Does Debt Money Matter? Evidence from Independent School Districts in Texas*

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U.S. school districts face pressing needs for facility improvements. Furthermore, limited debt capacity disproportionately hampers highly indebted districts from raising adequate levels of capital spending. In this paper, I study how debt assistance affects capital investment and student outcomes. Using a set of debt assistance programs in Texas, I find that debt relief leads to higher capital spending in the short run and substantial improvements in test scores and high school graduation rates around 4 to 6 years later. The findings suggest that debt relief can effectively address existing education inequalities by revitalizing previously abandoned high-impact projects.

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Deteriorating school facilities conditions in the U.S. pose a major threat to the quality of public education. For example, schools with poorly managed instructional facilities experienced 39% higher COVID-19 incidence in 2020, causing disproportionately large learning losses for their students (Gettings et al. 2021). Moreover, significant disparities exist in the district's ability to modernize and renovate facilities as 82% of funding for capital investment comes from local sources. Such disparities further widen the education gap by disrupting the acquisition of human capital for students in school districts with limited resources.

In this paper, I examine the extent to which debt relief can address education inequalities by alleviating disparities in a district's capacity to maintain adequate facilities. There are at least two reasons studying the local government's debt burden and its real effects in the context of school districts is important. First, debt financing is often the only way that local governments can fund public infrastructure projects due to their scale. In particular, school districts exclusively rely on issuing debt to raise capital spending to update their facilities conditions. They are often restricted to using tax revenues directly on construction projects, or the cost of these projects vastly exceeds how much school districts can save annually under the balanced budget requirement. This is in stark contrast with firms in the private sector which can leverage other financing options such as public equity offering. In addition, existing measures of education quality enable me to trace out the channel through which financing frictions influence public goods provision. School districts exist to provide public education which mostly benefits K-12 students among other stakeholders in the local community as opposed to city or county governments which engage in a broad range of public services to the general public.

Furthermore, studying the debt burden provides a unique angle to the long-standing question of whether (capital) spending matters for students.[1] As school districts exclusively rely on debt to finance capital projects, those with high bonded indebtedness have no

[1] Jackson (2020) provides a detailed review of recent studies.

choice but to forgo value-adding projects (Vallee and Sauvagnat 2023). To the extent that debt relief allows school districts under distress to borrow in excess of their limited debt capacity, they can enhance the quality of education through improving the learning environment. Hence, focusing on debt relief directs attention to the relevant margin, where marginal spending can be allocated to high-impact projects.

To identify the causal impact of debt relief on capital investment and student outcomes, I exploit a natural experiment in which state intervention lowered the local share of the debt servicing costs in Texas in 1998. I use the debt burden in the late 1980s, well in advance of 1998, to identify which school districts are most likely to benefit from the program. Importantly, this measure not only strongly predicts the extent of debt assistance later but also shows little correlation with other confounding factors such as income growth.

Using this shock, I find that school districts increase investment in capital projects upon receiving debt support. Specifically, a 10 percentage point increase in debt assistance leads to around 11% more spending on capital projects over the first four years. The reduction in local debt financing costs allows financially burdened school districts to initiate major construction or renovation projects. The results suggest that debt support creates room for additional capital investment by alleviating the local share of the debt servicing costs.

These infrastructure projects, made possible by debt relief, enhance educational outcomes for the treated school districts several years later. Academic achievement, as measured by standardized 8th-grade reading and math scores, increases by on average 0.07 and 0.12 standard deviations, respectively, around 5 years after an increase of 10 percentage points in the state's share of debt service.

Similarly, debt relief yields positive long-term outcomes beyond standardized testing. The effects on high school completion rates, college entrance exam participation rates, and college enrollment rates are generally positive, although the coefficient estimates for high school completion rates are statistically significant. The estimates suggest that a 10 percentage point increase in debt relief leads to an average 0.6 percentage point improvement in graduation rates after 5 years. These findings imply that easing the local debt burden can generate substantial returns for students across multiple dimensions.

The results regarding educational outcomes demonstrate the long-lasting benefits of infrastructure improvements. This is evident in the coherent patterns across different measures; the effects gradually increase over 4 to 6 years after receiving debt support and stay consistent thereafter, often preceded by an initial dip or non-response. The estimates during later periods indicate that the benefits of school infrastructure improvements take several years to materialize and persist over time.

To ensure the internal validity of the results, I take several steps to address any remaining endogeneity concerns. First, any time-invariant district characteristics along the unobservable dimensions are eliminated by adding school district fixed effects. Next, I drop the school districts in the top taxable property wealth bracket which are likely to be subject to the concurrent legislative change around the debt assistance programs. I also examine relationships between several measures of local economic growth and school district indebtedness to guarantee that the results are less likely to be driven by other confounding factors. I further perform a battery of robustness tests motivated by the geographical distribution of school district indebtedness and find that the results remain qualitatively similar.

Overall, the findings strongly support the evidence of the positive and sizable effects of relieving the school district's debt burden on education quality through increased capital spending. By focusing on the liability side of school financing, this paper sheds light on the effects of marginal and value-adding projects that were previously infeasible without federal or state support. In light of students left in hazardous infrastructure conditions, the findings highlight the critical role of local debt financing in safeguarding student well-being.

These results have broader implications beyond school districts as local governments often face similar underinvestment challenges. The findings in this paper warrant further investigation into the severe local debt burden and a reconsideration of federal or state-level debt support to improve public goods provision across various sectors.

1. Related Literature

This paper adds to the several strands of the literature. First, a growing literature in Finance examines the real effects of financing constraints in the context of local and state governments. Adelino et al. (2017) show that increases in the credit supply due to the credit rating recalibration positively affect government expenditures and private-sector employment. Exploiting the small issuer cutoff, Dagostino (2018) find that an exogenous increase in the cutoff leads to increases in issuance volume, employment, and wages at the county level. Agrawal and Kim (2022) indicate that the cross-sectional variation in water quality stems from the deterioration in bond credit rating following the demise of monoline insurers. Posenau (2022) examine the bond covenant and find that the violation of covenants induces utility districts to charge higher prices and lower water system expenses. Yi (2021) uses a change in the baking regulation to document that issuers significantly reduce issuance amount when the demand from banks declines.

I contribute to this literature by documenting the real effects of lowering the local governments' debt financing cost in a narrower target population. Studying school districts allows researchers to more precisely estimate the effects on stakeholders as their spending is concentrated on their students. In contrast, it is often challenging in the context of county or city governments because they use capital expenditures on general-purpose projects and target the general public.

This paper also relates to the literature that investigates the marginal effect of additional capital spending on the quality of education. Several studies examine the relationship between capital spending and student outcomes through close bond elections.[2] Cellini

[2] Papers that do not rely on the discontinuity in bond elections include, for example, Conlin and Thompson (2017), Goncalves (2015), Lafortune and Schönholzer (2022), and Neilson and Zimmerman (2014).

et al. (2010) is the first paper that exploits close school bond elections to identify the causal impact of capital spending. They find that school districts that pass the bond measures exhibit improvements in test scores and growth in housing prices in the long run. Other researchers utilize a similar setting, but their results are mixed. Martorell et al. (2016) use the same TEA data to show modest facility improvement after the school district passes bond elections. However, they do not find any significant effect on test scores. Baron (2022) shows similar results using close bond elections in Wisconsin that capital spending does not affect test scores, dropout rates, and college enrollment rates. On the other hand, some papers provide evidence in support of the positive effects of capital spending. Rauscher (2020) focus on California school districts and show that the effect mainly comes from low-socioeconomic-status (SES) students, suggesting heterogeneous effects depending on district characteristics. In a similar vein, Biasi et al. (2023) document that potential benefits of additional capital expenditures can differ across the type of spending across the U.S. Major instructional facilities renovation and construction lead to an increase in test scores whereas spending on non-instructional facilities such as football stadiums does not.

In contrast to these studies that rely on close bond elections for identification, this paper provides a complementary view to analyze the efficiency of capital spending. By focusing on the direct intervention in local debt financing costs among highly indebted school districts, I examine high-impact projects that were previously infeasible without federal or state support. In addition, the findings expand the external validity of the existing studies on close bond elections as the debt assistance programs cover school districts that cannot even resort to bond elections due to their overwhelming outstanding debt burden.

2. Institutional Details

2.1. Financing Capital Investment

In 2020, U.S. public school districts spent over $870B to provide an adequate level of public education to students. More than 10% of the total expenditure was spent on capital outlays. Capital spending is a crucial part of school district expenditures as it is typically used to construct new facilities, renovate existing buildings, and/or purchase educational equipment such as school buses. Given the scale of the infrastructure projects, a combination of local taxes or state support allocated to facilities maintenance each year is insufficient to cover the associated costs.[3] As a result, school districts almost always rely on debt financing.

The most common type of municipal bonds issued by school districts is called general obligation (GO) bonds.[4] GO bonds are backed by the taxing power of the issuer. School districts often pledge ad-valorem taxes, or property taxes, to repay bondholders. In addition to the exemption from federal income tax, this feature allows school districts to borrow at relatively low interest rates compared to other types of financing. Hence, school districts typically use GO bonds and increase property tax rates to cover the debt service payments.

However, some school districts remain underfunded without federal or state intervention since they differ vastly in their ability to raise property tax rates for many reasons.[5] For example, the issuance of GO bonds requires the issuer to receive voter approval. School

[3] Plant maintenance and operation spending explains around 9% of current spending among independent school districts in Texas. However, it cannot be used to, for example, build another campus for the following reasons. The usage of maintenance expenditures is limited to daily maintenance and operation of facilities, which often excludes major improvements. Even if those funds can be spent at the district's own discretion, it would require absurdly high property tax rates to raise enough capital funding. In addition, some districts may find maintenance expenditures insufficient for the regular upkeep of existing buildings if most of their buildings are severely outdated.

[4] Some school districts issue other types such as revenue bonds. Local governments issue revenue bonds to finance a specific project. They pay debt service on the bonds using the cash flows generated from the project. However, school districts rarely use revenue bonds as most of instructional facilities do not generate revenues.

[5] States and federal government pay less than a quarter of the capital outlay and debt service, and 11 states do not provide any funding to school districts.

districts with tax-sensitive voters may not be able to increase property tax rates if they cannot pass bond measures. Furthermore, high property taxes can lead to an increase in net out-migration which can erode the tax base(Tiebout 1956). State governments often impose debt restrictions on school districts as well to maintain the financial health of local governments.

2.2. State Debt Assistance Programs in Texas

Until the 1990s, Texas school districts already under a large debt burden found it challenging to raise additional debt from local sources in the absence of state or federal support for capital spending. Such concerns directed attention toward the equalization of facilities funding, which led the state of Texas to pass the Instructional Facilities Assistance (IFA) program in 1998.[6]

The IFA was the first state-level intervention in Texas to provide continuing support to school districts. By sharing the debt service of the newly issued bonds throughout their life, the state intended to boost capital investment by school districts. The program provides a guaranteed yield of $35 per average daily attendance (ADA) for each penny of Interest and Sinking (I&S) tax effort.[7] For example, the state would support 60% of annual debt service for qualifying bonds if an independent school district has $140,000 of taxable wealth per ADA.[8] Figure A2 presents the potential IFA assistance as a function of local taxable value per pupil.[9]

[6] Edgewood Independent School District and other school districts filed a series of school finance lawsuits since 1984, now known as the *Edgewood* cases. The Texas Supreme Court sided with the plaintiff, finding that the prevailing school finance system in Texas unconstitutional. Policymakers responded to the decision by revising the state funding formula and redistributing the excess revenues from wealthy districts to property-poor districts. However, the state's attempt at school finance equalization was limited to the current spending which covers all expenditures to run day-to-day school operations.

[7] Texas school districts charge two types of property tax rates. The school district uses I&S taxes to service debt and Maintenance and Operations (M&O) taxes to fund daily operations.

[8] In this example, the state pays 60%(=1-$140,000/$350,000) of the district's debt service payments on the approved bonds because the district can raise 40%(=$140,000/$350,000) under the current assessed property valuation.

