

Funding, Investment and Wealth Equalization Across Texas Public School Districts

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Abstract

We study how property-rich and property-poor districts respond to funding changes under a wealth equalization policy, using an instrument to exogenously identify funding changes. We find that property-rich districts reduce their tax rates and issue debt for capital expenditures after the state redistributes some of their funding to poorer districts. In contrast, when property-poor districts receive additional funding, this spending correlates with investments, such as employing more and better teachers, implying that properly recaptured and redistributed funds may increase quality in property-poor districts.

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1 Introduction

Despite being one of the biggest spenders on education per student in the world (OECD (2014a)), students score significantly lower on mathematics and reading assessments compared to other developed countries (OECD (2014b)). One potential driver of these differences might be differential access to resources in wealthy and less wealthy school districts. These differences contribute to achievement gaps across schools (Hanushek (2006a)). Could different allocations of funding across public schools help bridge achievement gaps between students throughout the United States (and thus the rest of the world)? To gain insight into how financial resources could be more efficiently allocated, we study how Texas school districts with different wealth levels invest funds. Specifically, we study how both property-rich and property-poor districts respond to increased funding under a wealth equalization policy, using an instrument to exogenously identify changes in wealth. We find that in Texas property-rich districts respond to a wealth equalization policy by reducing their tax rates and issuing debt for capital expenditures while property-poor districts respond to new funding by investing in teachers.

Texas offers an ideal setting to study allocation and investment of school funds. First, Texas public schools educate nearly 10% of all public school students in the United States (Imazeki and Reschovsky (2003)). Second, Texas school districts are independent units which provides a unique opportunity to study district revenue and investment decision-making. Districts generate revenue by directly taxing residents and have local superintendents who independently oversee expenditures. Third, Texas keeps detailed and complete data on district property wealth, taxation, revenue, expenditures, payroll and state-mandated district-wealth transfers. This data allows us to measure payroll, teacher headcount, teacher pay, teacher experience, and teacher education and consider changes in these measures as proxies for investment in quality. We study a rich 14-year panel of over 1,000 districts and focus on the top and bottom of the wealth distribution.

Texas has a wealth equalization policy, the Robin Hood Plan, designed to capture local

revenue from wealthy districts and to redistribute these funds to property-poor districts. We find that property-rich districts, having no incentive to collect revenue past the recapture point, respond strategically to this policy. Specifically, in the year after having funds recaptured, property-rich districts are 70\% more likely to lower their tax rates, thereby reducing recaptured funds. These districts also increase their debt, which is not subject to recapture, by 60% primarily order to fund capital expenditures, which can reduce recapture when spent on facilities.

Since funding and taxation decisions are endogenous, we use the number of horizontal wells—wells which were reactivated after the discovery of hydraulic fracturing—within a district to instrument for district tax revenue. School districts in Texas directly tax oil value. We find that the inception of a single horizontal well is related to a local revenue increase of 10% (around \$1000 per student). Other than through their impact on revenue, new horizontal wells should not affect the district tax level, debt or expenditure decisions. With subsample regressions of the first stage, we show that the instrument only has power in property-rich districts, meaning these estimates represent a local average treatment effect. The results confirm strategic behavior with respect to recapture in property-rich districts but tells us nothing about property-poor districts.

Next we provide suggestive evidence that the strategic behavior of property-rich districts limiting recapture matters. First, we show that property-rich districts raise more revenue and spend more per student even after wealth equalization, suggesting that wealth equalization is not complete. Second, property district wealth is positively correlated with several proxies for academic quality, such as overall payroll, teacher count, teacher pay and teacher subject concentration, implying at least in the cross-section the differences in spending matter. Third, we show that changes in funding are positively correlated with changes in these proxies for quality suggesting that when property-poor districts receive additional funding, they invest in becoming more like property-rich districts. While districts in the top decile have a relationship between funding and changes in quality that is indistinguishable from

zero, a 10% increase in revenue to a bottom decile district corresponds with economically and statistically significant increases in quality, such as a 5% increase in payroll, a 3.5% increase in teacher count, a 0.4% increase in teacher pay and a 3.5% drop in the subjects taught by a single teacher. Taken together these findings suggest that the strategic behavior of rich-districts negatively impacts the poorest districts, which might invest recaptured funds to become more like property-rich districts.

Our work has two policy implications that apply to public education funding within Texas and more broadly in the United States. First, if districts are capital constrained and can put new funds to good use, then governments should strongly consider policies to improve school funding. Second, if funding heterogeneity exists, then wealth equalization policies should not create perverse incentives limiting redistribution.

2 Literature Review

Since Texas educates so many of the nation's students, education policy is heavily debated in the state and in the literature (Patterson (2004), Hanushek (2003), Hanushek (2010), Imazeki and Reschovsky (2003), Vedder and Schlomach (2005), for example).¹ Hoxby and Kuziemko (2004) predict the demise of Texas' Robin Hood Plan based on poorly aligned incentives for richer districts and predict that the wealth equalization plan will not be optimal as a result. We build upon this work by instrumenting wealth at the district level with a strong instrument to quantify the extent of strategic behavior and predict the implications of this

¹Imazeki and Reschovsky (2004) use data from Texas to understand the additional costs of implementing new standards under The No Child Left Behind Act of 2001, finding that the costs of reaching these new standards substantially exceed the additional federal funding. Cortes and Friedson (2010) study the impact of Texas' top 10% rule on property tax values, finding that households reacted strategically to this policy by moving to neighborhoods with lower-performing schools, increasing property values in those areas, and that these strategic reactions were influenced by the number of local schooling options available: areas that had fewer school choices showed no reaction to the Top 10% Plan. Plummer and Pavur (2009) use the establishment in 1993 of a maximum 1.5 percent property tax for use of funding on maintenance and operations in Texas to understand the short and long-run impacts of the resulting changes in school funding. They find that some districts helped cushion the rate limits impact on their expenditures with funding from debt-related tax revenues and that for districts that did not, student test scores are lower and the rate limit causes a persistent decrease in school quality.

behavior for school quality. Hyman (ming) and Zimmer and Jones (2005) study the impact of a similar reform in Michigan—Proposal A—which boosts funding in lower spending districts without decreasing funding by higher spending districts. This reform differs from the Texas reform in that it does not take funds from wealthier districts to improve poorer district funding. Zimmer and Jones (2005) find that wealthier districts become more reliant on debt financing. Hyman (ming) looks at the long run effects of the reform on educational attainment and finds that students exposed to an additional \$1000 of per student per year funding experienced a 3.0 percentage point increase in college enrollment and a 2.3 percentage point increase in degree receipt.

A parallel issue to school funding is how districts achieve equality in school quality (Corcoran et al. (2008) and Corcoran and Evans (2008), for example). One goal of school reforms is to increase the quality of low-performing schools. Many papers investigate these ideas.² Lafortune et al. (2016) use an event study design to look at the impact of school finance reforms in the 1990s on low income schools. Specifically, they find that as a result of reforms, schools reduce class sizes and renovate buildings that are in poor shape. Our findings that the Robin Hood Plan decreased class sizes in property-poor districts are consistent with these. Lafortune et al. (2016) also finds that increases in achievement resulting from reforms take time to appear. Confirming these results under the Texas reform is beyond the scope

²For example, Hanushek and Lindseth (2009) investigate the school funding and achievement puzzle, tracing the history of school reform efforts and concluding that the principal focus of both courts and legislatures on ever-increasing funding has done little to improve student achievement. Similarly, Hanushek (2006b) provides a meta analysis of papers using court cases to reallocate school funding, finding that no approach can provide a reliable answer to the question “how much do adequate schools cost?” Hill and Kiewiet (2014) find that in California, court-case induced equalization reforms (e.g. *Serrano v. Priest* 1971) do not help diminish the strong, persistent association between the wealth of a school district and educational quality. Murray et al. (1998) conclude that equalization decisions lead to both lower levels of inequality and higher per-pupil expenditures. Hill and Kiewiet (2011) find that these results are not robust to additional data and specifications, finding that court rulings in California might have reached the limit of achievable equalization. Nechyba (2006) looks at state finance policies of two varieties: funding traditional local public schools and channelling funds to school entrepreneurs. Nechyba (2006) concludes that state policies should aim for a balance between the two types of policies to address equity concerns. Plummer et al. (2007) look at the risk of default among school districts using the information relevance of governmental financial statements published under Governmental Accounting Standards Board Statement No. 34 (GASB No. 34). For their sample of school districts, evidence suggests that information from the government-wide Statement of Net Assets and a measure of modified-accrual earnings provide the best information for explaining default risk.

of our paper.

