Will the Property Tax Continue to Play a Central Role in the Funding of Public Education?

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Introduction

Public education in the U.S. faces a myriad of challenges. Chief among them are increasing the level of knowledge and skills provided by our education system so that today's youth can better compete in the global economy, and closing the large gaps in educational achievement between students from different socioeconomic groups.

Based on 2009 results from the Program for International Student Assessment (PISA), 15-year olds in the U.S. scored no better in both reading and science literacy than the average student in Organization of Economic Development (OECD)-member countries, and scored below average in mathematical literacy (National Center for Education Statistics, 2012). These international comparisons serve to highlight the importance of taking steps, such as investing in curricular upgrades and improving the quality of instruction, to increase the opportunities for American students to acquire more knowledge and higher-level skills.

As our country becomes more ethnically and racially diverse and as income inequality rises, the challenges of closing achievement gaps grow. There is ample evidence of large achievement gaps, especially between students growing up in low-income and high-income families. As argued forcibly by Helen Ladd (2012), closing these gaps will require not only more effective education programs in our schools, but investments in pre-school education, in after-school and enrichment programs targeted to low-income students, and in programs to assure that poor children receive adequate health care and nutrition.

A necessary, although not sufficient, condition for meeting these two challenges is a combination of additional financial resources and more efficient use of current resources. In 2007, the United States devoted 3.6 percent of its GDP to public spending on primary and secondary education. This commitment to public education placed the U.S. above the OECD average of 3.4 percent,

but below spending in 14 of the 39 OECD-member countries (Organization of Economic Cooperation and Development, 2011).

The resources to finance public education come from all three levels of government. Over the latest decade for which these data are available (1999 to 2009), the federal share of public school revenues was 8.3, the share from state governments, 48.1 percent, and the share from local governments, 43.6 percent (National Center for Education Statistics, 2012). Although, real public education revenue grew over the decade at an average annual rate of 2.7 percent, there are good reasons to believe that at all three levels of government, the historical rates of growth will not be maintained, and there is the possibility that in real terms revenue available to fund public education will fall.

At the federal level, the fiscal environment is dominated by the nation's long-term debt problems. The Budget Control Act of 2011 mandates that Congress reduce spending over the next decade by $1.2 trillion and take actions to cut spending by an additional $1.5 trillion between 2013 and 2021. Even if Congress decides to cancel the cross-the-board cuts required by *sequestration*, it is highly likely that they will replace those cuts with legislation that reduces spending for a wide range of non-defense discretionary programs. Given the magnitude of the nation's long-term debt problem and the aversion to raising new revenues, there is a high probability that federal government spending on public education will be reduced.

The Great Recession led to sharply declining state government revenues and forced states to close budget gaps totaling about a half trillion dollars. The recession, by most measures, has been much more severe than other post-World War II recessions. It was accompanied by both a financial market and a housing market crisis, and caused the largest state government tax declines in more than five decades (Rockefeller Institute, Gais and Dadayan, 2012). One way in which many states chose to close their budget gaps was to reduce state grants to their local school districts. A survey conducted by the Center on Budget and Policy Priorities found that in 26 states, per student state

aid to elementary and secondary schools for the 2012-13 school year is lower than in the previous year (Oliff, Mai, and Leachman, 2012). In 35 states, real state aid per student this year is actually lower than it was in 2008.

In most states, state government tax revenues have been growing over the past couple years. The rate of growth, however, has been quite slow relative to the growth rate in the four years prior to the Great Recession. As a result, even though most states are now increasing state aid to education, it is likely to take a number of years before state aid per student returns to pre-recession levels. The prospects for robust future growth of state education aid are further dimmed by several long-run structural problems facing many state governments.

On the revenue side, many states have narrow sales tax bases that exclude many services. Over time the proportion of final consumption expenditures that are subject to state sales taxes is steadily declining. The reduced capacity to collect sales tax revenue is exacerbated by the inability of states to collect sales taxes on many internet and mail order purchases. Also, in the past several years, a number of states have chosen to lower individual and corporate income taxes, either through rate reductions or by enacting new credits and exemptions, often in the name of job-creation policies.

Fiscal pressures on state governments on the spending side are highlighted in a report issued by the State Budget Crisis Task Force (2012). The Task Force, chaired by Richard Ravitch and Paul Volcker, focuses on Medicaid spending and unfunded pension and retiree healthcare benefits. In most states, spending on Medicaid is growing faster than state tax revenues. This pattern is likely to continue as long as health care costs in the U.S. continue to grow at a faster rate than the economy and the number of people eligible for Medicaid continues to rise. The aging of the population and Medicaid expansions that are part of the Affordable Care Act both contribute to the rapid growth rate of Medicaid expenditures by state governments. Despite efforts in most states to curb the

growth in Medicaid spending, it is likely that Medicaid will continue to crowd out state spending in other areas, including public education.