[9] The IFA assistance is not zero for some districts with taxable property wealth above the guaranteed yield ($350,000) due to some additional factors. School districts with less than 400 ADA were treated as if they had

The IFA significantly lowered the local share of the debt burden. Around 30% of school districts received the funding during the first 4 rounds. They were able to borrow approximately $5.6 billion with state support, only paying 42% of debt service for the qualifying bonds on average. A total of $620 million was appropriated to help school districts pay for the first annual debt service on eligible debts across 11 funding rounds. The state continues to provide debt subsidies for the approved bonds, although no funding has been allocated to the IFA since 2017.

To be eligible for IFA assistance, the district has to meet several requirements. First, districts must apply for the funding as the IFA assistance is not automatically granted. The state funding was secured for the life of the eligible debt, so districts do not have to reapply for the funding in the following years. Also, the usage of bond proceeds is strictly limited to the instructional facilities. Next, districts must have sufficient authorized issuance amounts from the previous bond elections.

While the IFA made substantial progress toward capital spending equalization, there were some limitations. The funding rounds were competitive as the funding fell short of the growing demand for modernizing school facilities. The state prioritized low-property wealth districts when the total amount of assistance requested exceeded the available funding at each round. In addition, the state only supported the newly issued debt. Bonds issued before 1998 were not eligible for debt assistance, meaning that the issuers of these bonds unfortunately had to manage their debt on their own. Lastly, a concurrent legislative change partially negated the state's equalization effort. Both types of property tax rates (M&O and I&S) were initially subject to the recapture in 1993. However, districts have been allowed to retain excess revenues from I&S rates since 1997. This provision effectively induced property-rich districts to issue more debt, aggravating the inequalities in facilities spending..

The state of Texas subsequently launched the Existing Debt Allotment (EDA) program

400 students. Taxable wealth was adjusted downwards if the district experienced high enrollment growth over the past 5 years or was denied IFA assistance during the prior biennium.

in 2000 to reduce the local share of the debt service on the existing debt. The EDA covered most of the new money bonds that did not qualify for IFA assistance, but non-GO bonds such as revenue bonds were excluded.[10] The EDA also operated under a guaranteed-yield approach, where the state guarantees the same $35 per ADA for each penny of I&S tax effort up to $0.29 per $100 of assessed property valuation.[11] Unlike the IFA, districts are automatically eligible for EDA assistance as long as their taxable property value per pupil is below the threshold. Figure 1 presents the time-series of I&S tax rates during 1994-2006. Since the EDA came into effect in 2000, school districts almost halved I&S tax rates.

Figure 2 shows the proportion of state debt subsidy relative to the district's annual debt service costs. The increase in debt subsidies is modest in the first two years of the IFA as the state only subsidized newly issued debt. However, the state's share of debt service has jumped to roughly 30% since the EDA was introduced. Over 57% of independent school districts in Texas benefited from the EDA during the first biennium, and the state continues to share the debt burden with more than 80% of them as of 2022.

In sum, both the IFA and EDA provided substantial debt relief to the highly indebted school districts, expanding their debt capacity. The IFA reduced the marginal debt financing costs as it allowed the district to issue new debt with smaller property tax rate increases than before. On the other hand, the EDA lowered the debt servicing costs of the existing debt. which in turn left more room for taking on additional debt.[12]

[10]Revenue bonds are another commonly issued municipal bonds. Issuers of revenue bonds typically pledge future cash flows from a specific project. Since most facilities in school districts do not generate cash flows, revenue bonds were rarely issued by districts.

[11]In fact, the I&S tax rate eligible for the EDA funding is limited to the smaller of the three rates: the actual I&S rate during the second year of the preceding biennium, the I&S rate sufficient to pay the annual debt servicing costs on the EDA eligible bonds, and the statutory limit 0.29%.

[12]See Clark (2001) and Plummer (2006) for more detailed descriptions of both programs.

3. Data

3.1. Data

The estimation sample comes from four main sources. First, data on the student-level outcomes come from the Texas Education Agency (TEA), which covers all public K-12 students in Texas since 1993. The TEA records contain granular information on the student demographics, curricular activities, and educational outcomes. Individuals are anonymized with the identifier, which allows researchers to observe any public K-12 students in Texas throughout their school years. Since the TEA does not collect information on students who left the state, I assume those students dropped out of school following the existing papers using the same data (e.g. Cabral et al. (2021)).

I obtain administrative data on all public post-secondary institutions in Texas from the Texas Higher Education Coordinating Board (THECB). The THECB provides individual-level information on student enrollment, admissions, and graduation since 2004. As it shares the same individual identifier as the TEA records, the THECB is a useful source for observing whether students pursue a higher degree. Similar to the TEA data, the THECB does not report students who attend out-of-state higher education institutions. I assume the students in the TEA but not in the THECB do not pursue post-secondary degrees.

I use district financials from the merged dataset consisting of the TEA district income statement data and the Common Core of Data (CCD) hosted by the National Center for Education Statistics (NCES). The merged dataset covers the universe of Texas school districts and includes information on revenues and expenditures as well as outstanding bond principals. Most of the school district financial characteristics date back to 1987, but detailed bond issuance information becomes available in 1993. All financial variables are converted to 2000 dollars using the historical CPI for all urban consumers.

Lastly, I collect other district characteristics from the Academic Excellence Indicator System (AEIS) provided by the TEA. The AEIS mainly publishes student performance at the district level, but it also provides information on district demographics and tax collection data in the 1994-2011 school years.

To understand the effect of debt relief on the average student in the district I construct 5 district-level student outcomes from the resulting merged dataset. First, I define capital spending per pupil as the total capital outlays divided by the number of total enrolled students.[13] To measure student academic achievement, I standardize statewide 8th-grade reading and math individual test scores each year and aggregate these measures across all students in the same district-year group. I also define the graduation rates as the fraction of 12th-grade students graduating within the district-year group. College entrance exam participation rates are defined as the fraction of 12th-grade students who took either the SAT or ACT. Lastly, I construct college enrollment rates, defined as the fraction of 12th-grade students who enroll in any 2-year or 4-year institutions within 3 years of graduation.

The estimation sample includes all independent school districts in Texas between 1994 and 2004. I exclude any district with an average per-pupil taxable property value over $250,000 before 1998. Most of these districts were property-rich enough to benefit from the removal of the I&S tax recapture described earlier.[14] This leaves around 790 unique districts in the estimation sample, which covers roughly 80% of all Texas public school districts.

3.2. Summary Statistics

Table 1 describes the district characteristics between 1994 and 2004. All variables are winsorized at 1% and 99% to minimize the influence of outliers. The average district has a 20% higher net outstanding debt relative to its property tax levy between 1987 and 1991, where the net outstanding debt is computed as the long-term bond principal subtracted by the debt service fund balance. A large standard deviation relative to its mean indicates

[13] In the main analyses, I subtract the direct state subsidy to capital expenditures to mitigate the effects of state assistance prior to the IFA and EDA.

[14] Increasing the threshold to $350,000, which was the wealth cutoff for both the IFA and EDA, does not change the results qualitatively.

that there are substantial variations in the local debt burden. Capital spending is a large part of total expenditures as it alone explains around 10.9% of total expenditures per pupil. The average district spends around $879 per pupil on large-scale facilities improvement projects every year. Also, capital expenditures tend to be lumpy and concentrated around the bond issuance. Figure 3 plots the average per-pupil spending around the bond issuance year. School districts typically allocate a significant portion of the bond proceeds within a few years after issuance, as indicated by the relatively lower levels of capital spending outside of those years. This is consistent with the nature of infrastructure projects which often require a lump sum payment at the beginning.

4. Empirical Specification

This paper attempts to understand to what extent debt subsidies can improve education quality in the long run. To this end, a naive OLS approach would be to regress the realized debt relief on educational outcomes h period later. However, the regression fails to establish causality if unobservable district characteristics drive both the actual debt assistance and measures of educational improvement. For example, school districts with better economic conditions can offer more educational resources to their students. On the other hand, these school districts are responsible for a higher portion of debt servicing costs as the debt programs provide debt relief inversely proportional to the per-pupil taxable property value. They would still exhibit considerable enhancement in academic performance in the absence of debt support, which leads the OLS coefficients to be underestimated.

I take several steps to alleviate the endogeneity concerns. School district and year fixed effects are included to capture time-invariant school district characteristics and aggregate shocks. Importantly, school district fixed effects eliminate any level differences in school district economic conditions, which limits the sources of the endogeneity to time-varying conditions. To control for the remaining time-varying local economic conditions, I also add various observable district characteristics. I include an enrollment size quartile dummy to proxy for the school district size, which could be correlated with the growth in local economic activities. I add a log of per-pupil current expenditures as wealthy school districts spend more on instructional spending. I use cash holdings scaled by current expenditures in the regression as districts can utilize unrestricted cash holdings at their discretion to boost educational spending. Finally, I control for the local share of total revenue per pupil to factor in the district's dependence on state funding.

To strengthen the causal interpretation of the results, I employ an instrumental variable (IV) approach. I exploit plausibly exogenous variation in debt relief that can be attributed to the school district's varying exposure to the introduction of state debt assistance programs in Texas. To measure the exposure, I divide school districts into two groups by the median value of the average outstanding net long-term debt-to-property tax levy ratio in the 1987-1991 period, well ahead of the first debt programs in 1998. I use this ratio as the debt programs created greater incentives to apply for the IFA funding and larger debt relief for highly indebted school districts. The ratio, similar to the leverage ratio in the context of corporates, measures the outstanding debt position of school districts relative to cash flows from property tax revenues at least 7 to 10 years before the first debt relief rounds. I interact the group indicator variable with the indicator variable set equal to 1 in the years following 1998 to construct the instrument.

The instrument allows me to isolate the variations in debt relief orthogonal to local economic conditions. Note that school districts are divided into two groups based on the ratio measured long before the debt assistance programs. Hence, as long as local economic conditions in the late 1980s are not highly persistent over 10 or more years, the predicted debt support from the instrument does not reflect the cross-sectional distribution of economic conditions around 1998 and onwards.

Using this instrument, I analyze the impact of debt support on capital investment and student outcomes by estimating the following two-stage least squares (2SLS) regression model:

$$FTD_{i,t} = \pi(DTL\ High_i \times Post_t) + \Pi C_{i,t} + \alpha_i + \alpha_t + \epsilon_{i,t} \tag{1}$$

$$\bar{Y}_{i,t} = \beta \widehat{FTD}_{i,t} + \Gamma C_{i,t} + \delta_i + \delta_t + u_{i,t}, \tag{2}$$

where i denotes district, t denotes year, and $\bar{Y}_{i,t}$ represents the average of Y over a specified period. In what follows, I focus on the average from t to $t+4$, which I refer to as short-term, and the average from $t+5$ to $t+9$ as long-term.

In the first stage, I instrument the endogenous variable, *FTD*, using *DTL High* × *Post*. *FTD* is the percentage of annual debt service payments supported by the state, defined as the total state debt funding including both the IFA and EDA divided by the sum of interest and principal payment, net of the effect from refunding bond issuance.[15] I subtract the difference between the refunding issuance amount and the annual change in sinking fund balance from the denominator to account for the refinancing of the outstanding debt. *DTL High* takes a value of 1 if the district's average ratio of outstanding net long-term debt to property tax revenues between 1987 and 1991 is higher than the median. Intuitively, it proxies for the district's indebtedness scaled by cash flows from its property tax base. *Post* is an indicator denoting if t is greater than or equal to 1998. I choose 1998 as a cutoff because it is when the initial IFA funding round took place. Finally, *DTL High* × *Post*, the interaction between *DTL High* and *Post*, is the instrument throughout the analysis.