3 Texas Public School Districts

We begin by outlining characteristics of districts and their funding which make them ideal to study.

3.1 District Independence

In Texas, almost all school districts are independent.³ This means that districts are separate governing entities encompassing all elementary, middle and high schools within a defined geographic area which are not controlled by a municipality, county or state. Districts are run by elected school boards who have full authority to hire and fire superintendents who have spending authority.⁴ This provides heterogeneity in funding and spending both across districts and over time.

3.2 District Taxation

All business and residential property within the school district are subject to property taxation. Each year, a property is assessed and a market value is assigned. The district chooses a tax rate and collects a levy which encompasses the districts local funding.

The tax rate is comprised of two individual rates, Maintenance & Operations (M&O) and Interest and Sinking (I&S). M&O rates are subject to state level controls while I&S rates have local flexibility. The combination of the two results in significant heterogeneity across time and districts. Rates are set through votes and both boards and residents can put rate

³http://en.wikipedia.org/wiki/Independent_school_district

⁴Texas teacher unions are some of the weakest in the nation which facilitates heterogeneity of teacher employment outcomes. Texas prohibits collective bargaining across districts and the Texas State level National Education Association and American Federation of Teachers facilitates have the 2nd least resources per teacher in the nation. <http://www.edexcellencemedia.net/publications/2012/20121029-How-Strong-Are-US-Teacher-Unions/20121029-Union-Strength-Texas.pdf>. As of November 14, 2014.

increases or decreases on the ballot. Districts can also control taxation levels by providing homestead exemptions to offset tax increases in times of rising home prices.

In 2006, Texas passed a property tax relief law which was modified in 2009 and 2011. This greatly reduced M&O tax rates and provided a new structure for funding.

3.3 School Funding

Texas district funding is complex and outlined in detail on the Texas Education Agency (TEA) website.⁵ We simplify the mechanisms below, including only the elements and features relevant to this study.

Texas law mandates that districts receive equal access to revenue per student, considering all state and local tax revenues after acknowledging student and district cost differences.⁶ To determine the level of funding, each district calculates the weighted average daily attendance (WADA) by counting the number of students who show up to school each period. Enrollments are adjusted for several factors including: needs for special education, pregnancy related services, career and technical education, English as a second language, gifted and talented education, public education grants, transportation and military dependents. There are also adjustments made for school size and for some capital expenditures like the creation of new instructional facilities. Based on the districts' WADA, the state determines a funding level for the district.

Figure 1 is from the TEA handbook on school funding and outlines the framework for district funding. The horizontal line—\$59.97—is the required level of funding per WADA. The lower boxes are the local share while the higher boxes are the state share. The first district generates very little local revenue so the state fills in the gap. The third district generates too much revenue so the state recaptures funds. The policy of recapturing funds from the property-rich schools and redistributing to property-poor schools is the Texas Robin Hood

⁵http://tea.texas.gov/Finance_and_Grants/State_Funding/Chapter_41_Wealth_Equalization/Chapter_41_Wealth_Equalization/

⁶Texas Education Code, 42.001(b)

plan.

[INSERT FIGURE 1 HERE]

Figure 2 below shows a more complex representation of the tax scheme.

[INSERT FIGURE 2 HERE]

The horizontal axis is the M&O rate after the property tax relief bill of 2006. A district is free to choose any rate above \$1.00. Districts choose rates at or below \$1.17 because any funds generated above this M&O rate are recaptured. To a certain level up to the first \$1.00 a district can keep all its own funds. If a district can not cover its own Tier 1 demand, the state fills in the gap (the rest of the green box). The system allows for districts to set tax rates and keep a portion of local revenues. For example, the first 6 cents of taxation above \$1.00 are kept in full by the district. As a result, most districts have at least a tax rate of \$1.06. The district keeps a percentage of the next 11 cents. If the Tier I limit is met, the remaining funds are recaptured.

4 Data

4.1 Income Statement Data

Our primary data are district level income statements compiled from the Texas Education Agency. For each district from 2000-2013, the dataset contains a breakdown of the four revenue sources: local, state, federal and other revenue.⁷

Figure 3 provides a snapshot of the revenue side of the income statement for one district year. Available spending for districts to spend is called revenue. Funds collected by the districts are called receipts. The difference is that receipts include equity transfers which are the funds recaptured by the state.⁸

⁷Where other revenue is defined as local revenues realized as a result of services rendered to other school districts.

⁸We focus on “All Funds” and not “General Funds” as our interest is in total funding available to the district.

[INSERT FIGURE 3 HERE]

Figure 4 shows the breakdown of expenses from the same income statement. Total expenditures are broken into payroll expenses, other operating expenses, debt services and capital outlays.⁹

[INSERT FIGURE 4 HERE]

4.2 Property Tax Data

We compiled school district level property tax data from the Texas Comptroller's office.

[INSERT FIGURE 5 HERE]

In each year, observations are by taxing-unit. Taxing-units are mapped to districts with some aggregation. The key variables are market value, taxable value, maintenance and operations (M&O) rate, interest and sinking fund (I&S) rate, total rate, and levy. Market value is the sum of all assessed property value within the district. This is the primary measure of district wealth. Largely due to caps on tax increases in times of rising prices (homestead exemptions), the entire market value of a property is not taxable, so the relevant tax base is the taxable value. Importantly, we have measures of M&O rates which make up tier 1 funding and I&S rates which fund facilities. The total rate is the weighted sum of both and is used to calculate levies and available local revenue for the district. Levy is the taxable value multiplied by the levy rate. Market value and taxable value are self-reported rates from the comptroller's office and levy is calculated.

Levy is highly correlated with the sum of local revenue plus equity transfer from the income statement data. Data was merged on common district identifiers.¹⁰

Figure 6 plots the time series of the major variables from the main dataset.

[INSERT FIGURE 6 HERE]

⁹Other operating costs includes all non-payroll operating costs including but not limited to professional and contracted services and supplies and materials.

¹⁰In cases where there are multiple observations for one taxing unit, we use taxable value weighted averages for Rate.

The solid lines (left axis) are the market value and taxable value per student. The dashed lines are the levy, revenue and expenses per student. Texas property values have increased over time. While the growth slowed during the Great Recession, values still increased. The effect of the property tax relief act occurred just before the recession. First, market value and taxable value start to diverge as the increase in owners' taxable bases were limited. Second, most districts lowered base property tax values from 1.5% to 1% as seen in the kink in levy per student. While districts could still raise I&S rates, there was a reduction across the board. Finally, revenue and expenses per student move together until towards the end of the sample when they diverge. This divergence is due to districts greatly increasing their debt issuance so that funding stays the same (proceeds from debt sales are not considered revenue) while expenses (due to debt service payments) increase.