Over the next few decades many state governments will need to increase contributions to their state pension systems. While some states have fully-funded systems, many states currently have seriously under-funded systems. Unless these states, reform their pension systems or increases state contributions, many pension systems will eventually run out of money.[1] As pension benefits enjoy strong legal protection, once pension plans run out of money, state general fund revenue will have to be used to meet pension obligations, again, leaving fewer resources available to finance public schools. Most state governments have also promised to provide their employees with health insurance benefits in retirement. Unlike pensions, these benefits are generally paid on an ongoing basis, further increasing the fiscal pressures state governments will face over the next few decades.

With diminished prospects for growth in funding for public education from the federal government and great uncertainty about funding prospects from state governments, local school districts in many parts of the country are likely to have to play an increasingly important role in funding public education.

The property tax is the single most important source of local government revenue for elementary and secondary education. In 2009, the latest year for which these data are available, 79.4 percent of local government revenue for public education came from the property tax. Historically, the property tax has played an important role in providing relatively stable funding source for education over the course of the business cycle. Following the 2001 recession, a large number of states reduced funding for public education as a means of closing state budget gaps (Reschovsky, 2004).

[1] Estimates of how soon state pension systems will run out of money vary substantially. Rauh (2010) argues that a number of states pension systems will have insufficient money to pay beneficiaries within 15 years. Analysis by Munnell, et al. (2011) indicates that most state plans will have enough money to last at least 30 years.

Dye and Reschovsky (2008) find evidence that on average during this period local school districts increased property taxes by 23 cents for every dollar in reduced state education aid.

Although nationwide data on school property tax revenues for the years after 2009 are not yet available, aggregate statistics from the Census Bureau indicate that between the fourth quarter of 2009 and the third quarter of 2012, per capita local government property tax revenue for all purposes fell by 1.6 percent (7.6 percent in real terms).[2] Although it is impossible to predict future trends in property tax revenue with certainty, recent research by Lutz (2008), Lutz, Molloy, and Shan (2011) and Chernick, Langley, and Reschovsky (2012) found that changes in property tax revenues tend to lag changes in housing prices by about three years. As housing prices appear to have finally started rising in the first half of 2012, the evidence on the housing price-property tax revenue lag suggests that we can expect property tax revenue to continue declining into 2015.

The ability to provide high quality public education in the U.S. and to address the educational challenges outlined above depend on a steady, and perhaps increasing, flow of revenues from local governments. Unless local school districts begin to rely on alternative sources of revenue, such as a local income tax, the property tax will have to play a central role in the financing of public education. There are however several reasons why local school boards may be unwilling or unable to maintain or increase revenues from property taxation.

First, in most of the country, housing prices have fallen dramatically over the past five year. In some areas, prices have fallen by more than half, and in mid-2012, 10.8 million homeowners continue to owe more on their mortgage than the value of their homes (CoreLogic, 2012). Although, to date no evidence exists, it is not unreasonable to imagine that reductions in housing wealth may result in increased taxpayer opposition to increased property taxation. Second, the slow pace of the economic recovery, the persistently high unemployment rates, and the economic uncertainty exacer-

[2] These percentage changes in property tax revenues are based on U.S. Census Bureau (2012) quarterly data on state and local tax revenues.

bated by political gridlock, all may contribute to increased resistance to paying property taxes. Third, the emergence of the Tea Party movement may serve to coalesce opposition to property tax increases. And fourth, demographic changes may result in reduced support for the school property tax. Not only is the population aging rapidly with the share of the population over 65 projected to grow by nearly 24 percent between 2010 and 2020 (U.S. Census Bureau, 2008), but the number of households with children under the age of 18 has fallen from 36 percent in 2000 to 33.5 percent in 2010 (El Nasser and Overberg, 2011). The relationship between support for education and the share of elderly residents is controversial with some studies finding that higher concentrations of elderly are associated with lower education spending, and other studies finding that the relationship is weak or non-existent (Fletcher and Kenny, 2008).

Our goal in this paper is to explore how (or if) school districts' use of the property tax has changed over the past few years in light of the changing, economic, political, and fiscal environment. The direct approach of analyzing changes in school property tax levies is complicated by the fact that levy changes can occur for a wide and often difficult to identify set of reasons. Changes in citizen preferences, changes in state and federal fiscal assistance, changes in the number and the composition of students, and changes in local economic conditions can all have an impact on individual school board decisions with regard to changes in property tax levies. Because school finance systems and property tax institutions differ markedly across states, empirical studies of school district behavior with regard to the property tax need to be carried out on a state-by-state basis.

In this paper, we use data from nearly all of Wisconsin's 424 school districts to explore the role of the property tax before and after the 'Great Recession.' Since 1994 Wisconsin school districts have operated under statutorily-imposed revenue limits. These limits operate by placing a cap on the sum of state general aid and property tax levies. Once the state has allocated general state aid each year, the aid allocations are subtracted from the revenue limits in order to calculate a maximum al-

lowable property tax levy for each school district. As a means of measuring changes in property tax behavior, we calculate the ratio of each school districts actual levy to its allowable levy. We then develop a model to explain variations in these ratios as a function of school district economic, social, and demographic, and political characteristics.

In the next section, we describe Wisconsin's school funding system and the changes that were enacted in response to budget gaps that emerged during and after the Great Recession. We then develop our model of school district property tax decision making, and estimate it using a panel of school district-level data. In the final section, we draw some conclusion about future prospects for school property tax revenues.