$C_{i,t}$ is a vector of control variables including the local share of total revenue per pupil, a log of current expenditures per pupil, and cash holdings scaled by current expenditures. δ_i and δ_t denote district and year fixed effects, respectively. Standard errors are clustered

[15] Due to the data collection issue, the data on the IFA support in 1998, 1999, and 2003 are missing. I use the state revenue for capital outlays and/or debt service payments (C11) from CCD to replace missing values. Cross-checking using non-missing years of the IFA and EDA reveals the difference between the actual funding and C11 is extremely small. The results hold if I completely replace the debt assistance with C11.

at the district level.

In the second stage, I estimate the impact of debt funding on various district-level outcomes, $\bar{Y}_{i,t}$. The parameter of interest is β, representing the average cumulative improvement in outcome variables in the short or long run. The first part of the results focuses on school district financing behaviors, where the dependent variable is capital spending per pupil. The second part examines the effects on student outcomes. Here the dependent variables are standardized 8th-grade reading and math scores, graduation rates, college entrance exam participation rates, and college enrollment rates. These outcomes capture the overall impacts of debt subsidies on students.

The causal interpretations from the IV approach crucially depend on the two conditions: relevance and exclusion restriction. I first show that the instrument is highly correlated with the endogenous variable. School districts with higher bonded indebtedness around the late 1980s (i.e., *DTL High*=1) continue to bear sizeable debt service costs as their prior debt obligations extend into subsequent years, leading them to be more responsive to both types of the debt programs. As the average maturity of newly issued bonds is roughly 10 years since the 1980s (Cortes et al. 2022), a local government's debt burden is often highly persistent. This allows *DTL High*, which is the district-level indebtedness measured during the pre-sample period, to be highly predictive of the level of debt burden around the introduction of the debt programs in 1998. Consequently, distressed districts are unable to undertake positive net present value capital projects and, thus, seek debt support more actively than less constrained districts. Figure 4 shows a percentage of the IFA funding recipients within each group defined by *DTL High* from 1998 to 2018. The figure reveals a clear trend that highly indebted districts were more likely to receive the IFA funding. In addition, their existing debt burden made them automatically qualified for a larger amount of debt subsidies based on the EDA allocation formula.

A formal test of this condition in the regression framework confirms a statistically significant and positive relation between the instrument and the endogenous variable.

Table 2 presents the estimation results of the first stage in Equation 1. The results show that school districts with previously high indebtedness receive greater debt assistance than those with low indebtedness. For example, in Column 2, the debt assistance programs reduce the highly indebted school district's debt service costs by 15.5 percentage points more than less levered school districts. Importantly, high F-statistics in excess of 10 ensure that the instrument strongly predicts the endogenous variable.

Figure 5 visualizes how the IFA and EDA are implemented in time-series by plotting the yearly estimates of equation 1.[16] The reduction in debt financing costs is positive but small as the IFA only subsidized the new issuance costs. Subsequently, the EDA became effective in 2000 and substantially lowered the local share of average debt servicing costs. The gradual decline in the magnitude since 2002 is largely due to the stale taxable wealth threshold, which hasn't changed much since 1998.

Despite the strong first-stage results, the instrument is not valid if two groups of school districts diverge in outcome variables even without the debt relief programs. In particular, the identifying assumption fails if the instrument can predict local economic conditions around 1998 and onwards. Anecdotal evidence suggests that debt financing decisions do not reflect the economic outlook 7 to 10 years ahead. In general, Texas restricts school districts from excessively relying on projected future property taxes when they demonstrate their ability to pay off the bonds. Texas Education Code, Section 45.0031 allows school districts to use projected property tax revenues anticipated for the earlier of the tax year five years after the current tax year or the tax year in which the final payment is due for the bonds. This effectively limits school districts from incorporating the information on future property tax bases more than 5 years ahead. Therefore, debt financing decisions made prior to 1991 may not reflect the economic outlook at least 7 years ahead, which supports the validity of the instrument.

[16]Clustered standard errors yield extremely precise estimates during the pre-policy period, although the coefficient estimates are nearly zero. This may occur if there exists large negative correlations among error terms at the school district level. To be conservative, I plot heteroskedasticity-consistent standard errors(HC SE) in addition to clustered standard errors(Clustered SE).

While the instrument conditional on various controls including school district fixed effects can handle most of the time-invariant unobservable district characteristics or relatively short-lived economic growth, there may still exist some endogeneity concerns. To further examine the exclusion restriction, I test if school districts with high *DTL* exhibit higher growth in several proxies of local economic conditions: a log of per capita income, a log of median household income, a log of total labor force, and unemployment rates. Due to a lack of school district-level measures during the sample period, I rely on the 1990 and 2000 Decennial Census. This approach effectively leaves a single observation for each school district around the first debt assistance program in 1998.

Table 3 indicates that most of the local economic conditions are not strongly predicted by the instrument. Income measures and unemployment rates show no statistically significant relationship with the instrument, whereas the total employment growth is strongly correlated with *DTL High*. This may not come as a surprise given that high *DTL* school districts are often located next to or within metropolitan areas. Figure 9 shows the geographical distribution of school districts by indebtedness, with districts shaded in dark blue concentrated around some of the most populous cities in Texas. In this respect, column 4 of Table 3 raises a reasonable concern that the instrument may affect outcome variables through changes in local employment rather than debt subsidies. I take several steps to address this concern. First, I show that parametrically controlling for the population size does not alter the results in this paper. I rerun the main analysis after incorporating the interaction term between the log of employment in 1990 and linear trends. The results remain robust to the inclusion of the interaction terms (Table A1-A3). In addition, I include the log of enrollment size, which is available at an annual frequency and highly correlated with the total employment in the regression equation (Table A4-A6). This approach also does not change the results. Finally, I show that the results are robust to dropping the school districts in the top enrollment size quartile as of 1997 and reassigning *DTL High* among the remaining school districts (Table A7-A9). Since fast-growing districts are around metropolitan areas and tend to exhibit a larger number of enrolled students, this exercise ensures that the results are not driven by the school districts with high employment growth.

Concurrent events around the policy implementation might influence the outcome variables as well. A couple of notable changes coincided with the debt assistance programs, including the exclusion of I&S tax rates from the recapture and fracking booms. Changes to recapture rules were made, where excess revenues from I&S rates were retained since 1997, potentially incentivizing highly wealthy districts previously subject to recapture to issue debt. This change implies that highly wealthy districts previously subject to recapture may become more incentivized to issue debt, perhaps to offset the recaptured surplus from M&O taxes. To mitigate the confounding effects from such concurrent events, I eliminate districts that are wealthier than $250,000 per pupil in the pre-policy period.[17] Furthermore, the significant fracking booms in the early 2000s, affecting available school resources and local labor market conditions, especially around districts with large shale oil and gas reserves, are considered. The extraction booms had impacts on students from those areas as well, resulting in lower graduation rates (Kovalenko 2023). Results are robust to excluding districts with high exposure to the oil and gas industries, proxied by the percentage of taxable property values derived from oil and gas production sites (Table A10-A12).

School districts with below- and above-median debt-to-property tax levy ratios might also be different along unobservable dimensions. If this is the case, I may observe the same results in the absence of the debt relief programs. For example, one might be concerned that highly indebted school districts have already spent a substantial sum of money on ongoing or recently finished capital projects before the sample period, possibly showing improvements in educational outcomes in the following years.

Measuring the school district's indebtedness relative to property tax levies before 1991

[17] While $350,000 per pupil was the cutoff for the IFA and EDA, dropping highly wealthy districts(>$250,000) still leaves around 80% of all school districts in Texas.

alleviates this concern. The typical facilities improvement projects take around 3 years to complete. Figure A1 presents a recent construction schedule from the Austin ISD's bond proposal. As shown in Figure A1, most constructions are planned to take less than 5 years. At the beginning of the pre-policy period, 1994, it is plausible that most of the projects funded by the pre-1991 debt were already finished. Given that it may take several years for enhanced facilities conditions to pay off, one would be able to observe the effects of those projects by 1998. To the extent that these effects stabilize over time, district fixed effects should capture the permanent increase in outcomes due to the previous projects.

Furthermore, it is unlikely that school districts keep the proceeds over an extended period to spend on capital projects in the distant future. Rather, they tend to use bond proceeds within a few years. Note that the IRS prohibits tax arbitrage where districts borrow at the tax-exempt yield and invest at the taxable interest rate. The maximum yield the bond proceeds can earn is often much lower than the prevailing interest rate for that reason. Since most school bonds are tax-exempt, saving the bond proceeds in the investment account for a long time may result in negative returns or negative tax arbitrage.

5. Results

5.1. District Capital Investment

Upon receiving debt support, school districts spend more on capital investment in the short run. Table 4 reports the estimation results of Equation 2, where the dependent variable is a log of per-pupil capital spending. The coefficient estimate on short-term capital expenditure in column 1 is positive and statistically significant.[18] The economic magnitude is sizable. A 10 percentage point increase in the percentage of subsidized debt service payments increases per-pupil capital spending by around 11% during the first four

[18]The results are consistent with Plummer (2006), who also finds positive impacts of the same debt assistance programs in this paper on capital outlays. However, the sample period in Plummer (2006) ends in 2001 whereas my sample period is much longer to capture multiple IFA funding rounds until mid-2000s.

years on average (i.e. $0.1 \times 1.103 = 11.03(\%)$).

However, the effects do not persist over time. The coefficient estimates become close to zero or negative around 3 years after state support. Figure 6 graphically shows these short-lived effects. A couple of reasons can explain the short-term surge in capital spending. First, facilities improvement projects require a significant amount of money at the outset. Since capital outlays cover all associated costs such as acquiring land and construction, the majority of capital spending is allocated in the initial years. The tax status of bonds also incentivizes school districts to use up most of the bond proceeds within the first few years. School districts almost always issue tax-exempt municipal bonds to raise money. Since they enjoy low tax-exempt yields, the IRS prohibits them from investing at the taxable interest rate. Hence, it becomes costly for school districts to keep the bond proceeds in the fund balance.

These results suggest that the two debt relief programs successfully assisted school districts constrained from additional borrowing by lowering their debt financing costs. As school districts share debt servicing costs with the state, they are able to take on more debt for worthwhile infrastructure projects beyond what their debt capacity without state intervention allows. They immediately raise capital spending after receiving state debt support and use up most of the bond proceeds during the first few years for a lump-sum cost and pay debt service smoothed over the lifetime of the debt.

5.2. District Educational Outcomes

The results in the previous section document that an increase in state debt support leads to a substantial rise in the school district's capital expenditures, which are often used to fund large-scale infrastructure improvement projects. To measure potential gains from the reduction in debt financing costs, I next investigate how the quality of public goods changes after receiving debt relief.

5.2.1. Academic Achievement

I first examine the effects of debt relief on standardized 8th-grade reading and math test scores from the statewide assessment. To the extent that debt relief brings material benefits to students in the treated school districts, test scores can be used to measure improvements in the average student's academic performance.

I find that debt relief leads to long-term improvement in academic performance. Table 5 presents the estimation results of equation 2 using 8th-grade standardized reading and math test scores as dependent variables. In columns 1 and 2, debt relief increases average reading scores in the long run, while there is no short-term effect. The coefficient estimate in column 2 is both economically and statistically significant. The estimate implies that a 10 percentage point increase in the fraction of state-subsidized debt service payments results in roughly a 0.070 standard deviation increase in reading scores on average 5 years later (i.e., $0.1 \times 0.211/0.3=0.070$).

Debt relief increases average math scores as well. Columns 3 and 4 in Table 5 present the estimation results using 8th-grade standardized math test scores as dependent variables. The results for math scores also exhibit long-lasting improvements. The estimates imply that a 10 percentage point increase in the fraction of state-subsidized debt service payments leads to approximately a 0.123 standard deviation increase in math scores on average 5 years later (i.e., $0.1 \times 0.370/0.3=0.123$).