4.3 Teacher Data

Investment proxies for quality come from a third dataset also from TEA. This data contains information on all public school employees for 11 of the 14 years in the sample.¹¹ At the district level, we compute total payroll, teacher count, pay per teacher, pay per non-teacher, students per class ratios, percentage of teachers with advanced (Masters or PhD) degrees, average teacher qualities such as experience, tenure and age, the average subjects a single teacher teaches (a proxy for a teacher's ability to focus on one subject), and spending on management such as superintendents and principals.

While these proxies do not directly measure improved student outcomes such as test scores, graduation rates or college admissions, they are reasonable proxies for quality investments. Determining the highest return to investments is outside of the scope of this paper; however, improving along these dimensions are proxies for good management.

¹¹Only about half of all public school employees are teachers and most non-teachers are teacher's aides.

4.4 District Characteristics

Our panel consists of 1035 districts.¹² The average district includes 7 schools and enrolls 4310 students. Districts collect \$10,600 per student and spend \$11,200 per student on average. Of that \$10,600, districts collect \$5000 locally and keep \$4000, transfer almost \$1000 and receive almost \$5000 back from the state. Payroll is the largest expense but interest on debt and capital expenditures are also large. We report summary statistics in the rest table of the Appendix.

4.5 Recapture Data

We collect data from the Texas Education Agency on funding recaptured from property-rich districts. We merge this data at the district level with income statement data to verify that recapture correlates highly with equity transfer. Less than 10% of districts have funds recaptured and the amount recaptured is only sizeable for the wealthiest districts.

4.6 Oil Data

We obtained data on all oil wells in the state of Texas from Drilling Info. We only include horizontal wells which result from newer technology and capture more unexpected oil findings and wealth. We map each well to its nearest district based on their latitude and longitude. Then, we sum the total number of active wells in each year for each district. We use the time series of horizontal wells within a district to instrument for district revenue because district revenue might be endogenous.

5 Empirical Strategy

Our main results investigate the impact of the Robin Hood Plan on tax rates in property-rich districts. That is, we are concerned with how districts change their tax rates in response to

¹²Most of these districts are in all 14 years of the sample.

having funds recaptured. Because tax rates are endogenous, we instrument district revenue with new oil reserves discovered under hydraulic fracturing. Our main results are presented using two stage least squares estimates. In the first stage, we estimate the impact of new wells, λ , on revenue in district d at time t , while controlling for district and time fixed effects.

$$\text{revenue}_{dt} = \delta + \lambda \text{wells}_{dt} + X_d + \phi_t + \nu_{dt} \quad (1)$$

In the second stage, we estimate the impact of revenue estimated in the first stage on the local tax rate in district d and time t , while controlling for district and time fixed effects. Standard errors are clustered at the district level. Here, we care about the coefficient on revenue, β , which tells how the tax rate changes with revenue.

$$\text{tax rate}_{dt} = \alpha + \beta \text{revenue}_{dt} + X_d + \gamma_t + \epsilon_{dt} \quad (2)$$

This estimation strategy relies on the instrument, wells, being highly correlated with revenue but not impacted by the factors which make revenue endogenous. In the first stage, we establish a strong relationship between revenue and wells (instrument relevance). Since the application of hydraulic fracturing is not related to tax policy, we would expect that the instrument meets the exclusion restriction. We discuss both of these conditions in detail in the results section.

In addition to estimating the impact of revenue on tax rates for the whole sample, we look within the wealthiest districts to understand the local average treatment effect (LATE) on those districts most likely to change their tax rates in response to the Robin Hood Plan.

Finally, we investigate the impact of increased spending under the Robin Hood Plan on poorer districts' spending on proxies for school quality, like smaller class sizes and more educated and experienced teachers. We walk through each approach in turn below.

6 Results

6.1 Strategic Behavior of Property Rich Districts

We provide empirical evidence that property-rich districts strategically minimize recaptured funds under the Robin Hood Plan. These main results are found in Table 1.

[INSERT TABLE 1 HERE]

The variable of interest, funds recaptured, is equal to 1 in years in which a district has funds recaptured and equal to zero otherwise. As shown in Column 1, in years with recapture, districts have tax rates 3 basis points lower compared with those same districts in years with no recapture. Since districts choose rates between 1% and 1.17%, a change of 0.3% is economically large.

In Column 2, we run a logistic regression where the dependent variable is a dummy which equals 1 if the district lowered taxes in the following year. We find that within the top decile of property wealth being a district that has funds recaptured makes you 59% more likely to lower your taxes, controlling for the log of revenue, expenses and enrollment.¹³ We restrict the sample to those districts that experience at least one change in recapture status by removing any districts that always have funds recaptured or never have funds recaptured. In Column 3 we run a placebo on past taxation changes in order to rule out tax trends unrelated to recapture.

In Columns 4 and 5 we show the effect of having funds recaptured on districts issuing debt and increasing capital expenditures. Results indicate that districts have almost 60% higher debt expense and 29% higher capital expenditures.¹⁴ This is important because proceeds from debt are not subject to reclamation under the Robin Hood Plan.

All of these regressions are run with district fixed effects. As a result, the variation in the independent variable comes from districts who have some years with recaptured funds

¹³Due to rounding in tax rate calculation, a drop has to be at least 1 basis point to be considered material.

¹⁴We observe debt expense not total debt. This is a reliable proxy for total debt because districts have minimal default risk so rates do not vary. Additionally, property-poor districts likely have a higher default rates than property-rich ones, which could only bias against the results.

and some years without as opposed to districts that never or always have recaptured funds.

We test the results of the tax relief act directly because it could be that much of the variation driving these results is a consequence of districts resetting their taxes. Table 2 uses a difference-in-difference approach to compare wealthy districts who have had funds recaptured prior to the tax law change to districts that have not but are not property-poor (market value deciles 5-10).

[INSERT TABLE 2 HERE]

The important takeaway here is that districts who previously had funds recaptured reduce their tax-rates by over 2 basis points which coincided with a 23% drop in funds recaptured. Consistent with the above results, having funds recaptured before the policy change is consistent with large increases in debt and capital expenditures (80% and 40% respectively). Even with lower tax rates, property rich districts were able to increase revenue, payroll and teacher counts.

6.2 Oil Data as an Instrument for Changing District Wealth

How worried should we be that our results are endogenous? The strategic behavior results could be consistent with other stories. For example, it could be that within districts, the electorate changes over time in a manner that makes it more likely to reduce tax rates and fund new capital expenditures of schools with new debt independent of recapture, while also driving property values up. If this happens simultaneously with the law changes, our results may be upwardly biased. To mitigate these sorts of concerns, we exploit oil shocks which provide exogenous windfalls of funds to schools. While Texas has a long history as an oil producer, new technology has revived older, dry wells. Through hydraulic fracturing, existing wells are horizontally drilled to access new oil reserves. Oil value is directly taxed by school districts. Using latitude and longitude we map active horizontal wells to school districts and use the number of active horizontal wells as an instrument for district revenue.

[INSERT TABLE 3 HERE]

In Table 3, we run a series of two stage least squares (2SLS) regressions where the independent variable of interest is the log of the district’s local tax levy instrumented by the log of the number of wells within a district. Column 1 presents the first stage results, showing an increase in horizontal wells increases the local tax levy to school districts. One extra well is associated with an almost 10% increase in revenue collected from a district. This is an increase in \$1000 per student for the wealthiest districts in Texas which collect \$8000 dollars per student. The first stage F-Test provides evidence that the instrument is highly relevant. Other than through revenue, oil wells should not affect district taxation and debt decisions. Thus, our instrument satisfies the exclusion restriction. We test the results above using this clean source of variation in revenue.

Consistent with our results above, districts with oil windfalls lower their tax rates by 11 basis points. As shown in Columns 3 and 4, these districts have large increases in debt and capital expenditures. Finally, as shown in Columns 6 and 7, while these districts did increase spending, they reduce spending on teachers.