School Finance in Wisconsin

In Wisconsin, the state government and independent local school districts share approximately equal roles in funding K-12 education. Local funding for the state's 424 school districts comes primarily from the property tax. At the state level, about 90 percent of the state's financial contribution to public education is provided through General Aid, with the rest distributed through a number of categorical aid programs, the largest of which provides funding for students with disabilities. General Aid is allocated to local school districts using a foundation aid formula supplemented by a guaranteed tax base formula.

In 1993, concerned that school districts were using state aid to increase spending rather than reduce property taxes, the state legislature imposed an annual revenue limit on all school districts. The revenue cap applies to the sum of General Aid from the state and property taxes levied in each school district[3], It excludes revenue from both state categorical aid and federal grants. Each year, each school district's per student revenue under the limit (from state general aid and local property taxes) was allowed to grow by a specified per student amount, established annually by the state. For

[3] For a comprehensive description of the revenue limits see Wisconsin Legislative Fiscal Bureau (2011).

1993-94 this amount was set at $190 per student. In each subsequent year, the per student increment grew at approximately the rate of inflation. In 2008-09 it was equal to $275 per student. School districts can exceed their revenue limit only if local voters agree via a referendum to override the revenue cap.

With the onset of the Great Recession, Wisconsin, like most other states, faced a large budget gap. The state's 2009-11 biennial budget cut state aid to schools by nearly three percent, and to prevent local school districts from completely replacing lost state aid with increased property tax revenue, reduced the annual increment in the revenue limit for fiscal years 2010 and 2011 to $200 per pupil.[4] Responding to an approximately $3 billion budget gap, the governor and legislature enacted a 2011-13 budget that reduced total state aid to school districts by about eight percent. In an attempt to prevent reductions in the quality of public education, and increases in school property taxes, the legislature eliminated most collective bargaining rights of school district employees, mandated reductions in employee benefits, and reduced the revenue limits of most school districts by 5.5 percent.

Model Specification: Property Tax Decisions of Local School Districts

Against this background, we want to explore the property tax behavior of local school districts. Except for the possibility of overriding the revenue limit through the successful passage of a referendum, each year, each school district's maximum allowable levy is determined by the state government polies with regard to the revenue limit and the allocation of General Aid. Local school boards face the choice of setting their property tax levy equal to the allowable levy or underlevying by choosing a levy below the limit.

To begin to understand the differences across school districts and over time in decisions about property tax levies, we calculate for each district the ratio of its actual property tax levy to its

[4] In addition to reducing the General Aid budget, the state used nearly $800 million from its allocation of federal stimulus dollars to replace state dollars that would have been used to fund General Aid.

allowable levy under the revenue cap. We name this variable, $levyratio_{it}$, where i denotes the school district and t denotes the year. $levyratio_{it} = \frac{actual\ levy_{it}}{allowable\ levy_{it}}$. $Actual\ levy_{it}$ is the amount that each school district i chose to levy in time t.[5] $Allowable\ levy_{it}$ is the maximum possible amount of revenue that school district i was allowed to levy under the revenue cap. This variable allows us to gauge each school district's annual decision about how much property tax to levy against the state-imposed revenue limits.

The most straightforward way to explain variations in levy ratios would be to regress $levyratio_{it}$ on a set of fiscal, economic, and demographic variables related to each school district. There are however several potential econometric problems with this approach. First, there could be a problem of endogeneity. By definition, $allowable\ levy_{it}$, the denominator of our dependent variable, is equal to the difference between each school district's state-determined revenue limit and their General Aid allocation. For many school districts, $General\ Aid_{it}$ is in part a function of their tax levy decisions in year t-1. In general, in districts with above-average property wealth, an increase in levy may result in decreased General Aid in the next, while in districts with below-average property wealth, a higher levy in year t-1 may result in higher General Aid in t-1. These levy decisions in turn may be explained in part by some of the school district characteristics included in our model.

There are several reasons why we believe that endogeneity is in fact not a major problem. About 16 percent of Wisconsin's school districts receive aid through a hold-harmless provision known as special adjustment aid. For these districts, property tax levy decisions in year t-1 have no impact on general aid allocations in year t. Furthermore, because the General Aid formula is extremely complex and because it allocates a fixed amount of money budgeted each year by the state legislature, it is impossible for any school district to predict the impact of any levy decision in year t-

[5] School districts can levy small amounts of property taxes for some narrow special purposes that are not included in the revenue limit. These levies are excluded from our analysis.

1 on aid allocations in year t. Aid to district i in year t will depend on change in students, changes in property values, and levy decisions made by all other school districts. None of this information will be available to a school district when it is making its property tax levy decision.

A second econometric problem is created by the fact that in the majority of years since 2004 more than 90 percent of school districts chose property tax levies equal to their allowable levies. This fact creates a censoring problem, as a large proportion of our *levyratio* observations have a value of one. The data also indicate that among districts with levy ratios less than one, there are a number of districts that choose to underlevy quite frequently. This observation suggests that we may have a selection problem, with districts that underlevy being systematically different from districts that always set their property tax levies equal to their allowable levies.

