers the probability by about half a percentage point; assigning rural slopes to urban districts does not change the referendum probability.

Voter Approval

Conditional upon proposing an educational tax referendum, voters approve or reject the referendum. Overall, the approval rates are very high: 84 percent in rural and 81 percent in urban school districts. As was the case with the proposal probabilities, the rural dummy in Model 2 is insignificant. Thus, rural-urban disparities are—at best—manifested in slope differences of voter and district variables, so the discussion is confined to Model 3.

While voter attributes were found to have significant effects on proposal probabilities, their influence is minor when it comes to predicting referendum approval. In fact, for urban districts none of the voter variables is significant. In rural districts, racial diversity is negatively associated with approval, but only weakly. And rural districts with a higher share of college graduates tend to have higher approval rates.

Among the school district variables, the proposed tax increase is relevant for both rural and urban districts. Approval rates tend to be even higher when the proposed tax increase is above average. However, although highly significant the magnitude of the effect is small, and so is the slope difference between rural and urban school districts. In rural districts, two additional variables shape approval rates. First, the presence of private alternatives again plays a pivotal role in rural districts, where approval becomes more likely with rising numbers of private schools. Second, larger school districts are associated with lower approval rates, just as they were predicted to be less likely to propose a referendum.

Applying the estimated model to the average rural school district yields a high estimated approval rate of 91.7 percent. If the average rural school district had the attributes of the average urban school district, then the approval rate is estimated to drop by 24 percentage points to a mere 67.5 percent. In contrast, keeping the rural attributes but applying the urban parameters barely changes the initial probability, slightly increasing from 91.7 to 92.2 percent. For urban school districts the compositional effects are a lot less relevant. Switching to rural attributes lowers the approval probability by 1.2 percentage points, whereas switching to rural parameters lowers the approval probability by 26 percentage points.

4. Summary and conclusions

School districts propose education tax referenda to attain funds in addition to their state-allocated funds and federal funding. This research set out to analyze rural-urban differences in (1) the propensity that school districts propose such referenda, and (2) the likelihood that voters approve the referendum. Rooted in median voter theory, we conceptualized that referendum proposal probabilities and referendum approval probabilities differ between rural and urban school districts and are influenced by voter composition and school district attributes. For the

empirical analysis, we used a sample of school districts from Illinois, Indiana, and Michigan during the four-year period 2010 to 2013.

We found that during the four-year period only one out of five school districts resorted to a tax referendum strategy to attain additional funds, but rural school districts were significantly more likely to do so than urban school districts. Once a referendum is proposed, voters are very likely to approve the proposed tax increase. In fact, in more than 80 percent of all school districts that had proposed a referendum, voters were supportive of the proposed increase. Moreover, voter approval of an educational referendum was slightly, but not significantly more likely, in rural than in urban school districts.

Accounting for sample selectivity and jointly estimating probit models of the proposal and approval probabilities, the research extracts the factors influencing the probabilities and assesses whether these factors operate differently in rural than in urban school districts. The main results can be summarized in three points. First, we found that voter composition plays a pivotal role for the chances that an educational tax referendum is proposed and that it is subsequently approved. Most important is the racial composition. Ceteris paribus, white school districts are significantly more likely to propose an educational tax referendum than racially diverse school districts, and the race gradient is steeper in rural than in urban school districts. Regarding the chances that voters approve an educational tax referendum, urban districts' approval probabilities do not vary by race, whereas rural districts' approval becomes significantly less likely as racial diversity intensifies.

Second, among the school district attributes competition from private school alternatives is particularly important for the likelihood of a referendum being proposed. Moreover, rural and urban school districts differ in their response. Stronger competition makes urban districts more prone to seek additional funds, whereas rural districts become less likely to propose a tax referendum. Rural districts' reduced propensity to propose a referendum with increasing competition is interesting, since rural voters become more likely to approve an additional tax as the competition becomes stronger.

Third, the controversy around school district consolidation in rural areas seems to be reflected in the effect of school district size on voter approval for higher taxes. Voters of small rural school districts are more likely to approve the taxes than are voters in bigger rural districts.

There are several implications for policy makers. The timing of proposed budgets is pivotal for understanding the referendum process. Residents who turn out to vote for referendum proposals timed conjointly with general elections may not necessarily value public education as highly as people who turn out specifically for referendum elections (Ehrenberg et al., 2003). Timing thus influences the median voter. Our results suggest that school officials—both in rural and in urban districts—are wary of proposing referenda to elderly populations. However, the population aged 65 and over does not significantly affect referendum success, signifying the mismatch between voter preferences and school board preferences.

The results suggest that very few school districts propose referenda for additional school funding, whereas their residents are quite likely to pass them. This could mean that school districts do not adequately understand their residents' preferences. If school districts propose fewer referenda than they could potentially gain support for, they may face larger financial struggles than those that are more pro-active. In the rural setting, this discrepancy may advance further consolidation of rural school districts.

References

Arnold, M.L., J.H. Newman, B.B. Gaddy, and C.B. Dean. 2005. A look at the condition of rural education research: Setting a direction for future research. *Journal of Research in Rural Education* 20(6):1-25.

Balsdon, E., E.J. Brunner, and K. Rueben. 2003. Private demands for public capital: Evidence from school bond referenda. *Journal of Urban Economics* 54(3):610-638.