Because our study considers heterogeneity in the cross section of districts, it is essential to think about the local average treatment effect (LATE). We show in Table 4 that our shock affects richer districts much more than poorer districts. With some subsample regressions of the first stage, we show that the instrument only has meaning for property-richest districts. This is important because these regressions point to districts behaving strategically and not being capital constrained. However, if the property-poor districts changed their taxation behavior, it would be puzzling since these districts are not subject to recapture.

[INSERT TABLE 4 HERE]

6.3 Are Property-Poor Districts Capital Constrained?

In Figure 7 below, we divide the districts into deciles (market value categories) based on market value per student (1 being the poorest, 10 the richest) redefined annually. We plot the average total revenue and the average total expenses. Revenue is broken into four

sources: local, state, federal and other. Expenses are broken into four categories: payroll, other operating, capital expenditures (capex) and debt expense.

[INSERT FIGURE 7 HERE]

[INSERT TABLE 5 HERE]

Figure 7 and Table 5 show that the levy is monotonically increasing in property wealth. The poorest decile collects under \$2,000 per student while the wealthiest collect over \$18,000 per student. Note that this is in spite of both the tax rate and the implied rate (levy over market value) being monotonically decreasing.¹⁵ Under the Robin Hood Plan, excess local funds are recaptured by the state as equity transfers per student. The majority of districts had no funds recaptured while the wealthiest districts had on average over \$8,000 recaptured per year. After recapture, local revenue (levy less recapture) is still monotonically increasing in market value category. In contrast, state revenue per student is monotonically decreasing by market value category with poorest districts receiving substantially more than property wealthy ones.¹⁶ The result is that funding is relatively uniform per student for the bottom five deciles, but still increasing for the top five deciles. Total expenses are highly correlated with total revenue and therefore also increasing with property wealth. This implies that wealth equalization under the Robin Hood Plan reduces but does not eliminate funding heterogeneity. This is the first key finding.

[INSERT TABLE 6 HERE]

Table 6 shows that the funding heterogeneity shown above has material effects. Along the same market value categories, we investigate the impact of funding on four measures considered consistent with school quality. Students per class is defined as the average number of students assigned to each teacher.¹⁷ Percentage of teachers with advanced degrees is defined as the number of teachers with a masters or a PhD divided the number of teachers

¹⁵There are two primary drivers of the implied rate being lower than the statutory one. First, when property values increase, only a portion of the increase is taxable. Second, some districts are more effective at collecting tax than others.

¹⁶Recapture is sometimes greater and sometimes less than the State Revenue implying that some districts still on net get state funds while others subsidize the state.

¹⁷This also includes other roles teachers are paid for like coaching.

in a district. Teacher experience is the average number of years a teacher has been working as a teacher (in any district). Finally, pay per teacher is the average total pay (not including benefits) an individual teacher receives. The first three—class size, teacher education and teacher experience—all increase in quality as property wealth increases. This is the second key finding: property-wealth is positively correlated with proxies for quality. Since property-poor districts may spend money differently because their students have different needs, this might not imply that schools are unequal.

[INSERT TABLE 7 HERE]

In Table 7, we run log on log regressions to isolate investment and revenue sensitivities. We include district fixed effects to understand how districts respond to funding changes and year fixed effects to account for Texas' growth trend throughout the sample. We also cluster standard errors by district. Schools spend more money, hire more teachers at slightly higher pay rates and hire more educated and experienced teachers. Districts also reduce the number of subjects taught by teachers, which could improve efficiency by allowing teachers to specialize. In the last three regressions, we show that schools spend funds in ways that may not be as beneficial to student achievement. Districts increase pay to their superintendents and top administrators and increase athletic spending when they have more revenue to spend.¹⁸

[INSERT TABLE 8 HERE]

In Table 8, we split results into quintiles and present the top and bottom quintiles using the same market value categories. Property-poor districts and property-rich districts respond to new cash by increasing spending. Poor districts payroll expense is significantly (economically and statistically) more sensitive to new revenue than that of rich districts. Similarly, property-poor districts add more teachers, increase their pay more and have teachers teach less subjects. This provides the third key finding: property-poor districts invest more in measures which proxy for quality.

¹⁸We define administrators as superintendents, assistant superintendents, principals, assistant principals, and other non-teachers with similar wage profile.

These three results together provide evidence that poor districts are capital constrained and the strategic behavior by rich districts has real effects. First, in spite of wealth equalization, property-poor districts spend less per student than property-rich districts. Second, property-wealth is associated with higher levels of quality. Finally, property-poor schools' spending is more sensitive to funding shocks along those measures of quality. Together, this is evidence that property-poor schools are capital constrained and would use funding in beneficial ways.

7 Conclusion

We study how Texas school districts with different wealth levels invest funds in order to understand how districts use school funding. Specifically, we study how both property-rich and property-poor districts respond to increased funding under wealth equalization policy, using an instrument to exogenously identify changes in wealth. We find that property-rich districts respond to wealth equalization policy by reducing their tax rates and issuing debt for capital expenditures while property-poor districts respond to new funding by investing in teachers and other proxies for quality.

The Robin Hood Plan is a wealth equalization policy in Texas designed to capture local revenue in excess of an established level from wealthier districts and redistribute these funds to poorer districts. We find property-rich districts respond strategically to this policy in ways that reduce recaptured funds. Specifically, in the year after having funds recaptured, property-rich districts lower their tax rates thereby reducing recaptured funds and issue debt to fund new capital expenditures, which are not subject to recapture under the Robin Hood Plan. We show that for districts in the top decile there is little relationship between funding and changes in quality whereas in the bottom decile a 10% increase in revenue corresponds with economically and statistically significant increases in quality such as a 5% increase in payroll, a 3.5% increase in teacher count, a 0.4% increase in teacher pay and a 3.5% drop

the subjects taught by a single teacher. We conclude the strategic behavior of rich-districts negatively impacts the poorest districts, who could invest recaptured funds to become more like property-rich districts.

To address endogeneity, we use the number of horizontal wells within a district to instrument for district tax revenue. We show that an increase in horizontal wells is related to an increase in tax revenue for school districts. In particular, the inception of a single horizontal well is related to a local revenue increase of 10% (an increase of around \$1000 per student). Outside of revenue, wells should not affect district tax level, debt or expenditure decisions.

Our work has two policy implications for public education funding within Texas and more broadly in the United States. First, if districts are capital constrained and can put new funds to good use, governments should strongly consider policies to improve school funding. Second, if funding heterogeneity exists, wealth equalization policies should not create perverse incentives limiting redistribution.