To address these econometric issues, we pursue a two-stage strategy. In the first stage, a school district makes a decision about whether or not it will set its levy at the maximum allow level. The second stage, which involves only those districts that chose to underlevy, we attempt to explain by how much these districts chose to underlevy.

In stage one (the selection stage), school districts decide whether to underlevy or to levy up to the amount allowable under the revenue cap; if a school district *i* chooses underlevy in time t, then the selection variable, $underlevy_{it}$, equals one. If a school district *i* chooses to set it's property tax levy to the maximum allowed under the revenue limit (that is to say, they do not underlevy), then $underlevy_{it}$ equals zero. We assume that in stage one, school districts choose to underlevy based on a number of community, economic and school district variables, denoted by W_{it}. The selection equation is a probit regression:

$$P\left(underlevy_{it}=1\right)=\sum \beta_k W_{it}+u_{2it}$$
$$u_{2it}\sim N\left(0,1\right)$$

such that u_2 are the residuals from the selection stage. Due to the difficulty of setting property tax levies to exactly equal the allowable levy, we assume that school districts who levy greater than 98.5 percent of allowable levy are choosing to levy the maximum allowed under the revenue cap, and thus, $underlevy_{it}$=0. School districts that choose to levy less than or equal to 98.5 percent of their allowable levy choose to underlevy and *underlevy*=1.

The levy ratios for school districts that levy under the amount allowed by the revenue cap are the focus of the second stage "outcome equation" and can be modeled by:

$$levyratio_{it} = \alpha_0 + \sum \alpha_k Z_{it,k} + \sum \gamma_l X_{it,l} + \sum \phi_{it,m} E_{it,m} + u_{1it}$$
$$u_{1it} \sim N(0, \sigma)$$

where Z are demographic variables, X are school district variables, E are economic environment variables and u_1 are the residuals..

In the Heckman selection model differs from the OLS model because it permits the residuals in stage one, u_2 to be correlated with the residuals is stage two (u_1). The correlation between u_1 and u_2 is given by ρ. If ρ is not significant, than a simple OLS model is sufficient; however, if ρ is significant, then a simple OLS of our dependent variable (*levyratio*) would result in biased estimates. Additionally, we must also be concerned with heteroscedasity in our model. We have annual cross-sectional data for each school district in Wisconsin from 2004 through 2012, resulting in multiple observations for each school district in the sample. Given the presence of hetoroscedasticity, we calculate the Heckman selection model using robust standard errors.

Description of Data

In order to examine our hypothesis, we have constructed a panel of data for 419 of Wisconsin's 424 school districts for the 9 years period from 2003-04 to 2011-12.[6] Most of the data we use

[6] Four districts were excluded because they were involved in recent consolidations, and one because it is a state-run residential school.

comes from either the Wisconsin Department of Public Instruction or from the Wisconsin Department of Revenue. U.S. Census data were used to measures demographic characteristics of school districts. As the census data were generally available only for 2000 and either 2007 or 2010, we used linear interpolations for the non-census years. A fuller description of the data and the data sources is available from the authors.

Our dependent variable in stage one is *underlevy*. As illustrated in figure 1, the data show clearly that through 2009 about 95 percent of all school districts levied up to their allowable levy. The percentage of school districts setting their levies below their maximum allowable level grew rapidly after 2009, with 17 and 18 percent underlevying in 2010 and 2011. In part because the state budget reduced the allowable levy for most school districts, in 2012 the number of school districts choosing to underlevy, while still relatively high, was below the level in 2010 and 2011. A similar picture emerges by looking at the aggregate amount by which property tax levies fell below allowable levies. Between 2002 and 2008, annual underlevies average about $15 million (0.5 percent of allowable levies). From figure 1, we can see that from the 2008-2009 to the 2010-2011 school year, the average annual aggregate amount of underlevies quadrupled, and the percentage of school districts that choose to underlevy increases greatly.

Stage One Explanatory Variables

The summary statistics of each of the explanatory variables from stages one and two can be found in table 1. As a measure of the fiscal capacity of a school district, we use the equalized value of property per student lagged one year (*EQV Lagged*). School districts with greater resources find it easier to levy up to their allowable limit. Thus the expected sign of *EQV Lagged* is negative.

The lagged change in the mill rate (Δ *millrate*) is the change in the property tax mill rate from t-2 to t-1. We hypothesize that a school district that raised its mill rate in the recent past will have a

more difficult time increasing its mill rate in the current period. Thus, if Δ *mill rate* is positive, we expect that school districts are more likely to underlevy in the current period.

The change in enrollment is an important factor in local school district financing, in part because the revenue cap is defined on a per student basis. Thus, an increase in enrollment will raise the revenue ceiling that applies to any given school district. A portion of school district expenditures, such as heating, transportation, maintenance do no change if student enrollment changes. Salary costs are unlikely to decline if only a few students leave each grade level. If enrollment declines, we expect school districts to feel great fiscal pressure and consequently levy to the maximum allowable level. Thus, we expect the sign of Δ*students* to be positive.