Graphical representation of the coefficient estimates briefly summarizes the results, characterized by long-term improvements in test scores following the initial dip. Each panel in Figure 7 graphically depicts the estimates from the dynamic version of equation 2 , where I rerun equation 2 using $Y_{i,t+h}$ for each $h = 0, 1, ..., 9$ instead of the average. The evolution of the estimates is in line with prior studies documenting the positive effects of capital spending on educational outcomes(e.g. Cellini et al. (2010)). Test scores are negatively affected by debt assistance during the initial periods as a major renovation of the existing facilities or construction of new buildings may disrupt student learning. For example, loud noise from the construction sites or temporary portable classrooms due to facilities upgrades can adversely impact students' motivation and result in muted or even negative effects during the first few years. Several years after receiving debt relief, the coefficient estimates gradually increase and stabilize. This is consistent with the benefits of school infrastructure improvements which can take years to materialize(Jackson and Mackevicius 2021).

The results for both academic achievement measures consistently suggest the positive and long-lasting effects of debt assistance occur as value-adding capital projects become affordable for school districts. The results in this paper confirm that incremental capital spending from lower debt financing costs yields long-term positive gains for students.

5.2.2. Non-Test Outcomes

While debt assistance leads to long-term improvements in academic outcomes, test scores alone do not fully capture its benefits to student learning. For example, students on the margin can complete public education and pursue higher degrees if they can stay comfortable during hot weather due to the updated air-conditioning system. To evaluate the overall impact of debt relief on students, I examine a set of non-test outcomes.

Non-test outcomes improve after receiving debt support, consistent with the previous results on academic achievement. Table 6 estimates equation 2 with graduation rates, college entrance exam participation rates, and college enrollment rates as dependent variables. In columns 1 and 2, the coefficient estimates point to evidence supporting the positive effects of debt assistance in the long run. The coefficient estimate is statistically and economically significant only in column 2. The results imply that a 10 percentage point increase in debt assistance as a fraction of debt servicing costs leads to a roughly 0.6 percentage point increase in graduation rates after 5 years. Similar to the previous results for the test scores, the pattern observed in columns 1 and 2 assures that the effects come from improvements in school facilities; graduation rates show muted or negative effects in the short term, but they go up after 5 years.

Panel A in Figure 8 visualizes the results. In particular, it shows that the long-lasting effect of debt subsidies on high school completion rates. In the short run, the coefficient estimates remain close to zero, but they jump around 6 years later and stay elevated until the 9th year.

I also show that students become more motivated to pursue higher degrees, although the estimates exhibit marginally positive responses. Columns 3 through 6 of Table 6 report the estimation results using college entrance exam participation rates and college enrollment rates as dependent variables, respectively. Both results suggest that debt relief influences students by motivating them to take college entrance exams such as the SAT and attend post-secondary institutions. A 10 percentage point increase in debt relief raises college exam participation rates by roughly 0.5 percentage points after five years. The effects on college enrollment rates are positive as well. The results imply that a 10 percentage point increase in debt assistance leads to a roughly 0.3 percentage point increase in college enrollment rates after five years. Although most of the estimates are insignificant at a 10% significance level, the general pattern across the two results resembles the previous results. Again, lasting positive effects are followed by downturns during the first few years potentially due to the temporary distraction from capital projects.

Several factors can explain relatively weak responses on non-test outcomes. First, both college entrance exam participation rates and college enrollment rates could be imprecisely measured. For example, if better educational facilities increase the likelihood of pursuing higher education throughout one's life, these measures fail to identify individuals who change their minds about attending college after working for a few years. In addition, the TEA and THECB do not report students who leave the state before they graduate and attend higher education institutions elsewhere. This could either bias the coefficient estimates toward zero due to measurement errors or downward if the attrition rate is systematically higher among the treated school districts.

Overall, the findings on both test and non-test measures confirm that debt support brings long-lasting benefits to students. Across various educational improvement measures, this paper documents positive and persistent impacts several years after receiving state debt assistance. In line with debt relief allowing school districts to pursue value-adding projects that they could not before, I show that the effects are insignificant or even negative during the initial period, turning positive and persistent over the next years.

6. Conclusion

As the school district's debt capacity is tightly linked to its property tax base, some districts find it much harder to raise funding to improve outdated educational facilities. Overwhelmed by the outstanding debt position, students in highly indebted districts are forced to learn in a disadvantaged environment without external debt support.

In this paper, I investigate the relationship between debt relief and educational outcomes in the context of independent school districts in Texas. Using the introduction of a series of state-level debt assistance programs, I first find that additional debt support allows highly indebted school districts to take on more debt to increase capital spending. The state intervention has substantial impacts on capital investment as an additional 10 pp in state debt subsidy leads to a 10% increase in capital spending over the first two years.

I also document that students benefit in the long run from additional infrastructure projects with the debt assistance program. Despite the initial drop, standardized scores on reading and math reveal that improved building conditions have a long-term positive impact on students. The magnitude vastly exceeds what the existing studies relying on close bond elections find and corresponds with what has been observed from the well-known results on current spending. In a similar vein, students in the more distressed districts exhibit higher graduation rates and probability of taking college entrance exams and entering college.

The findings of this study shed light on how lowering the local debt burden can contribute to narrowing the education gap due to poor educational infrastructure. The examples of the IFA and EDA in Texas illustrate how strategic policy interventions can enable highly indebted districts to overcome previous borrowing limitations, resulting in enhanced educational facilities and improved student outcomes. Importantly, this has broader implications beyond school district financing as public goods provision by other types of local governments also hinges on their debt positions. This study underscores the significance of municipal finance policies in shaping residents' well-being and local communities' sustainability.

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FIGURE 1. Average I&S Tax Rates in the 1994-2006 period.
This figure plots the average I&S tax rates, a part of property tax rates dedicated to debt service, from 1994 to 2006.

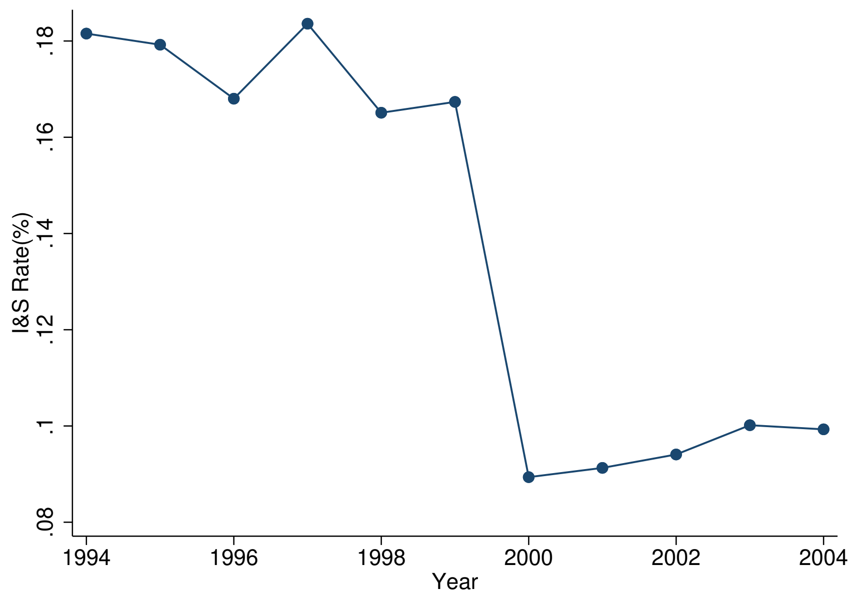


FIGURE 2. Average State Debt Assistance in the 1996-2004 period.
This figure plots the average state debt assistance as a fraction of annual debt service payments between 1996 and 2004. Debt assistance includes debt subsidies from both IFA and EDA. Annual debt service payments are defined as the sum of the amount of long-term debt retired and interest payments, subtracted by the changes in the sinking fund balance.

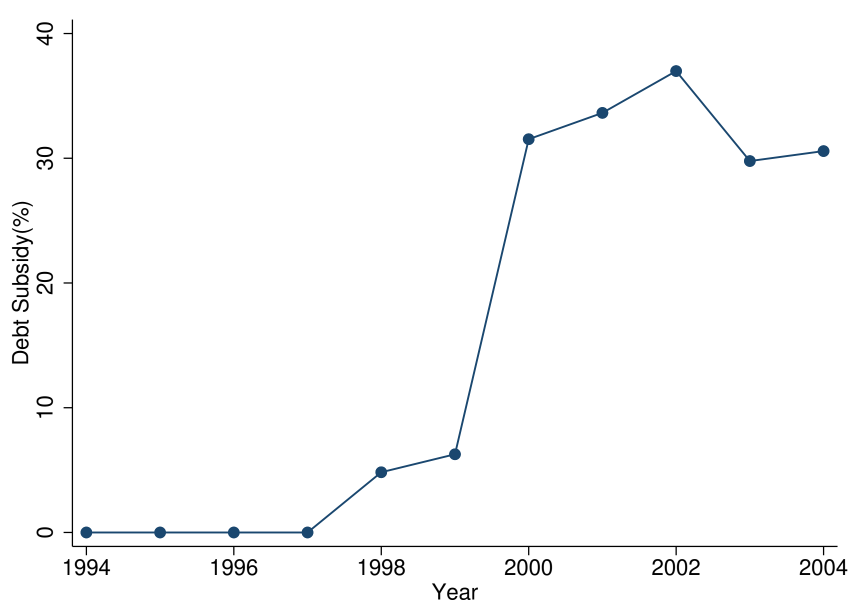


FIGURE 3. Average Per-Pupil Capital Spending Relative to Issuance Year.
This figure shows the average per-pupil capital spending relative to the issuance year. Year 0 represents the year of bond issuance.

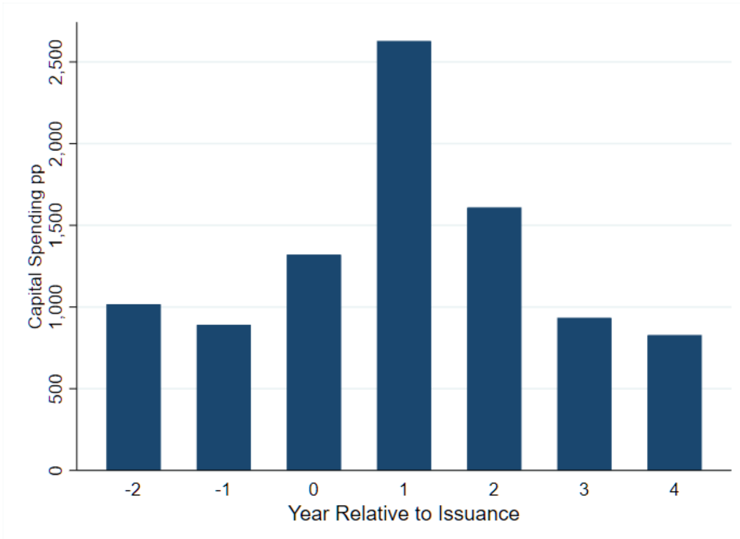


FIGURE 4. IFA Funding Recipients in the 1996-2006 period.
This figure plots the districts receiving IFA assistance as a fraction of the total number of school districts in each group defined by *DTL High*$_i$ between 1996 and 2006. The blue line indicates the average percentage of IFA funding approval among districts with low ex-ante borrowing constraints (*DTL High*$_i$ = 0). The red line indicates the average percentage of IFA funding approval among districts with high ex-ante borrowing constraints (*DTL High*$_i$ = 1).