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A Figures

Figure 1: Simple Model of Funding and Recapture

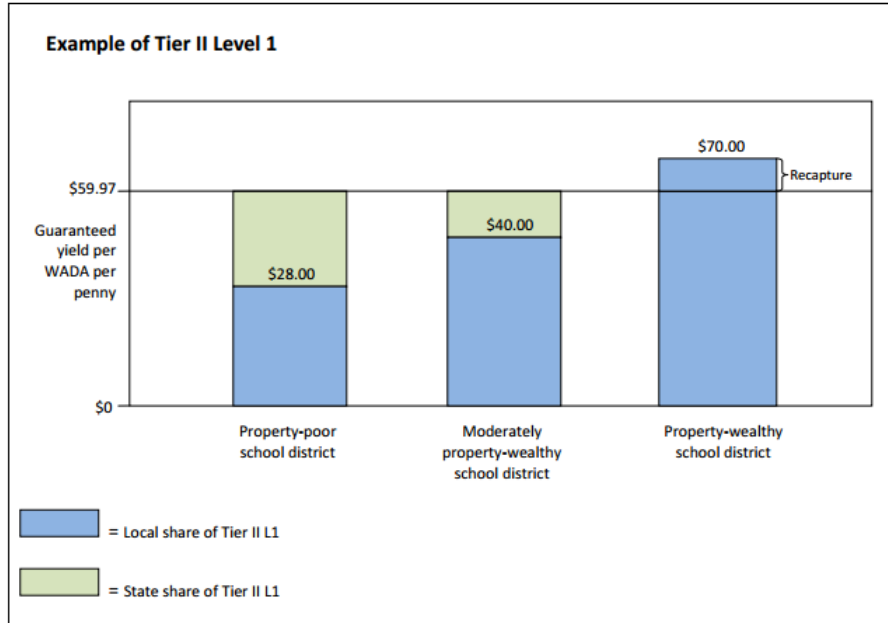


Figure 2: More Detailed Model of Funding and Recapture

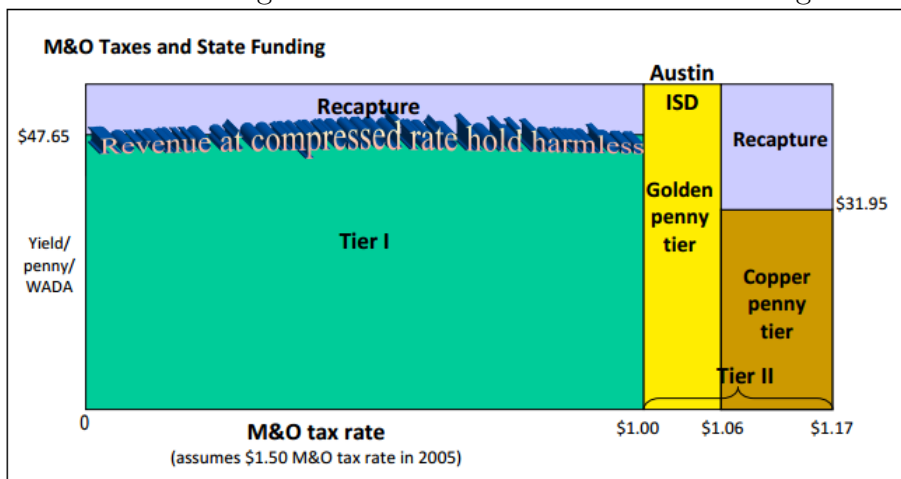


Figure 3: Income Statement–Revenue

	<u>District</u>					
	General Fund	%	Per Student	All Funds	%	Per Student
Receipts						
Total Revenue	684,182,349	100.00%	7,934	931,639,616	100.00%	10,804
Local Tax	554,155,420	81.00%	6,426	655,957,425	70.41%	7,607
Other Local and Intermediate	6,985,888	1.02%	81	21,067,141	2.26%	244
State*	101,842,960	14.89%	1,181	106,915,944	11.48%	1,240
Federal	21,198,081	3.10%	246	147,699,106	15.85%	1,713
* State Fiscal Stabilization Fund	0	0.00%	0	0	0.00%	0
* This amount represents the amount of Foundation School Program funding that was financed by Federal State Fiscal Stabilization Fund funds distributed under the American Recovery and Reinvestment Act of 2009. This funding is included in the state category of the total revenue reported above.						
Total Receipts	805,963,899	100.00%	9,346	1,169,913,296	100.00%	13,567
Total Revenue	684,182,349	84.89%	7,934	931,639,616	79.63%	10,804
Equity Transfers	120,069,626	14.90%	1,392	120,069,626	10.26%	1,392
Total Other Resources	1,711,924	0.21%	20	118,204,054	10.10%	1,371

Figure 4: Income Statement–Expense

Disbursements						
Total Expenditures						
BY OBJECT	691,680,927	100.00%	8,021	987,772,307	100.00%	11,455
Payroll	590,541,701	85.38%	6,848	690,894,468	69.94%	8,012
Other Operating	99,469,098	14.38%	1,153	149,578,504	15.14%	1,735
Debt Service	812,565	0.12%	9	97,084,073	9.83%	1,126
Capital Outlay	857,563	0.12%	10	50,215,262	5.08%	582

Figure 5: Tax Data

CAD #	CAD Name	Taxing Unit #	Taxing Unit Name	Market Value	Taxable Value	M&O Rate	I&S Rate	Total Rate	Levy
001	Anderson	001-000	Anderson County	3,065,459,421	2,317,821,292	0.458900	0.052100	0.511000	11,841,494
001	Anderson	001-902	Cayuga Independent School District	480,392,005	339,300,459	1.040000	0.000000	1.040000	3,529,896
001	Anderson	001-903	Elkhart Independent School District	304,958,029	183,040,768	1.170000	0.000000	1.170000	2,147,293
001	Anderson	001-904	Frankston Independent School District	360,362,889	264,130,617	1.040000	0.056000	1.096000	2,894,872
001	Anderson	001-906	Neches Independent School District	154,678,869	98,563,369	1.040000	0.278000	1.318000	1,301,450