School districts can override their revenue limit each year by passing a referencum that raises their revenue limit for one or more years. School districts who choose to override their revenue limit will obviously not underlevy. We include a dummy variable if a school district's voters approved a revenue limit override (*Referenda*).

The relative age of a school district's population is measured by the percent of the population greater than 65 (*elderly*). The literature suggests that the greatest support for public education comes from younger populations, and that support for education decreases as the population ages. Harris, Evans and Schwab (2001) using district and county level data to examine the impact of an aging population on support for education funding. They found much more modest results than earlier studies that used state level data. They determined that elderly populations have a small, but negative, impact on educational funding (Harris et al, 2001).

There are several reasons, however, why the coefficient on the percent of the population over 65 years of age could be positive. Poterba (1998) and Ladd and Murray (2001), delineate four main reasons why older populations may support public education spending: first, the elderly may support education in order to improve wages in the future, and by extension, social security and

Medicare funding; secondly, the elderly might believe intrinsically believe in the value of public education; likewise, the elderly may demonstrate "intergenerational altruism" for the prospect of future generations, particularly if they have grandchildren attending school in the district; finally, Tiebout sorting, where individuals move to locations based on the public services provided, might cause the elderly with a lower demand for K-12 education to congregate in school districts with lower educational spending, thereby leaving educational spending unchanged by their presence (Poterba, 1998). In a recent paper, Figlio and Fletcher (2012) directly address the issue of Tiebout sorting. They develop a method to isolate the impact of aging in place and find evidence that as people become elderly they reduce their support for public education. They also find that the elderly are more likely to support cutting education revenue when the share of public school students that are nonwhite is larger.

There are a couple of studies that have found that public education spending is not adversely impacted by a large elderly population. Berkman and Plutzer (2004) found that the support of the elderly for local public education spending depends a great deal upon specific aspects of the state and local funding dynamic for public education as well as whether the elderly are longstanding citizens of the community or new residents. New residents are less likely to support educational funding for public education than the elder who are longstanding residents. Similarly, Gradstein and Kaganovich (2004) find a positive impact of the elderly on educational finance. Consequently, the sign of the percent over 65 variable is uncertain.

We use the percentage of the population over the age of 25 with a bachelor's degree or higher (*Education*) as an indicator of the education level of the population in each school district. Citizens with a higher level of education are more likely to demand a higher level of education for their children. Consequently, citizens with a higher level of education will most likely be more willing to support a school board's decision to levy up to the revenue limit. Thus, we hypothesize that the school

districts with a higher percentage of the population who have a bachelor's degree or higher are more likely to levy to the limit and less likely to underlevy. Thus the expected sign is negative.

The percent of the population voting for the republican candidate during either the gubernatorial or presidential election (*Republican*) is the final variable used to control for characteristics of the population living in each school district. This variable was calculated using the results from the previous statewide election e.g. in 2011 the value of the Republican variable is the Republican vote share within the school district from the 2010 gubernatorial election. To obtain the Republican vote share for a school district, statewide ward level election returns from the presidential and gubernatorial elections during this time period were obtained from the Government Accountability Bureau in Wisconsin. This ward level data was aggregated to the municipality level. Then, using a crosswalk between municipalities and school districts from the Department of Revenue, a share of voters from each municipality was assigned to their corresponding school district based on the proportion of property wealth in each municipality belonging to each school district. Republican school districts may be more fiscally conservative, and thus less willing to levy up to the revenue limit. Thus, we expect this variable to be positive.

Stage Two Explanatory Variables

In stage two, we examine the levy ratio of school districts that underlevy. Explanatory variables include the change in the equalized value of property per student (ΔEQV) between year t-2 and year t-1. We hypothesize that the coefficient of the change in equalized value per member will be positive. Since the equalized value per member can be seen as a measure of wealth, if the equalized value per member is increasing, then the school district is getting wealthier. Thus, as the change in equalized value per member gets larger, the levy ratio should also increase.

The lagged change in the mill rate ($\Delta millrate$), and the change in enrollment ($\Delta students$), are included in both stage one and stage two. If school district *i* increased its mill rate in the past, then

we hypothesize that this school district will have a more difficult time changing the mill rate in the current period, and thus could have a lower levy ratio. Thus, we hypothesize that the sign of Δ*mill rate* should be negative. School district enrollment influences both the cost of providing an education as well as the total revenue a school district can have under the revenue cap. Total allowable revenue decreases when enrollment decreases since the revenue cap is defined on a per student basis. Overall costs, on the other hand, do not change significantly with declining enrollment, since a lot of educational expenditures do not change when enrollment declines. Declining enrollment generally means that total allowable revenue decreases while total costs remain largely unchanged, at least in the short-run. Thus, if enrollment drops, we expect school districts to levy as close to the revenue limit as possible and we expect the sign of *Δstudents* to be negative.