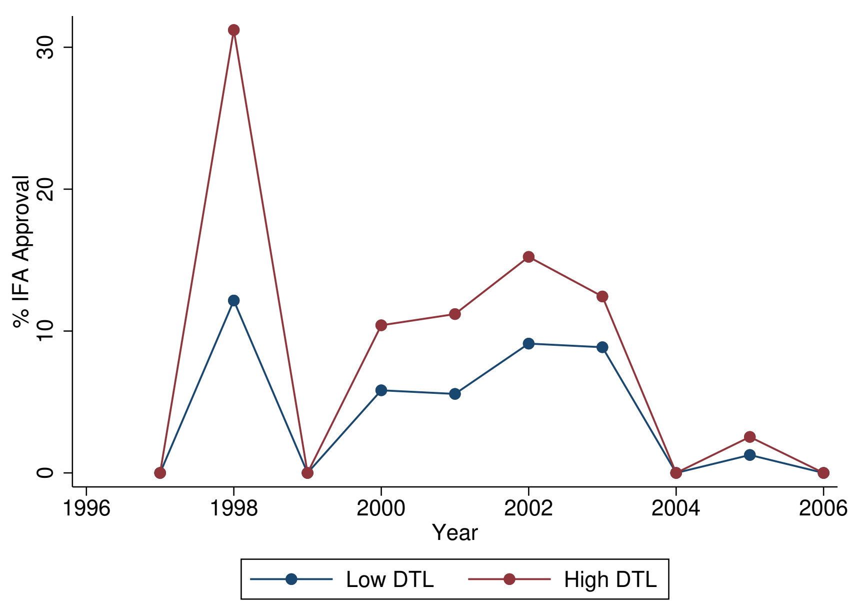


FIGURE 5. First Stage Estimation Results.

This figure plots coefficient estimates and 95% confidence intervals from the following first stage of the IV approach: $FTD_{i,t} = \sum_{j \neq 1997} \pi_j (DTL\ High_i \times \mathbf{1}_{t=j}) + \Pi C_{i,t} + \alpha_i + \alpha_t + \epsilon_{i,t}$. The dependent variable is the percentage of annual debt service payments supported by the state. The coefficient estimate is allowed to vary by year where the reference point is the year 1997. $DTL\ High_i$ takes a value of 1 if the district has an average outstanding net long-term debt-to-property tax levy ratio in the 1987-1991 period that is above the median and 0 otherwise. Control variables in $C_{i,t}$ include the local share of total revenue per pupil, a log of current expenditures per pupil, cash holdings scaled by current expenditures, district dummies, and year dummies. Diamond plots indicate that heteroskedasticity-consistent standard errors are used. Square plots indicate that standard errors are clustered at the school district level. All variables are winsorized at the 1st and 99th percentile.

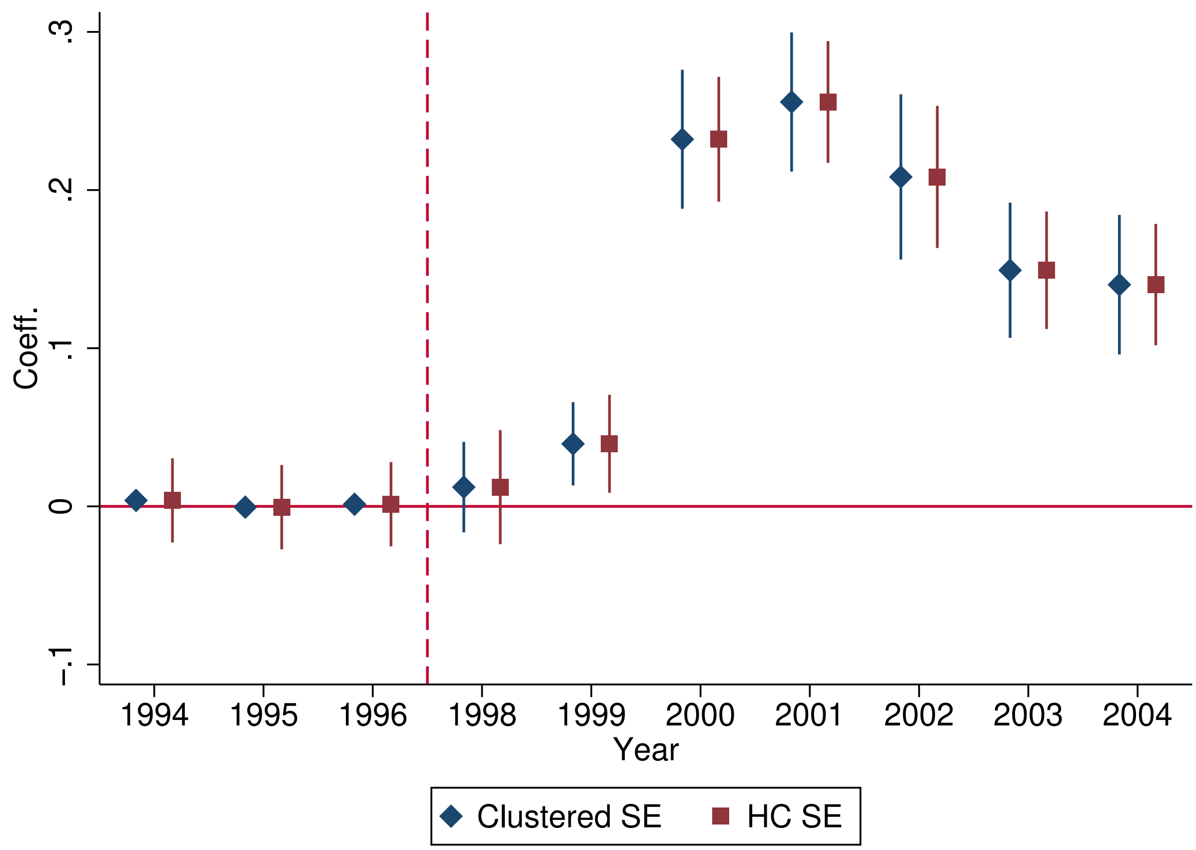


FIGURE 6. Effect of Debt Relief on Capital Investment.
This figure plots coefficient estimates and 95% confidence intervals from the following second stage of the IV approach: $Y_{i,t+h} = \beta^h \widehat{FTD_{i,t}} + \Gamma^h C_{i,t} + \delta_i^h + \delta_t^h + u_{i,t+h}$, for h=0,1,...,9. The dependent variable is a log of capital spending per pupil. $FTD_{i,t}$ is the percentage of annual debt service payments supported by the state. $\widehat{FTD_{i,t}}$ is the predicted value of $FTD_{i,t}$ from the first stage. Control variables in $C_{i,t}$ include the local share of total revenue per pupil, a log of current expenditures per pupil, cash holdings scaled by current expenditures, district dummies, and year dummies. Each plot represents the coefficient estimate from the regressions of h-period ahead outcome variables. For example, the first plot presents the concurrent effect(h=0).

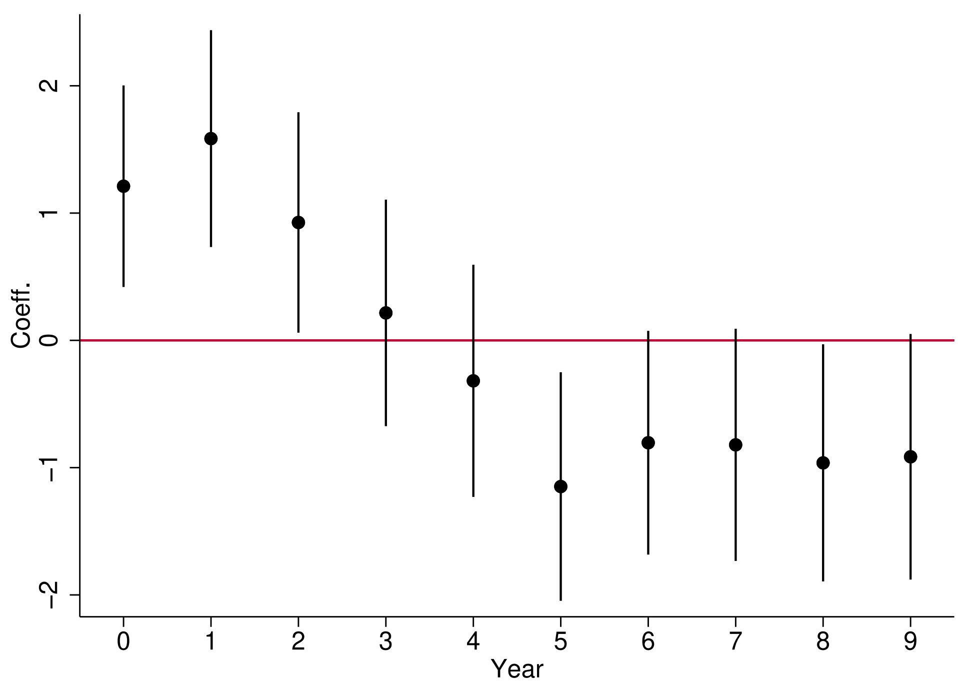
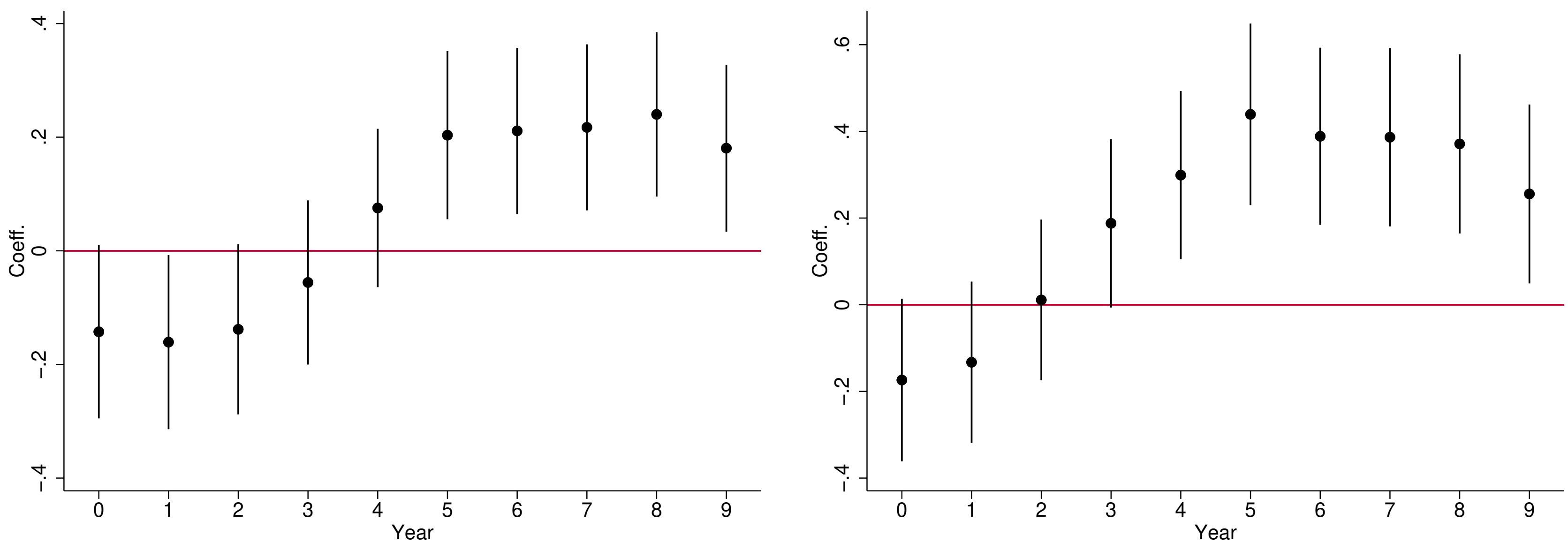


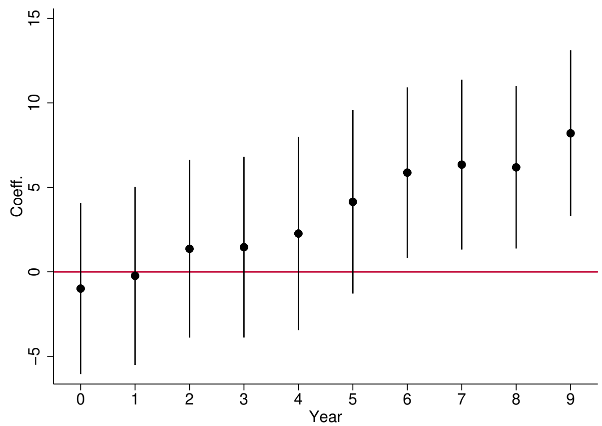
FIGURE 7. Effect of Debt Relief on Standardized Test Scores.
This figure plots coefficient estimates and 95% confidence intervals from the following second stage of the IV approach: $Y_{i,t+h} = \beta^h \widehat{FTD_{i,t}} + \Gamma^h C_{i,t} + \delta_i^h + \delta_t^h + u_{i,t+h}$, for h=0,1,...,9. The dependent variables are standardized 8th-grade reading scores in panel A and standardized 8th-grad math scores in panel B. $FTD_{i,t}$ is the percentage of annual debt service payments supported by the state. $\widehat{FTD_{i,t}}$ is the predicted value of $FTD_{i,t}$ from the first stage. Control variables in $C_{i,t}$ include the local share of total revenue per pupil, a log of current expenditures per pupil, cash holdings scaled by current expenditures, district dummies, and year dummies. Each plot represents the coefficient estimate from the regressions of h-period ahead outcome variables. For example, the first plot presents the concurrent effect(h=0).