Figure 6: Time Series of Tax and Income Statement Data

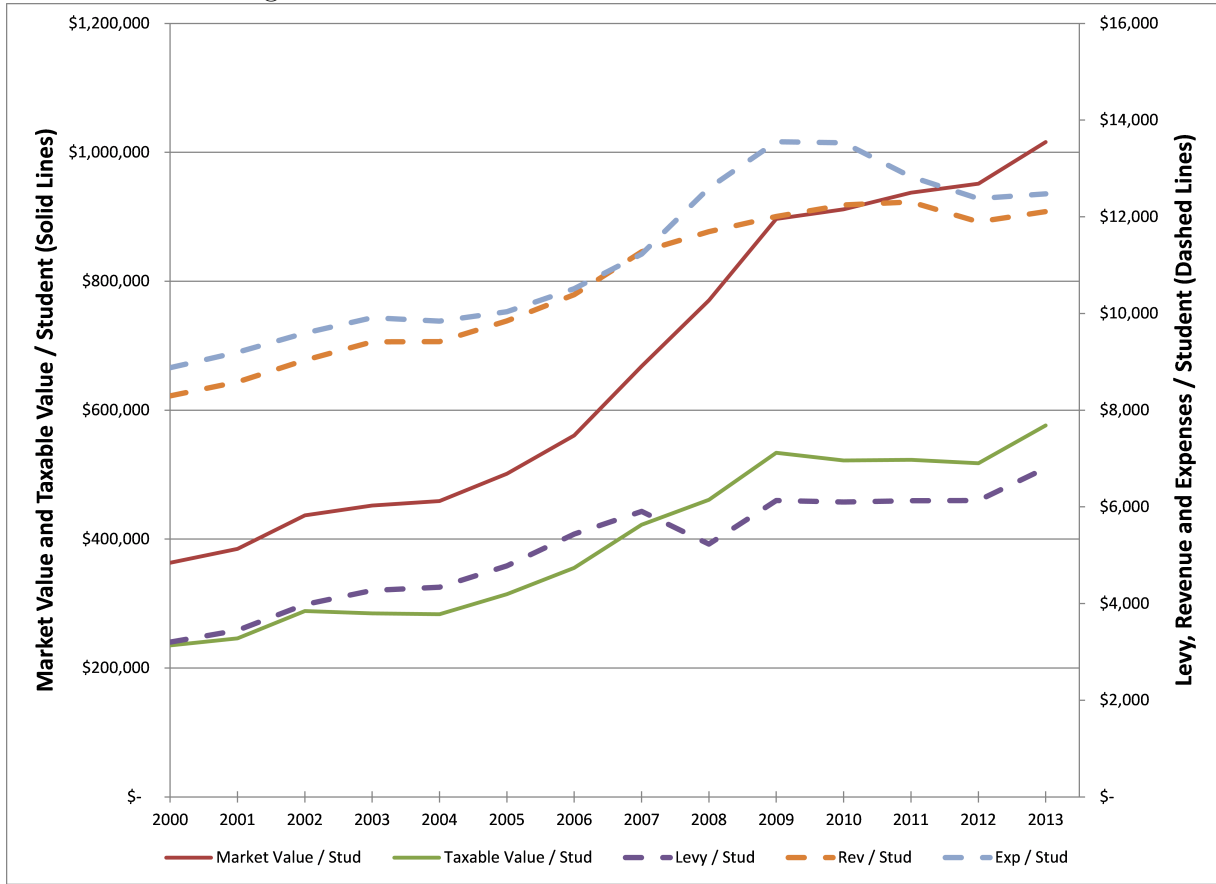


Figure 7: Revenue Sources and Expenses by Market Value Categories

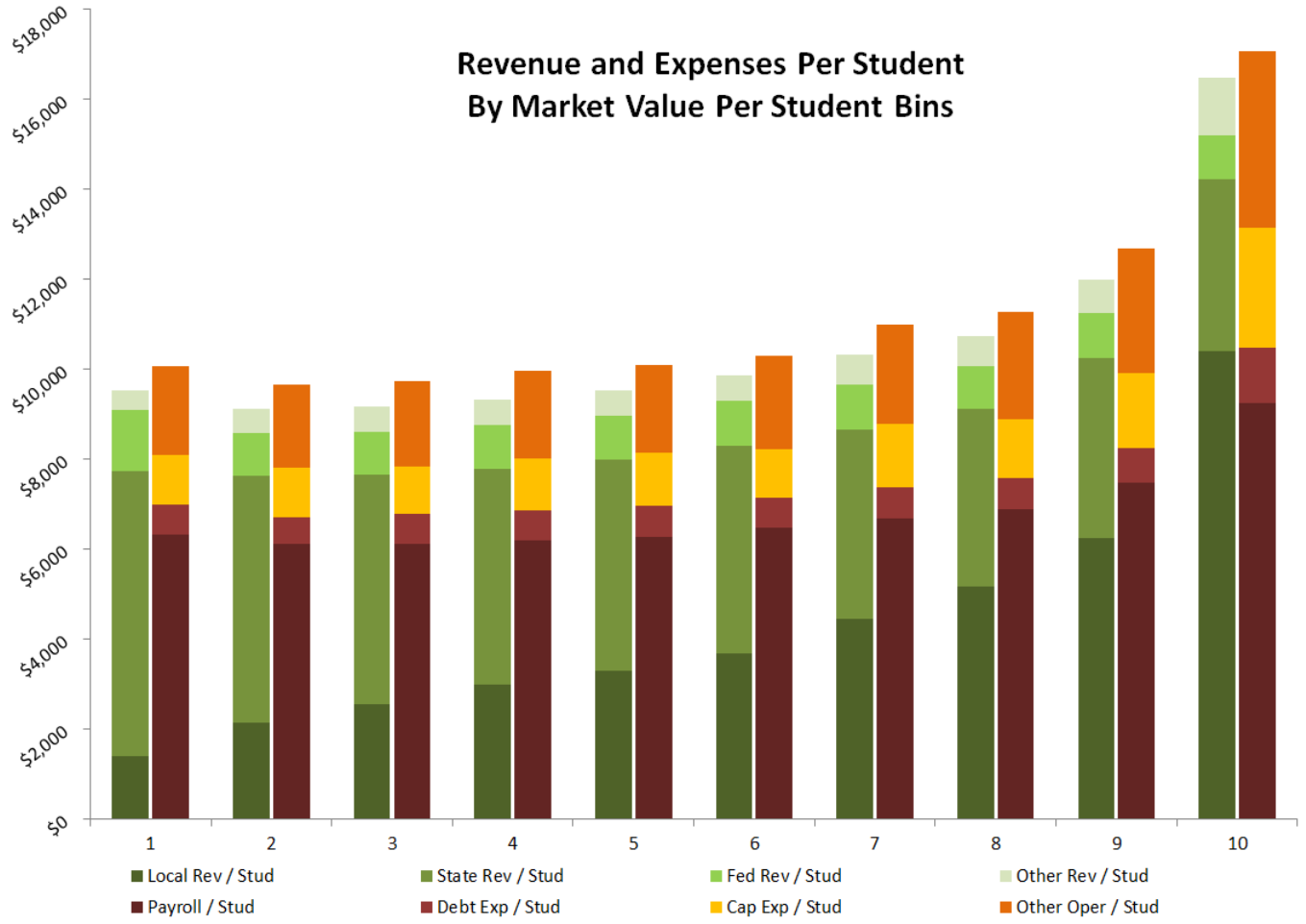


Table 1: Property Rich District Strategic Behavior

	(1)	(2)	(3)	(4)	(5)
	Tax	Lower Tax	Lower Tax	Debt	Capital
	Rate	Rate	Rate	Expense	Expense
		Next Year	Prev Year		
District has Funds Recaptured	-0.0317*** (-4.392)	1.586*\$ (1.846)	1.019\$ (0.0764)	0.592** (2.544)	0.285** (2.116)
Total Revenue	0.0727*** (3.843)	2.999** (2.137)	0.170*** (-3.735)	5.403*** (9.451)	4.805*** (15.55)
Total Expenses	0.0958*** (16.30)	1.334 (0.591)	2.593*** (2.987)		
Total Payroll Expenses				-3.962*** (-6.053)	-2.420*** (-6.100)
Total Other Expenses				-0.470** (-2.273)	0.296* (1.874)
Enrollment	-0.0405** (-2.330)	0.262*** (-4.615)	2.067* (1.805)	0.598 (0.957)	-0.198 (-0.556)
Observations	14,400	712	606	14,400	14,395
R-squared	0.869			0.750	0.562
Market Value Cat	All	10	10	All	All
Rich Change Filter	No	YES	YES	NO	NO

Regressions include year and district fixed effects.

Standard errors are clustered at the district level.

Expense, revenue and enrollment variables in logs.

\$Result from logistic regression. Odds ratio displayed.

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

Table 2: Tax Policy Affect on Strategic Behavior

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Tax Rate		Log Equity Transfer	Log Debt Expense	Log Capital Expense	Log Total Revenue	Log Payroll Expense	Log Teacher Count
Recap Before '06 X Post '06	-0.0231** (-2.042)	-0.235 (-0.595)	0.801* (1.834)	0.483* (1.666)	0.0595*** (3.465)	0.0432*** (4.822)	0.0269*** (2.870)
Std Log Enrollment	0.0575 (1.282)	0.291 (0.197)	3.179** (2.042)	3.463** (2.120)	0.958*** (10.84)	0.738*** (8.593)	0.760*** (10.23)
Observations	2,464	2,464	2,464	2,463	2,464	2,464	2,458
R-squared	0.939	0.901	0.856	0.666	0.996	0.999	0.999

Regressions use year and district fixed effects. Standard errors are clustered at the district level. Control group restricted to districts in market value categories 5-10.

Robust t-statistics in parentheses.

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

Table 3: Oil Shock Instrumental Variable Regressions

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Log Levy	Tax Rate	Log Debt Expense	Log Capex	Log Equity Transfer	Log Payroll Expenses	Log Teacher Count
Log(Active Hznt Wells + 1)	0.0963*** (7.854)						
Log Levy (Instr.)		-0.110*** (-3.223)	4.144*** (3.791)	2.882*** (4.549)	4.080*** (3.476)	-0.0703*** (-2.579)	-0.130*** (-2.216)
Std Log Enrollment	0.777*** (14.41)	0.210*** (6.241)	-0.875 (-0.893)	0.666 (1.079)	-2.839** (-2.487)	1.157*** (23.72)	1.031*** (15.88)
Std Log Total Students							0.123*** (9.876)
First Stage F-Test	66.472						
Observations	14,394	14,393	14,393	14,388	14,393	14,393	11,311
R-squared	0.988	0.741	0.037	0.024	0.124	0.815	0.529

Regressions use year and district fixed effects. Standard errors are clustered at the district level.