With the exception of school districts that have overrode their revenue limits, the current revenue limit for each district is a function of its per student revenues in 1994, when the limits were first imposed, and any changes in enrollment. To capture these differences in initial conditions, we consider the revenue limit per member in 2002 (*limit*). Low revenue limit districts are able to increase per student revenues by a larger percent than high revenue districts. For example, in 2002, The legislature increased the per student revenue limit for all school districts by $227. This annual increase provided a larger percentage increase in the per student revenue limit, and hence in allowable revenues, in low revenue school districts than in high revenue districts.[7] We hypothesize that because school districts with lower values of *limit* face a more generous percentage increase in their revenue limits, they would be more likely to underlevy, implying that the coefficient on *limit* will be positive.

We also include a variable, *residshare,* indicating the share of each school district's assessed value of property that is residential. The higher the residential share of property values in a school

[7] As an example, at $5,997 per student, North Cape School District was one of the lowest revenue districts in 2001. If North Cape took full advantage of the legislated $227 increase in the revenue cap, they could increase their per student revenues by approximately 3.8 percent. In contrast, the same $227 per student increase allowed the Phelps School District, with 2001 per student revenues of $10,599, to increase its per student revenues by only 2.1 percent.

district, the higher that tax-price faced by local residents, and the more likely they will oppose increases in property taxes.

The amount of categorical aid from the state (*categorical*) may also influence how much a school district chooses to underlevy. There are about 25 categorical aid programs, the largest of which are for special education. Money from categorical aids is not counted under the revenue limit, and thus additional categorical aid frees up resources for other purposes suggesting that categorical aid should be negatively correlated with the levy ratio. On the other hand, the total allocation of categorical aids to individual school districts is in large part a function of the number of students with disabilities and qualified to receive special education. In Wisconsin, categorical aid only accounts for about a quarter of the costs associated with providing special education services to eligible students. The categorical aid allocation received by each school district may thus provide a measure of the special education funding liabilities imposed on each district. In this case, the coefficient on categorical aid would be positive; school districts that receive more categorical aid would underlevy less in order to cover the additional costs associated with its special education students.

It is well established in the educational finance literature that poverty increases the cost of providing an adequate education (Duncombe and Yinger, 1997; Duncombe and Yinger, 2005; Imanzek and Reschovsky, 2004). Consequently, school districts with a higher percentage of poor students might need to increase their levy ratio in order to raise enough revenue to provide an adequate education for all their students. However, there are also several reasons why a larger percentage of poor students could lead to a reduced willingness to increase property taxes.

First, school districts with higher poverty rates may have less revenue capacity. Additionally, the increase in foreclosures during the Great Recession have adversely impact the poor. The Annie E. Casey Foundation (2012) found that foreclosures have hit families with children and at-risk families particularly hard. By 2009, they found that more than 67 percent of low income children lived in

households where housing costs exceeded 30 percent of income. Thus, school districts with a larger percentage of students living in poverty may not be able to levy up to the maximum allowed under the revenue cap without putting undue fiscal stress on lower income families. Finally, school districts with a larger percentage of students who are poor may be more economically and socially diverse; hence residents (the median voter) may be more resistant to increasing property taxation. Thus the expected coefficient on *poverty* is indeterminate.

The final variable *city* is a dummy variable that classifies whether the school district is urban or rural. A school district is classified as *city* if the National Center for Education Statistics classifies the school district as either urban or suburban. While we do not have theoretical expectations regarding the sign of this variable, we are interested in exploring any heterogeneity in preferences that may be due to the urban or rural character of school districts.

Results

The Heckman model used in this paper divides our coefficients into two separate groups. In the first stage, we can interpret the coefficients as measuring the likelihood of a district underlevying. In the second stage, the coefficients explain how far from the maximum allowable levy a district chooses to set its actual levy.

As discussed earlier, ρ is the correlation between the residuals in stage one and the residuals in stage two. If ρ is statistically significant, then the Heckman selection model is an improvement over the simple OLS specification. ρ is one component of the likelihood function. However, due to the complexity of the likelihood function, as well as the necessity of constraining the value of ρ such that $-1 \leq \rho \leq 1$, $\operatorname{atanh}\rho = \frac{1}{2}\ln\left(\frac{1+\rho}{1-\rho}\right)$ and $\ln\sigma$ are directly estimated during the maximum likelihood process instead of ρ and σ; ρ and σ are then calculated from the estimates of $\operatorname{atanh}\rho$ and $\ln\sigma$ and the standard errors are derived using the delta method. As shown in table 2, ρ=.4,

atanhρ=.423, and is statistically significant at the 99 percent confidence level. Since testing for atanhρ=0 is the same as testing for ρ=0, we can infer that ρ is positive and statistically different from zero. The Wald test of independence between the selection and outcome equations also confirms that the Heckman selection model is preferable to a simple OLS specification.

The first stage results indicate that districts that previously increased their mill rates are more likely to underlevy. In effect, this result suggests that school districts that have recently increased their property tax rates will find it more difficult to raise property tax revenues, and thus are more likely to underlevy. We also find that school districts with a higher percentage of elderly residents are less likely to underlevy. This effect is net of controls for partisanship in the electorate. More work is needed to explore possible explanations for this relationship.

The lagged value of EQV per student is also statistically significant, suggesting that low EQV districts are more likely to underlevy. Our variable indicating years in which a school district has successfully overrode its revenue limit is surprisingly not statistically significant. Perhaps because changes in school district enrollment influence both the revenue limit and the allocation of General Aid, our change in student enrollment variable is not statistically significant.