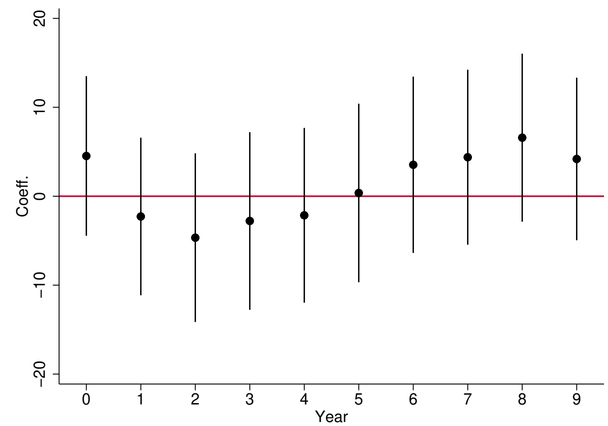
a. Reading Scores

b. Math Scores

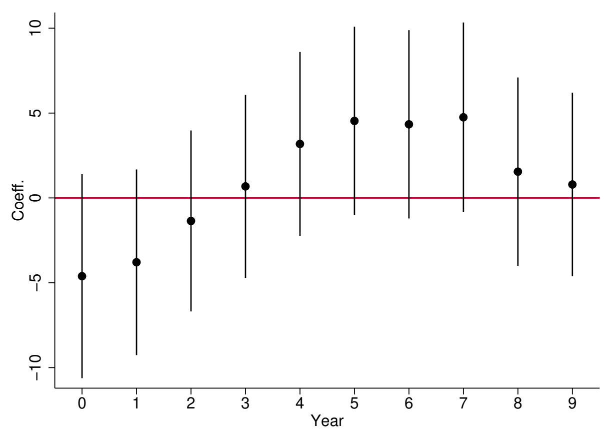
FIGURE 8. Effect of Debt Relief on Non-Test Outcomes.
This figure plots coefficient estimates and 95% confidence intervals from the following second stage of the IV approach: $Y_{i,t+h} = \beta^h \widehat{FTD_{i,t}} + \Gamma^h C_{i,t} + \delta_i^h + \delta_t^h + u_{i,t+h}$, for h=0,1,...,9. The dependent variables are graduation rates in panel A college entrance exam participation rates in panel B, and college enrollment rates in panel C. $FTD_{i,t}$ is the percentage of annual debt service payments supported by the state. $\widehat{FTD_{i,t}}$ is the predicted value of $FTD_{i,t}$ from the first stage. Control variables in $C_{i,t}$ include the local share of total revenue per pupil, a log of current expenditures per pupil, cash holdings scaled by current expenditures, district dummies, and year dummies. Each plot represents the coefficient estimate from the regressions of h-period ahead outcome variables. For example, the first plot presents the concurrent effect(h=0).



a. Graduation (%)



b. College Exam Tested (%)



c. College Enroll (%)

FIGURE 9. Geographical Distribution of School Districts by Indebtedness.
This figure shows the geographical distribution of school districts by *DTL High,* which takes a value of 1 if the district has an average outstanding net long-term debt-to-property tax levy ratio in the 1987-1991 period that is above the median and 0 otherwise.

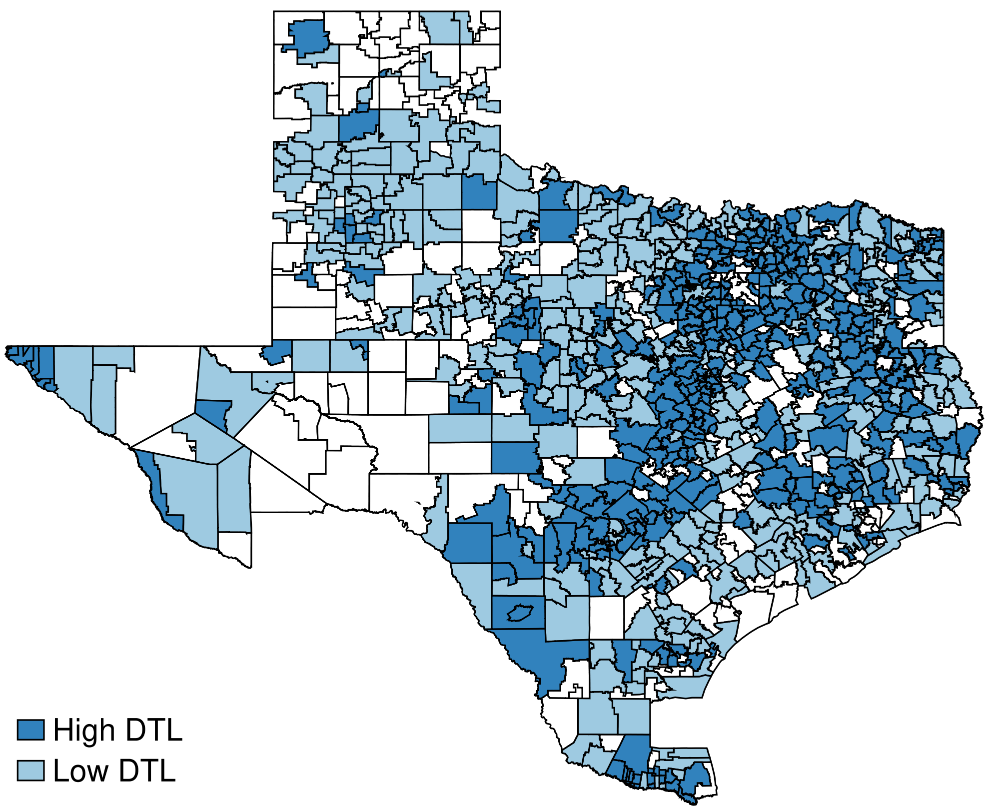


TABLE 1. Summary Statistics

This table provides descriptive statistics at the district-year level. The sample consists of independent school districts in Texas from 1994 to 2004. *Debt-to-prop tax rev* is the ratio of the outstanding long-term debt to property tax revenues. *Debt-to-prop tax rev pre* is defined as the average *Debt-to-prop tax rev* in the 1987-1991 period. *Subsidy-to-Debt Payment* is calculated as the sum of state debt funding divided by the annual debt service payment. *Local* and *State* are local and state revenues as a fraction of total revenues, respectively. *Capital Outlays* and *Current* are capital and current spending as a fraction of total expenditures, respectively. *Enrollment* is the number of students enrolled at the beginning of the fiscal year. *Std. Reading* and *Std. Math* are the district average of standardized 8th-grade reading and math scores, respectively. *% Hispanic* is the percentage of Hispanic student population in the district. *% Econ Disadv* is the percentage of students eligible for free or reduced-price meals in the district.

	Mean	SD	p25	p50	p75
DTL 1987-1991	1.20	1.3	0.16	0.88	1.89
Subsidy-to-Debt Payment	0.16	0.3	0	0	0.23
Taxable Wth pp ($K)	226.6	292.7	103.8	151.3	236.8
Total Rev pp	8003.0	3633.7	6211.4	7316.5	8561.1
Local Rev (%)	42.2	21.4	26.1	36.4	53.4
Expenditure pp	8069.1	3692.3	6113.9	7333.3	8844.5
Capital Outlays (%)	10.9	10.6	3.53	7.09	14.6
Current Spending (%)	84.9	12.9	79.9	89.6	93.9
Enrollment	4006.2	11753.9	428	978	2802
Reading	0.057	0.3	-0.11	0.086	0.26
Math	0.058	0.3	-0.15	0.078	0.28
Graduation (%)	74.3	12.7	66.7	74.4	82.5
College Enrolled (%)	45.5	12.2	37.5	45	53.1
College Exam Tested (%)	62.5	16.2	52	62.2	73.5
LT Debt pp	3074.8	4061.6	0	1814.4	4618.4
Hispanic (%)	28.4	26.7	7.00	19	42
Econ disadv (%)	48.0	18.9	35.3	47.5	59.4

TABLE 2. First Stage Estimation Results.
This table reports coefficient estimates from the following first stage of the IV approach: $FTD_{i,t} = \pi(DTL\ High_i \times Post_t) + \Pi C_{i,t} + \alpha_i + \alpha_t + \epsilon_{i,t}$. The dependent variable is the percentage of annual debt service payments supported by the state. Columns 1 and 2 estimate the first stage without and with control variables, respectively. $FTD_{i,t}$ is the percentage of annual debt service payments supported by the state. $DTL\ High_i$ takes a value of 1 if the district has an average outstanding net long-term debt-to-property tax levy ratio in the 1987-1991 period that is above the median and 0 otherwise. $Post_t$ is an indicator denoting if t is greater than or equal to 1998. Control variables in $C_{i,t}$ include the enrollment size quartile dummies, the local share of total revenue per pupil, a log of current expenditures per pupil, and cash holdings scaled by current expenditures. α_i and α_t are district dummies and year dummies, respectively. All variables are winsorized at the 1st and 99th percentile. Standard errors are presented in parentheses and are clustered at the district level. Significance levels are denoted by *, **, ***, which correspond to 10%, 5%, and 1% levels, respectively.

	(1)	(2)
Dep. Var.: Subsidy-to-Debt Payment		
DTL High × Post	0.151***	0.155***
	(0.014)	(0.014)
% Local Rev		-0.001**
		(0.001)
Log Current Exp. pp		0.097*
		(0.052)
Cash-to-Current Exp.		-0.040
		(0.027)
Size Quartiles		0.058***
		(0.017)
Controls	No	Yes
District FE	Yes	Yes
Year FE	Yes	Yes
Adj R^2	0.54	0.54
Obs.	8675	8674
F-stats	110	117

TABLE 3. Correlations between Local Economy Growth Measures and Treatment Assignment.

This table reports coefficient estimates from the following cross-sectional regression equation: $\Delta Y_i = \rho\ DTL\ High_i + \Gamma \Delta C_i + \epsilon_i$. The dependent variables are a log of per capita income growth, a log of median household income growth, unemployment rate growth, and a log of total employment growth between 1990 and 2000. $DTL\ High_i$ takes a value of 1 if the district has an average outstanding net long-term debt-to-property tax levy ratio in the 1987-1991 period that is above the median and 0 otherwise. Control variables in $C_{i,t}$ include changes in the enrollment size quartile, growth rates of the local share of total revenue per pupil, a log of current expenditures per pupil, cash holdings scaled by current expenditures. Heteroskedasticity-consistent standard errors are presented in parentheses. Significance levels are denoted by *, **, ***, which correspond to 10%, 5%, and 1% levels, respectively.