Bergstrom, T.C., and R.P. Goodman. 1973. Private demands for public goods. *The American Economic Review* 63(3):280-296.

Borcherding, T.E., and R.T. Deacon. 1972. The demand for the services of non-federal governments. *The American Economic Review* 62(5):891-901.

Brunner, E.J., and S.L. Ross. 2009. Is the median voter decisive? Evidence of 'ends against the middle' from referenda voting patterns. UConn. Economics Working Papers. http://digitalcommons.uconn.edu/cgi/viewcontent.cgi?article=1246&context=econ_wpapers.

Cebula, R.J. 2008. Influence of the number of statewide referenda involving emotionally-charged issues on voter turnout, 2006. *Atlantic Economic Journal* 36(4):383-393.

Corcoran, S., and W.N. Evans. 2010. Income inequality, the median voter, and the support for public education. Working Paper No. w16097. National Bureau of Economic Research.

Deller, S.C., and N. Walzer. 1993. The effects of an aging rural population on the financing of rural public education. *Journal of Research in Rural Education* 9(2):104-114.

Downs, A. 1957. An economic theory of political action in a democracy. *Journal of Political Economy* 65(2):135-150.

Ehrenberg, R.G., R.A. Ehrenberg, C.L. Smith, and L. Zhang. 2004. Why do school district budget referenda fail? *Educational Evaluation and Policy Analysis* 26(2):111-125.

Epple, D., and R.E. Romano. 1996. Ends against the middle: Determining public service provision when there are private alternatives. *Journal of Public Economics* 62(3):297-325.

Fletcher, D., and L. Kenny. 2008. The influence of the elderly on school spending in a median voter framework. *Education Finance and Policy* 3(3):283-315.

Gerber, E.R., and J.B. Lewis. 2004. Beyond the median: Voter preferences, district heterogeneity, and political representation. *Journal of Political Economy* 112(6):1364-1383.

Gibbs, R. 2005. Education as a rural development strategy. *Amber Waves* 3(5):20.

Heckman, J.J. 1979. Sample selection bias as a specification error. *Econometrica* 47:153–162.

Hilber, C.A., and C. Mayer. 2009. Why do households without children support local public schools? Linking house price capitalization to school spending. *Journal of Urban Economics* 65(1):74-90.

Holcombe, R.G., and L.W. Kenny. 2008. Does restricting choice in referenda enable governments to spend more? *Public Choice* 136(1-2):87-101.

Holcombe, R.G. 1989. The median voter model in public choice theory. *Public Choice* 61(2):115-125.

Hotelling, H. 1929. Stability in competition. *Economic Journal* 39:41-57.

Inman, R.P. 1978. Testing political economy's 'as if' proposition: Is the median income voter really decisive? *Public Choice* 33(4):45-65.

McGranahan, D.A., T.R. Wojan, and D.M. Lambert. 2010. The rural growth trifecta: Outdoor amenities, creative class and entrepreneurial context. *Journal of Economic Geography* 11(3):529-557.

Muir, E., and K. Schneider. 1999. State initiatives and referenda on bonds: A comparative analysis of one solution for the school infrastructure crisis. *Journal of Education Finance* 24(4):415-433.

Partridge, M.D., M.R. Olfert, and K. Ali. 2009. Towards a rural development policy: Lessons from the United States and Canada. *Journal of Regional Analysis & Policy* 39(2):109-125.

Penska, N. 1996. Voter approval or defeat of school district budgets: A view from New York State. *ERS Spectrum* 14(1):24-30.

Plutzer, E., and M. Berkman. 2005. The graying of America and support for funding the nation's schools. *Public Opinion Quarterly* 69(1):66-86.

Romer, T., and H. Rosenthal. 1979. The elusive median voter. *Journal of Public Economics* 12(2):143-170.

Romer, T., H. Rosenthal, and V.G. Munley. 1992. Economic incentives and political institutions: Spending and voting in school budget referenda. *Journal of Public Economics* 49(1):1-33.

Rubinfield, D.L., P. Shapiro, and J. Roberts. 1987. Tiebout bias and the demand for local public schooling. *The Review of Economics and Statistics* 69:426-437.

Tedin, K.L., R.E. Matland, and G.R. Weiher. 2001. Age, race, self-interest, and financing public schools through referenda. *The Journal of Politics* 63(1):270-294.

Turnbull, G.K., and P.M. Mitias. 1999. The median voter model across levels of government. *Public Choice* 99(1-2):119-138.

Tiebout, C. M. 1956. A pure theory of local expenditures. *The Journal of Political Economy* 64(5):416-424.

Waldorf, B. 2006. A continuous multi-dimensional measure of rurality: Moving beyond threshold measures. Selected Paper, Annual Meetings of the Association of Agricultural Economics, Long Beach, CA, July 2006. http://agecon-search.umn.edu/handle/21383.

Whisler, R.L., B. Waldorf, G.F. Mulligan, and D.A. Plane. 2008. Quality of life and the migration of the college-educated: A life-course approach. *Growth and Change* 39:58–94.

Zimmer, R., R. Buddin, J.Jones, and N. Liu. 2011. What types of school capital projects are voters willing to support? *Public Budgeting & Finance* 31(1):37-55.