In the second stage, we see some very interesting patterns emerge in the ability of our variables to explain the variation in the amount districts underlevy. Our first indicator, a measure of the number of students in the school district who are classified as economically disadvantaged has a large and negative coefficient. Consequently, the higher percentage of poor students in a district, *ceteris paribus*, the lower the district levy will be below the maximum allowable levy. This suggests that school districts with arguably higher resource needs are more likely to approve lower levies relative to the maximum allowable.

The coefficient on Δ *students* is negative and significant. This implies that if enrollment declines in the previous year, then a school district will underlevy less. Changing enrollments place fis-

cal pressure on school districts as they receive less overall state aid when enrollment declines. Consequently, when enrollment declines, school districts that chose to underlevy will need to contribute more local funding and thus underlevy less than districts that do not face declining enrollment. Additionally, the coefficient on the change in equalized value per student in the previous year is positive. This implies that losing more property wealth in the district also leads to a further underlevy.

The coefficient on categorical aids per student (*categorical*) is statistically significant and positive. This suggests that higher levels of per student categorical aid serve as a proxy for special education costs that are not met by state and federal aid and thus increase pressure to raise property tax levies. The coefficient on the change in millrate (Δ *millrate)* is also positive and significant. Recall that in stage one, the coefficient on the change in the millrate (Δ *millrate)* is positive and significant; this suggested that school districts that increased their millrate in the past are more likely to underlevy in the current period. The second stage results are puzzling, indicating that the same school districts that were more likely to underlevy due to an increase in mill rates in the past are also more likely to levy a higher share of their maximum allowable levy.

We also see that among schools districts that underlevy, those in areas classified as *cities* are more likely to levy closer to their maximum allowable amount than their rural counterparts. Our *residshare* variable is significantly negative at the 10 percent level. This suggests that school districts that are more residential (and thus with a lower share of commercial and industrial property) are more likely to have the lower levy ratios, reflecting the higher tax price faced by residents.

Some variables that we had a strong theoretical reason for including do not turn up as statistically significant—most notably the Republican vote share in the school district for the top of the ticket in the most recent statewide election. All else equal, we would expect that more Republican districts would have a more fiscally conservative electorate, and that this would create fiscal pressure on districts facing a reduction in state and federal spending that would lead them to underlevy.

However, this does not appear to be the case here. Several reasons for this are plausible and merit further study: 1) the electorate for school board and statewide office are sufficiently distinct that no comparison can be drawn between them; 2) school districts are already operating as fiscally conservatively as they can in the eyes of the electorate, and thus levy decisions are not viewed as a salient issue in local elections; or 3) Republican vote share of the top of the statewide ticket is too noisy of a measure of community fiscal preferences. The *limit* variable is also not statistically significant.

Conclusion

We have argued in this paper that in the future it is unlikely that local school districts will be able to rely on either the federal government or state governments for substantial increases in revenues. The result is that funding for the increasing costs of public elementary and secondary education the U.S. will have to come from local governments. Unless local governments develop alternative sources of revenue, school districts around the country will face growing pressure to expand their reliance on the property tax.

The property tax, however, has never been a popular tax. It is thus not surprising that state legislatures around the country have enacted provisions to limit the amount of property tax collected or the rate of growth of property tax revenues. One goal of this paper is to use data from one state, to explore the decisions by local school districts concerning property tax levies. We are interested in learning more about how property tax decisions of individual school districts have been influenced by the Great Recession, by declining property values, and increased political instability.

This paper reflects our quite preliminary analysis of the property tax decisions of Wisconsin's school districts based on a nine-year panel of data for nearly all of the state's 424 independent school districts. We have identified a mixture of community, fiscal, and educational factors that play a role in how school districts are able to respond to the pressures placed on them by changes in the economy and in the political environment. While structural and fiscal factors, such as changes in

mill rates and in per student property values, play an important role in explaining the property tax choice of individual school districts, the type of students served and the type of community a school district serves play perhaps, an even bigger role.

Of particular significance is our finding that districts with high rates of poverty are more likely to underlevy by a greater amount than districts that serve a less disadvantaged population. In practice, this means that as state and federal funding shrinks, communities with economically disadvantaged students appear to be less willing to raise property taxes, even relative to allowable revenue limits, and thus are left with fewer available resources to finance education. This pattern of funding will make it increasingly difficult to close the already large racial and income gaps in student achievement.

In future work, we plan to explore systematically the factors that lead some school districts to hold referenda to override the state-imposed revenue limits, and the factors that lead to success of these referenda in some school districts and failure in other districts.

We conclude by noting that even in 2010 and 2011, when the number of school districts choosing to underlevy rose dramatically, over 80 percent of Wisconsin's school districts chose to levy property taxes at their maximum allowable rate. One interpretation of this behavior is that despite declines in property values and a weak economy, there continues to be widespread support for public education and a willingness to finance public education using the property tax. On the other hand, the tightening of Wisconsin's revenue limits during this period meant that the majority of school districts could simultaneously levy to the maximum allowable level and reduce their annual levies. This pattern may possible continue. Governor Scott Walker's proposed 2013-15 biennial budget calls for no increase in the revenue limits combined with a one percent increase in general school aids, a combination that will result in mandated cuts in property taxes going forward.