Dep. Var.:	(1) Log Per Capita Income90_00	(2) Log HH Med Income90_00	(3) Unemployment Rate90_00	(4) Log Employment90_00
DTL High	-0.001	0.008	-0.003	0.143***
	(0.011)	(0.009)	(0.002)	(0.014)
Controls	Yes	Yes	Yes	Yes
Adj. R^2	0.01	0.02	0.00	0.19
Obs.	785	786	781	781

TABLE 4. Effect of Debt Relief on Capital Expenditures.
This table reports coefficient estimates from the following second stage of the IV approach: $\bar{Y}_{i,t} = \beta\widehat{FTD_{i,t}} + \Gamma C_{i,t} + \delta_i + \delta_t + \bar{u}_{i,t}$, where $\bar{Y}_{i,t}$ denotes the average of Y over a specified period. The dependent variable is the log of capital spending per pupil. In particular, the dependent variables are the average between t and $t+4$ in column 1, and between $t+5$ and $t+9$ in column 2. $FTD_{i,t}$ is the percentage of annual debt service payments supported by the state. $\widehat{FTD_{i,t}}$ is the predicted value of $FTD_{i,t}$ from the first stage. Control variables in $C_{i,t}$ include the enrollment size quartile dummies, the local share of total revenue per pupil, a log of current expenditures per pupil, and cash holdings scaled by current expenditures. δ_i and δ_t are district dummies and year dummies, respectively. All variables are winsorized at the 1st and 99th percentile. Standard errors are presented in parentheses and are clustered at the district level. Significance levels are denoted by *, **, ***, which correspond to 10%, 5%, and 1% levels, respectively.

	(1) Yr 0-4	(2) Yr 5-9
Subsidy-to-Debt Payment	1.103***	-0.879**
	(0.365)	(0.396)
Controls	Yes	Yes
District FE	Yes	Yes
Year FE	Yes	Yes
Obs.	8675	8675
F-stat	102.15	102.36

TABLE 5. Effect of Debt Relief on Test Scores.
This table reports coefficient estimates from the following second stage of the IV approach: $\bar{Y}_{i,t} = \beta\widehat{FTD_{i,t}} + \Gamma C_{i,t} + \delta_i + \delta_t + \bar{u}_{i,t}$, where $\bar{Y}_{i,t}$ denotes the average of Y over a specified period. The dependent variables are standardized 8th-grade reading scores in columns 1 and 2 and math scores in columns 3 and 4. In particular, the dependent variables are the average between t and $t+4$ in columns 1 and 3, and between $t+5$ and $t+9$ in columns 2 and 4. $FTD_{i,t}$ is the percentage of annual debt service payments supported by the state. $\widehat{FTD_{i,t}}$ is the predicted value of $FTD_{i,t}$ from the first stage. Control variables in $C_{i,t}$ include the enrollment size quartile dummies, the local share of total revenue per pupil, a log of current expenditures per pupil, and cash holdings scaled by current expenditures. δ_i and δ_t are district dummies and year dummies, respectively. All variables are winsorized at the 1st and 99th percentile. Standard errors are presented in parentheses and are clustered at the district level. Significance levels are denoted by *, **, ***, which correspond to 10%, 5%, and 1% levels, respectively.

	Reading		Math	
	(1)	(2)	(3)	(4)
	Yr 0-4	Yr 5-9	Yr 0-4	Yr 5-9
Subsidy-to-Debt Payment	-0.084	0.211***	0.039	0.370***
	(0.059)	(0.062)	(0.078)	(0.089)
Controls	Yes	Yes	Yes	Yes
District FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Obs.	8677	8677	8677	8677
F-stat	102.28	102.28	102.28	102.28

TABLE 6. Effect of Debt Relief on Non-test Outcomes.
This table reports coefficient estimates from the following second stage of the IV approach: $\bar{Y}_{i,t} = \beta\widehat{FTD_{i,t}} + \Gamma C_{i,t} + \delta_i + \delta_t + \bar{u}_{i,t}$, where $\bar{Y}_{i,t}$ denotes the average of Y over a specified period. The dependent variables are graduation rates in columns 1 and 2, college entrance exam participation rates in columns 3 and 4, and college enrollment rates in columns 5 and 6. In particular, the dependent variables are the average between t and $t+4$ in columns 1, 3, and 5, and between $t+5$ and $t+9$ in columns 2, 4, and 6. $FTD_{i,t}$ is the percentage of annual debt service payments supported by the state. $\widehat{FTD_{i,t}}$ is the predicted value of $FTD_{i,t}$ from the first stage. Control variables in $C_{i,t}$ include the enrollment size quartile dummies, the local share of total revenue per pupil, a log of current expenditures per pupil, and cash holdings scaled by current expenditures. δ_i and δ_t are district dummies and year dummies, respectively. All variables are winsorized at the 1st and 99th percentile. Standard errors are presented in parentheses and are clustered at the district level. Significance levels are denoted by *, **, ***, which correspond to 10%, 5%, and 1% levels, respectively.

	Graduation (%)		College Exam Tested (%)		College Enroll (%)	
	(1)	(2)	(3)	(4)	(5)	(6)
	Yr 0-4	Yr 5-9	Yr 0-4	Yr 5-9	Yr 0-4	Yr 5-9
Subsidy-to-Debt Payment	0.746	6.174***	-2.140	4.647	-1.194	3.227
	(1.967)	(2.062)	(3.886)	(4.176)	(2.178)	(2.257)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
District FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	8677	8677	8675	8675	8677	8677
F-stat	102.28	102.28	102.06	102.35	102.28	102.28

FIGURE A1. 2022 AISD Bond Proposal Construction Schedule
This figure is an example of a construction schedule from the Austin ISD's 2022 bond proposal.

BOND PROGRAM AUSTIN ISD 2022

2022 Bond Schedule: Campus Architectural Team Projects

TABLE KEY
ST: Design Start
OP: Estimated School Opening

SCHOOL	PROJECT TYPE	2023				2024				2025				2026				2027				2028			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
COOK ELEMENTARY SCHOOL	OPEN CONCEPT		ST									OP													
OAK HILL ELEMENTARY SCHOOL	OPEN CONCEPT		ST									OP													
ODOM ELEMENTARY SCHOOL	OPEN CONCEPT		ST							OP															
WILLIAMS ELEMENTARY SCHOOL	OPEN CONCEPT		ST									OP													
ALLISON ELEMENTARY SCHOOL	FULL MODERNIZATION		ST											OP											
BURNET MIDDLE SCHOOL	FULL MODERNIZATION		ST															OP							
HARRIS ELEMENTARY SCHOOL	FULL MODERNIZATION		ST											OP											
HOUSTON ELEMENTARY SCHOOL	FULL MODERNIZATION		ST											OP											
LINDER ELEMENTARY SCHOOL	FULL MODERNIZATION		ST											OP											
PECAN SPRINGS ELEMENTARY SCHOOL	FULL MODERNIZATION		ST											OP											
SADLER MEANS YOUNG WOMEN'S LEADERSHIP ACADEMY	FULL MODERNIZATION		ST															OP							
TRAVIS EARLY COLLEGE HIGH SCHOOL	FULL MODERNIZATION		ST																					OP	
WOOTEN ELEMENTARY SCHOOL	FULL MODERNIZATION		ST											OP											
ANDERSON HIGH SCHOOL	PHASED MODERNIZATION			ST										OP											
CROCKETT EARLY COLLEGE HIGH SCHOOL	PHASED MODERNIZATION			ST														OP							
LANGFORD ELEMENTARY SCHOOL	FULL MODERNIZATION			ST												OP									
LBJ EARLY COLLEGE HIGH SCHOOL	PHASED MODERNIZATION			ST																		OP			
MCCALLUM HIGH SCHOOL	PHASED MODERNIZATION			ST														OP							
NORTHEAST EARLY COLLEGE HIGH SCHOOL	PHASED MODERNIZATION			ST																		OP			
BARRINGTON ELEMENTARY SCHOOL	FULL MODERNIZATION				ST											OP									
CLIFTON CAREER DEVELOPMENT SCHOOL	COMPREHENSIVE				ST									OP											
DOBIE MIDDLE SCHOOL	PHASED MODERNIZATION				ST									OP											
MARTIN MIDDLE SCHOOL	PHASED MODERNIZATION				ST															OP					
OAK SPRINGS ELEMENTARY SCHOOL	FULL MODERNIZATION				ST											OP									
NELSON FIELD	COMPREHENSIVE					ST									OP										
AKINS EARLY COLLEGE HIGH SCHOOL	COMPREHENSIVE						ST								OP										
NAVARRO EARLY COLLEGE HIGH SCHOOL	PHASED MODERNIZATION						ST													OP					
WOOLDRIDGE ELEMENTARY SCHOOL	FULL MODERNIZATION						ST											OP							
AUSTIN HIGH SCHOOL	PHASED MODERNIZATION							ST										OP							
YELLOW JACKET STADIUM	COMPREHENSIVE								ST						OP										
ANDREWS ELEMENTARY SCHOOL	FULL MODERNIZATION								ST													OP			
NELSON BUS TERMINAL	COMPREHENSIVE									ST									OP						
O. HENRY MIDDLE SCHOOL	PHASED MODERNIZATION									ST														OP	
HILL ELEMENTARY SCHOOL	PHASED MODERNIZATION										ST											OP			
DELCO ACTIVITY CENTER	COMPREHENSIVE												ST									OP			

Project timelines were determined by prioritizing safety and security, historically underserved communities, construction timelines and cost savings. The design start and estimated open dates are subject to change based on factors such as supply chain, weather, site development permitting, unforeseen construction conditions, etc.

In addition to the projects listed, there are **300+ targeted projects** which will be implemented as part of the 2022 Bond. For more information, visit **AISDFuture.com** and the **FAQ**.

Revised September 2023 - Design start and estimated opening dates are subject to change.

TABLE A1. Effect of Debt Relief on Capital Expenditures - Robustness Checks Controlling for the 1990 Employment × Linear Trends.

This table reports coefficient estimates from the following second stage of the IV approach: $\bar{Y}_{i,t} = \beta\widehat{FTD_{i,t}} + \Gamma C_{i,t} + \delta_i + \delta_t + \bar{u}_{i,t}$, where $\bar{Y}_{i,t}$ denotes the average of Y over a specified period. The dependent variable is the log of capital spending per pupil. In particular, the dependent variables are the average between t and $t+4$ in column 1, and between $t+5$ and $t+9$ in column 2. $FTD_{i,t}$ is the percentage of annual debt service payments supported by the state. $\widehat{FTD_{i,t}}$ is the predicted value of $FTD_{i,t}$ from the first stage. Control variables in $C_{i,t}$ include the local share of total revenue per pupil, a log of current expenditures per pupil, cash holdings scaled by current expenditures, and the interaction term between the log of 1990 employment and linear trends. δ_i and δ_t are district dummies and year dummies, respectively. All variables are winsorized at the 1st and 99th percentile. Standard errors are presented in parentheses and are clustered at the district level. Significance levels are denoted by *, **, ***, which correspond to 10%, 5%, and 1% levels, respectively.

	Log Cap pp		Log Current Exp. pp	
	(1)	(2)	(3)	(4)
	Yr 0-4	Yr 5-9	Yr 0-4	Yr 5-9
Subsidy-to-Debt Payment	0.988**	-0.579	0.010	-0.015
	(0.426)	(0.471)	(0.031)	(0.034)
Controls	Yes	Yes	Yes	Yes
District FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Obs.	8609	8609	8611	8611
F-stat	76.75	76.83	76.71	76.71

FIGURE A2. Potential IFA Assistance and Taxable Property Value per pupil.
This figure shows the relationship between the potential IFA assistance as a fraction of the debt service payments on the approved bond and the taxable property value per pupil. The sample is the universe of school districts in Texas in the 1998-2003 period.