Robust t-statistics in parentheses.

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

Table 4: Relevance and Local Average Treatment Effect

Dependent: Levy	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	All	top Quint	2nd Quint	3rd Quint	4th Quint	bot Quint	All
Active Wells in District + 1	0.0963*** (8.153)	0.124*** (6.192)	0.0248* (1.879)	0.0266** (2.123)	0.0180 (1.612)	0.00513 (0.252)	0.167*** (9.574)
wellcat1							-0.217*** (-6.643)
wellcat2							-0.164*** (-8.158)
wellcat3							-0.129*** (-6.423)
wellcat4							-0.103*** (-5.171)
Std Log Enrollment	0.777*** (14.96)	0.552*** (4.976)	1.117*** (10.81)	1.498*** (15.04)	1.473*** (14.68)	1.208*** (9.329)	0.783*** (14.86)
Observations	14,393	2,845	2,842	2,825	2,833	2,864	14,393
R-squared	0.988	0.981	0.994	0.997	0.997	0.995	0.988

Variables are in logs. Regressions use year and district fixed effects.

Standard errors are clustered at the district level.

Robust t-statistics in parentheses.

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

Table 5: Local Funding Varies with Wealth

Market Value Bin	Market Value / Stud	Rate	Implied Rate	Levy / Stud	Equity Transfer / Stud	Local Rev / Stud	Total Rev / Stud	Total Exp / Stud
1	143,045	1.43%	0.98%	1,377	0	1,402	9,529	10,069
2	222,016	1.43%	0.97%	2,137	-	2,153	9,114	9,644
3	268,676	1.42%	0.95%	2,516	-	2,544	9,171	9,720
4	315,796	1.42%	0.95%	2,945	0	2,980	9,318	9,953
5	369,279	1.42%	0.91%	3,259	3	3,294	9,528	10,101
6	434,946	1.39%	0.87%	3,634	9	3,675	9,862	10,304
7	532,839	1.39%	0.87%	4,461	68	4,450	10,313	10,991
8	694,801	1.36%	0.82%	5,437	313	5,174	10,739	11,267
9	1,030,000	1.34%	0.76%	7,222	1,060	6,245	11,993	12,684
10	2,639,000	1.27%	0.78%	18,383	8,149	10,395	16,476	17,063
Mean	663,968	1.39%	0.89%	5,130	957	4,228	10,602	11,177
Stand Dev	1,126,015	0.21%		7,308	4,923	3,501	4,037	4,916

Table 6: Material Effects of Wealth Disparity

Market Value Bin	Payroll Per Student	Students / Class	Pay Per Teacher	% Teachers With Adv Degrees	Teacher Experience
1	6,326	14.86	39,436	16.0%	11.5
2	6,113	14.07	38,556	16.8%	12.2
3	6,120	14.09	38,622	17.4%	12.3
4	6,192	14.06	38,672	17.9%	12.4
5	6,277	13.73	38,462	17.7%	12.5
6	6,485	13.19	38,410	17.6%	12.5
7	6,677	12.89	38,618	18.1%	12.5
8	6,889	12.18	38,349	17.2%	12.9
9	7,476	11.45	38,277	17.1%	13.0
10	9,234	9.43	38,649	18.3%	13.5
Mean	6,778	13	38,606	17.4%	12.5
Stand Dev	1,878	4,037	4,646	8.6%	2.5

Table 7: Schools Invest to Improve “Quality”

	(1)	(2)	(3)	(4)	(5)	(6)
	Payroll Expense	Teacher Count	Avg Teacher Pay	% Teachers with Adv Degrees	Avg Subjects Taught	Students / Class
Total Revenue	0.295*** (10.68)	0.170*** (7.668)	0.0442*** (6.226)	0.105** (2.334)	-0.0768*** (-3.206)	-0.0685*** (-3.036)
Teacher Exp			0.0618*** (6.085)	0.332*** (5.859)	-0.0465** (-2.164)	0.0436 (1.397)
Teacher Age			0.116*** (4.164)	0.809*** (4.699)	-0.123 (-1.500)	-0.207** (-2.286)
Teacher Tenure			0.0108* (1.654)	0.00160 (0.0458)	0.0786*** (5.811)	0.0385** (2.224)
Total Students	0.0482*** (5.607)	0.106*** (10.54)	-0.00778 (-1.164)	0.0133 (0.372)	0.967*** (27.28)	0.381*** (11.31)
Enrollment	0.687*** (11.37)	0.750*** (16.31)	0.0617*** (3.642)	0.0454 (0.426)	-0.777*** (-15.30)	0.0911 (1.601)
Observations	11,318	11,318	11,312	11,009	11,312	11,312
R-squared	0.998	0.998	0.901	0.705	0.824	0.808

Variables are in logs. Regressions use year and district fixed effects.

Standard errors are clustered at the district level.

Robust t-statistics in parentheses.

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

Table 8: Effects Stronger in Property-Poor Districts

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(7)	(8)
	Log	Log	Log	Average	Average	Rich	Poor	Rich	Poor	Rich
Expenses	Payroll	Teacher Count	Teacher Pay	Subjects Taught	Subjects Taught	Rich	Poor	Rich	Poor	Rich
Poor	Rich	Poor	Rich	Poor	Poor	Rich	Poor	Rich	Poor	Rich
Total Revenue	0.652*** (6.164)	0.610*** (7.542)	0.510*** (4.194)	0.0915*** (2.775)	0.353*** (4.269)	0.0462 (1.167)	0.0430*** (2.792)	0.0260 (1.534)	-0.391*** (-5.183)	0.00268 (0.0739)
Teacher Exp							0.0316 (1.566)	0.109*** (3.694)	-0.114* (-1.655)	-0.0673 (-0.997)
Teacher Age							0.125 (1.559)	0.0760 (0.851)	0.200 (0.785)	-0.0517 (-0.209)
Teacher Tenure							0.0371*** (3.027)	0.00927 (0.749)	0.106* (1.960)	0.0886** (2.447)
Total Students	0.0500 (1.191)	0.0452 (0.515)	0.0457** (2.289)	0.0117 (0.652)	0.0513** (2.572)	0.115*** (3.996)	-0.00460 (-0.417)	-0.0433* (-1.665)	1.400*** (16.79)	0.808*** (6.872)
Enrollment	0.345** (2.078)	0.237** (2.106)	0.624*** (4.428)	0.469*** (4.633)	0.806*** (7.039)	0.570*** (5.461)	0.0230 (0.445)	0.0195 (0.628)	-0.305* (-1.749)	-0.862*** (-6.847)

Variables in logs. Regressions use year and district fixed effects. Standard errors are clustered at the district level.

Robust t-statistics in parentheses. Rich and poor defined as top and bottom decile market value decile annually.