Figure 1
Number of School Districts that Underlevy and Total Amount Underlevied, 2002-2012

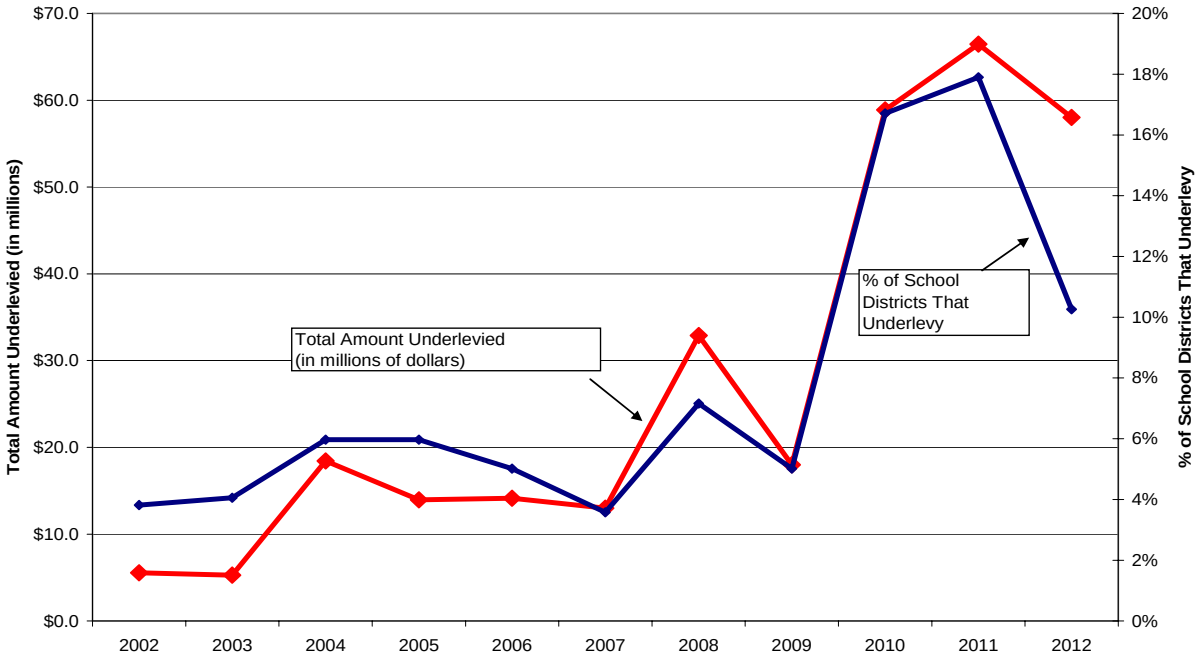

Table 1: Summary Table
Summary Statistics for Year 2007

Variable	Mean	Std. Dev.	Min	Max
poverty	25.86%	15.09%	0.00%	83.48%
Δ students	-2.00	106.28	-1901.00	325.00
limit	7693.73	916.91	6224.49	13062.80
Republican	48.20%	0.10%	17%	74%
elderly	15.17%	0.04%	7%	33%
Δ EQV	104.01	250.84	-47.65	2461.01
city	0.19	0.39	0	1
Δ millrate	-0.31	0.78	-4.04	4.52
residshare	72%	0.12%	40%	98%
categorical	0.55	0.34	0.06	2.41
underlevy	0.04	0.19	0	1
referenda	0.21	0.41	0	1
education	14.57%	0.07%	5%	41%
EQV Lagged	866069.40	1509484	179035.30	16600000

N=419

Table 2: Heckman selection model

		Coefficient		Robust Standard Errors
Stage 1	Δmillrate	0.260	***	0.04
"Selection Stage"	Δstudents	-0.00007		0.00
	Republican	0.329		0.28
	Elderly	-3.568	***	0.83
	Referenda	0.033		0.07
	Education	-0.856	*	0.48
	EQV Lagged	-0.00000009	**	0.00
	Constant	-0.823	***	0.23
Stage 2	Poverty	-26.228	***	0.05
"Outcome Stage"	Δstudents	-0.003	***	0.00
	Limit	0.00012		0.00
	Republican	1.864		3.82
	Δeqv	0.006	**	0.00
	City	5.551	***	0.73
	Δmillrate	3.169	***	0.71
	Residshare	-6.507	*	3.25
	Categorical	4.318	***	1.12
	Constant	92.045	***	5.14
	$\text{atanh}\rho = \frac{1}{2}\ln\left(\frac{1+\rho}{1-\rho}\right)$	0.423	***	0.08
	$\ln\sigma$	2.286	***	0.09
	ρ	0.400		0.07
	σ	9.833		0.84
	λ=ρσ	3.930		0.70

Wald test of independent equations. (rho = 0): chi2(1) = 26.16 Prob > chi2 = 0.0000

Significance at: p<.10*, p<.05** p<.01***

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