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

Table 9: Summary Stats/Student

	mean	Std Dev	min	p10	p25	p50	p75	p90	max
Market Value / Student	663,968	1,126,015	17,942	170,178	246,603	383,131	677,886	1,292,040	31,913,996
Taxable Value / Student	396,932	663,435	11,460	102,797	149,243	234,107	391,132	719,052	13,909,640
Levy / Student	5,130	7,308	0	1,438	2,089	3,259	5,339	9,372	150,224
Statutory Rate	1.39	0.21	0.00	1.10	1.23	1.41	1.54	1.65	2
Expense / Student	11,177	4,916	3,470	7,618	8,603	10,060	12,103	15,399	106,823
Total Revenue / Student	10,602	4,037	3,148	7,490	8,455	9,785	11,534	14,014	112,434
Local Revenue / Student	4,228	3,501	-244	1,461	2,112	3,287	5,355	7,846	100,971
State Revenue / Student	4,703	2,272	-6,332	1,789	3,207	4,675	6,018	7,290	37,450
Federal Revenue / Student	1,010	821	0	354	544	836	1,238	1,790	26,995
Equity Transfer / Student	957	4,923	0	0	0	0	0	1,058	131,064
Payroll Expense / Student	6,778	1,878	1,409	5,094	5,655	6,440	7,396	8,690	58,509
Debt Expense / Student	735	1,019	0	0	248	548	930	1,443	34,764
Capex / Student	1,369	2,885	-50	70	198	490	1,352	3,385	85,859
Enrollment	4,310	12,532	0	165	361	917	2,813	8,522	211,762
Pay per Teacher	38,606	4,646	24,354	33,268	35,248	38,040	41,415	44,914	73,922
Pay per Non Teacher	35,573	9,647	3,720	26,035	29,538	34,113	39,648	46,609	143,659
% Teachers with Adv Degree	17%	9%	0%	7%	12%	17%	22%	28%	97%
Average Subjects Taught	2.04	0.74	1.00	1.29	1.48	1.86	2.43	3.03	9.33
Teacher Experience	13	3	0	10	11	13	14	16	29
Teacher Tenure	7	2	0	5	6	7	9	10	21
Teacher Age	43	3	29	40	41	43	44	46	61
Students / Class	13	4	0	8	10	13	16	18	149

Table 10: Taxes, Revenue and Spending by Market Value per Student Categories

Market Value Bin	Market Value		Taxable Value		Levy	Rate	Implied Rate	Expenses		Total		Local		State		Fed		Equity	
	Value	/ Stud	Value	/ Stud	/ Stud	%	%	Rev	/ Stud	Rev	/ Stud	Rev	/ Stud	Rev	/ Stud	Rev	/ Stud	Rev	/ Stud
1	143,045		97,922		1,377	1.43%	0.98%	10,069		9,529		1,402		6,326		1,354		0	
2	222,016		151,524		2,137	1.43%	0.97%	9,644		9,114		2,153		5,485		942		-	
3	268,676		179,249		2,516	1.42%	0.95%	9,720		9,171		2,544		5,116		942		-	
4	315,796		209,530		2,945	1.42%	0.95%	9,953		9,318		2,980		4,805		963		0	
5	369,279		233,852		3,259	1.42%	0.91%	10,101		9,528		3,294		4,684		980		3	
6	434,946		266,693		3,634	1.39%	0.87%	10,304		9,862		3,675		4,628		990		9	
7	532,839		325,857		4,461	1.39%	0.87%	10,991		10,313		4,450		4,206		1,000		68	
8	694,801		409,634		5,437	1.36%	0.82%	11,267		10,739		5,174		3,942		955		313	
9	1,030,000		554,273		7,222	1.34%	0.76%	12,684		11,993		6,245		4,007		991		1,060	
10	2,639,000		1,547,000		18,383	1.27%	0.78%	17,063		16,476		10,395		3,814		978		8,149	
Total	663,968		396,932		5,130	1.39%	0.89%	11,177		10,602		4,228		4,703		1,010		957	

Table 11: Spending on State Rev and Levy By Top and Bottom Quintile

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Log Total Expenses		Log Total Payroll		Log Total Teacher Count		% of Teachers W/ Advanced Degrees		Log Debt Expense	
	Poor	Rich	Poor	Rich	Poor	Rich	Poor	Rich	Poor	Rich
Log State Revenue	0.225** (2.087)	0.110*** (6.254)	0.176** (2.321)	0.0388*** (4.466)	0.103* (1.967)	0.0101 (1.176)	0.0181** (2.071)	-0.000270 (-0.0507)	1.244*** (2.780)	1.020*** (3.284)
Log Levy	0.212*** (4.305)	0.409*** (11.64)	0.0541*** (3.296)	0.0702*** (4.256)	0.0356** (2.110)	0.0608*** (3.026)	0.0234** (2.403)	-0.00187 (-0.160)	1.467** (2.274)	3.616*** (5.347)
Std Log Total Students					0.00963** (2.390)	0.0685 (1.099)	0.00634* (1.798)	-0.00717 (-0.611)		
Log Teacher Experience							0.0492*** (2.837)	0.0360** (2.563)		
Log Teacher Age							0.0848 (1.465)	0.150*** (2.631)		
Log Teacher Tenure							0.00601 (0.401)	0.00956 (0.766)		
Std Log Enrollment	0.739*** (4.974)	0.467*** (4.488)	1.001*** (9.697)	0.628*** (8.798)	1.063*** (14.50)	0.729*** (10.15)	-0.912*** (-3.492)	-0.454 (-1.575)	-1.601 (-1.002)	0.397 (0.241)
Constant	9.574*** (5.135)	8.046*** (13.06)	12.10*** (10.13)	13.52*** (40.22)	2.414*** (2.975)	3.087*** (8.149)			-28.57** (-2.322)	-57.90*** (-4.659)
Observations	2,886	2,872	2,886	2,872	2,271	2,252	2,271	2,249	2,886	2,872
R-squared	0.990	0.972	0.998	0.995	0.998	0.995	0.789	0.738	0.815	0.679
District FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	Yes	Yes	YES	YES
Clustering	District	District	District	District	District	District	District	District	District	District

Robust t-statistics in parentheses.

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

Table 12: Effect of State Tax Policy Change on Property Rich vs. Property Poor Districts

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Tax Rate	Log Levy	Log Local Revenue	Log State Revenue	Log Total Revenue	Log Total Expenses	Log Total Payroll	Log Teacher Count	Log Debt Expense	Log Capex
Rich Pre-2006XPost-2006	-0.0322*** (-2.620)	0.0676** (2.402)	-0.0692*** (-2.743)	1.040*** (27.41)	0.0854*** (5.018)	0.158*** (5.286)	0.0520*** (4.988)	0.0302*** (3.139)	0.726* (1.667)	0.889*** (3.031)
Std Log Enrollment	0.0973 (1.328)	0.469*** (2.651)	0.949*** (5.938)	1.247*** (5.652)	1.016*** (7.609)	0.895*** (4.518)	0.894*** (7.594)	0.890*** (7.646)	2.827 (1.121)	0.299 (0.124)
YEAR = 2006	0.00980*** (2.707)	0.108*** (17.07)	0.0621*** (6.884)	-0.0188 (-1.173)	0.0517*** (5.716)	0.0339*** (3.108)	0.0427*** (12.71)	0.0171*** (4.203)	-0.0647 (-0.461)	0.214 (1.306)
YEAR = 2008	-0.0245*** (-5.988)	-0.134*** (-18.70)	-0.109*** (-12.09)	0.0103 (0.534)	-0.0361*** (-5.020)	-0.0800*** (-5.375)	-0.0317*** (-10.19)	-0.00778** (-2.338)	-0.403*** (-2.965)	-0.0534 (-0.389)
post2006 = 1	-0.340*** (-38.94)	0.155*** (11.24)	0.118*** (8.779)	0.186*** (11.66)	0.173*** (17.01)	0.243*** (12.86)	0.170*** (19.83)	0.0330*** (5.115)	0.512*** (2.611)	0.692*** (2.998)
Constant	1.546*** (118.3)	15.39*** (507.1)	15.19*** (564.8)	14.95*** (434.7)	16.26*** (716.7)	16.30*** (473.4)	15.84*** (791.1)	4.589*** (222.3)	11.79*** (29.52)	12.80*** (31.40)
Observations	1,445	1,445	1,445	1,445	1,445	1,445	1,445	1,444	1,445	1,444
R-squared	0.936	0.995	0.994	0.988	0.996	0.989	0.999	0.999	0.820	0.692
District FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Clustering	District	District	District	District	District	District	District	District	District	District

Robust t-statistics in parentheses.

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