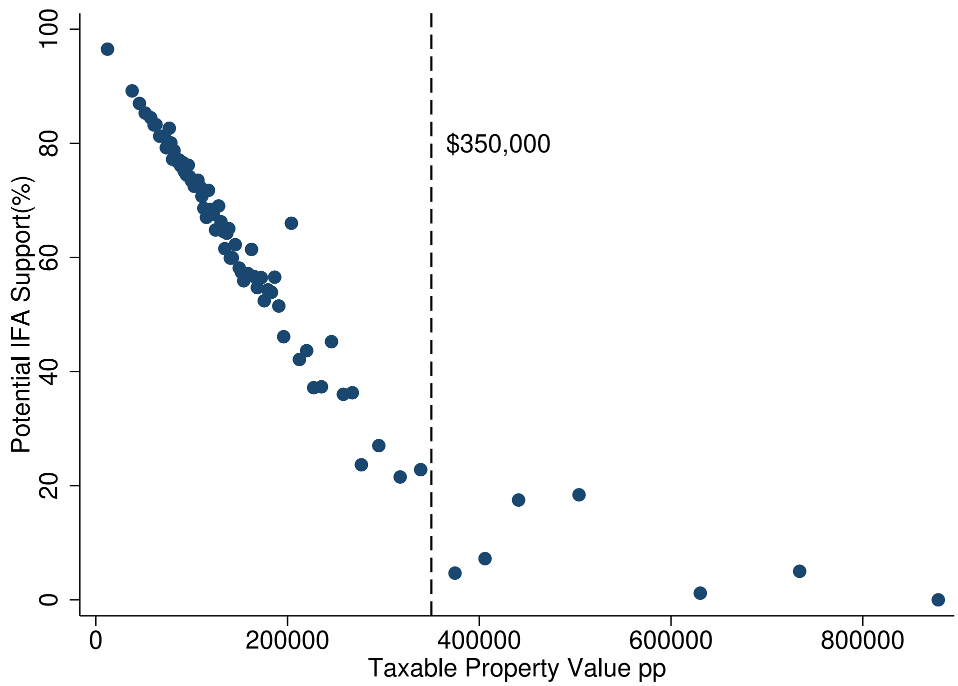


TABLE A2. Effect of Debt Relief on Test Scores - Robustness Checks Controlling for the 1990 Employment × Linear Trends.

This table reports coefficient estimates from the following second stage of the IV approach: $\bar{Y}_{i,t} = \beta\widehat{FTD_{i,t}} + \Gamma C_{i,t} + \delta_i + \delta_t + \bar{u}_{i,t}$, where $\bar{Y}_{i,t}$ denotes the average of Y over a specified period. The dependent variables are standardized 8th-grade reading scores in columns 1 and 2 and math scores in columns 3 and 4. In particular, the dependent variables are the average between t and $t+4$ in columns 1 and 3, and between $t+5$ and $t+9$ in columns 2 and 4. $FTD_{i,t}$ is the percentage of annual debt service payments supported by the state. $\widehat{FTD_{i,t}}$ is the predicted value of $FTD_{i,t}$ from the first stage. Control variables in $C_{i,t}$ include the local share of total revenue per pupil, a log of current expenditures per pupil, cash holdings scaled by current expenditures, and the interaction term between the log of 1990 employment and linear trends. δ_i and δ_t are district dummies and year dummies, respectively. All variables are winsorized at the 1st and 99th percentile. Standard errors are presented in parentheses and are clustered at the district level. Significance levels are denoted by *, **, ***, which correspond to 10%, 5%, and 1% levels, respectively.

	Reading		Math	
	(1)	(2)	(3)	(4)
	Yr 0-4	Yr 5-9	Yr 0-4	Yr 5-9
Subsidy-to-Debt Payment	-0.097	0.136**	-0.154*	0.247**
	(0.071)	(0.069)	(0.093)	(0.102)
Controls	Yes	Yes	Yes	Yes
District FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Obs.	8611	8611	8611	8611
F-stat	76.71	76.71	76.71	76.71

TABLE A3. Effect of Debt Relief on Non-test Outcomes - Robustness Checks Controlling for the 1990 Employment × Linear Trends.

This table reports coefficient estimates from the following second stage of the IV approach: $\bar{Y}_{i,t} = \beta\widehat{FTD_{i,t}} + \Gamma C_{i,t} + \delta_i + \delta_t + \bar{u}_{i,t}$, where $\bar{Y}_{i,t}$ denotes the average of Y over a specified period. The dependent variables are graduation rates in columns 1 and 2, college entrance exam participation rates in columns 3 and 4, and college enrollment rates in columns 5 and 6. In particular, the dependent variables are the average between t and $t+4$ in columns 1, 3, and 5, and between $t+5$ and $t+9$ in columns 2, 4, and 6. $FTD_{i,t}$ is the percentage of annual debt service payments supported by the state. $\widehat{FTD_{i,t}}$ is the predicted value of $FTD_{i,t}$ from the first stage. Control variables in $C_{i,t}$ include the local share of total revenue per pupil, a log of current expenditures per pupil, cash holdings scaled by current expenditures, and the interaction term between the log of 1990 employment and linear trends. δ_i and δ_t are district dummies and year dummies, respectively. All variables are winsorized at the 1st and 99th percentile. Standard errors are presented in parentheses and are clustered at the district level. Significance levels are denoted by *, **, ***, which correspond to 10%, 5%, and 1% levels, respectively.

	Graduation (%)		College Exam Tested (%)		College Enroll (%)	
	(1)	(2)	(3)	(4)	(5)	(6)
	Yr 0-4	Yr 5-9	Yr 0-4	Yr 5-9	Yr 0-4	Yr 5-9
Subsidy-to-Debt Payment	-3.590	2.861	-1.698	8.260	-0.827	5.055**
	(2.305)	(2.325)	(4.733)	(5.137)	(2.508)	(2.553)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
District FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	8611	8611	8609	8609	8611	8611
F-stat	76.71	76.71	76.66	76.79	76.71	76.71

TABLE A4. Effect of Debt Relief on Capital Expenditures - Robustness Checks Controlling for the Enrollment Size Directly.

This table reports coefficient estimates from the following second stage of the IV approach: $\bar{Y}_{i,t} = \beta\widehat{FTD_{i,t}} + \Gamma C_{i,t} + \delta_i + \delta_t + \bar{u}_{i,t}$, where $\bar{Y}_{i,t}$ denotes the average of Y over a specified period. The dependent variable is the log of capital spending per pupil. In particular, the dependent variables are the average between t and $t+4$ in column 1, and between $t+5$ and $t+9$ in column 2. $FTD_{i,t}$ is the percentage of annual debt service payments supported by the state. $\widehat{FTD_{i,t}}$ is the predicted value of $FTD_{i,t}$ from the first stage. Control variables in $C_{i,t}$ include the log of enrollment size, the local share of total revenue per pupil, a log of current expenditures per pupil, and cash holdings scaled by current expenditures. δ_i and δ_t are district dummies and year dummies, respectively. All variables are winsorized at the 1st and 99th percentile. Standard errors are presented in parentheses and are clustered at the district level. Significance levels are denoted by *, **, ***, which correspond to 10%, 5%, and 1% levels, respectively.

	Log Cap pp		Log Current Exp. pp	
	(1)	(2)	(3)	(4)
	Yr 0-4	Yr 5-9	Yr 0-4	Yr 5-9
Subsidy-to-Debt Payment	1.397***	-0.325	0.057*	0.010
	(0.424)	(0.454)	(0.031)	(0.034)
Controls	Yes	Yes	Yes	Yes
District FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Obs.	8675	8675	8677	8677
F-stat	83.05	83.18	83.07	83.07

TABLE A5. Effect of Debt Relief on Test Scores - Robustness Checks Controlling for the Enrollment Size Directly.

This table reports coefficient estimates from the following second stage of the IV approach: $\bar{Y}_{i,t} = \beta\widehat{FTD_{i,t}} + \Gamma C_{i,t} + \delta_i + \delta_t + \bar{u}_{i,t}$, where $\bar{Y}_{i,t}$ denotes the average of Y over a specified period. The dependent variables are standardized 8th-grade reading scores in columns 1 and 2 and math scores in columns 3 and 4. In particular, the dependent variables are the average between t and $t+4$ in columns 1 and 3, and between $t+5$ and $t+9$ in columns 2 and 4. $FTD_{i,t}$ is the percentage of annual debt service payments supported by the state. $\widehat{FTD_{i,t}}$ is the predicted value of $FTD_{i,t}$ from the first stage. Control variables in $C_{i,t}$ include the log of enrollment size, the local share of total revenue per pupil, a log of current expenditures per pupil, and cash holdings scaled by current expenditures. δ_i and δ_t are district dummies and year dummies, respectively. All variables are winsorized at the 1st and 99th percentile. Standard errors are presented in parentheses and are clustered at the district level. Significance levels are denoted by *, **, ***, which correspond to 10%, 5%, and 1% levels, respectively.

	Reading		Math	
	(1)	(2)	(3)	(4)
	Yr 0-4	Yr 5-9	Yr 0-4	Yr 5-9
Subsidy-to-Debt Payment	-0.122*	0.146**	-0.075	0.284***
	(0.068)	(0.069)	(0.088)	(0.099)
Controls	Yes	Yes	Yes	Yes
District FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Obs.	8677	8677	8677	8677
F-stat	83.07	83.07	83.07	83.07

TABLE A6. Effect of Debt Relief on Non-test Outcomes - Robustness Checks Controlling for the Enrollment Size Directly.
This table reports coefficient estimates from the following second stage of the IV approach: $\bar{Y}_{i,t} = \beta\widehat{FTD_{i,t}} + \Gamma C_{i,t} + \delta_i + \delta_t + \bar{u}_{i,t}$, where $\bar{Y}_{i,t}$ denotes the average of Y over a specified period. The dependent variables are graduation rates in columns 1 and 2, college entrance exam participation rates in columns 3 and 4, and college enrollment rates in columns 5 and 6. In particular, the dependent variables are the average between t and $t+4$ in columns 1, 3, and 5, and between $t+5$ and $t+9$ in columns 2, 4, and 6. $FTD_{i,t}$ is the percentage of annual debt service payments supported by the state. $\widehat{FTD_{i,t}}$ is the predicted value of $FTD_{i,t}$ from the first stage. Control variables in $C_{i,t}$ include the log of enrollment size, the local share of total revenue per pupil, a log of current expenditures per pupil, and cash holdings scaled by current expenditures. δ_i and δ_t are district dummies and year dummies, respectively. All variables are winsorized at the 1st and 99th percentile. Standard errors are presented in parentheses and are clustered at the district level. Significance levels are denoted by *, **, ***, which correspond to 10%, 5%, and 1% levels, respectively.

	Graduation (%)		College Exam Tested (%)		College Enroll (%)	
	(1)	(2)	(3)	(4)	(5)	(6)
	Yr 0-4	Yr 5-9	Yr 0-4	Yr 5-9	Yr 0-4	Yr 5-9
Subsidy-to-Debt Payment	-1.632	4.461*	-3.414	6.143	-3.164	2.025
	(2.270)	(2.305)	(4.621)	(4.928)	(2.562)	(2.541)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
District FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	8677	8677	8675	8675	8677	8677
F-stat	83.07	83.07	82.87	83.13	83.07	83.07

TABLE A7. Effect of Debt Relief on Capital Expenditures - Robustness Checks Dropping the Top Enrollment Size Quartile.
This table reports coefficient estimates from the following second stage of the IV approach after dropping the school districts in the top enrollment size quartile as of 1997: $\bar{Y}_{i,t} = \beta\widehat{FTD_{i,t}} + \Gamma C_{i,t} + \delta_i + \delta_t + \bar{u}_{i,t}$, where $\bar{Y}_{i,t}$ denotes the average of Y over a specified period. The dependent variable is the log of capital spending per pupil. In particular, the dependent variables are the average between t and $t+4$ in column 1, and between $t+5$ and $t+9$ in column 2. $FTD_{i,t}$ is the percentage of annual debt service payments supported by the state. $\widehat{FTD_{i,t}}$ is the predicted value of $FTD_{i,t}$ from the first stage. Control variables in $C_{i,t}$ include the enrollment size quartile dummies, the local share of total revenue per pupil, a log of current expenditures per pupil, and cash holdings scaled by current expenditures. δ_i and δ_t are district dummies and year dummies, respectively. All variables are winsorized at the 1st and 99th percentile. Standard errors are presented in parentheses and are clustered at the district level. Significance levels are denoted by *, **, ***, which correspond to 10%, 5%, and 1% levels, respectively.

	Log Cap pp		Log Current Exp. pp	
	(1)	(2)	(3)	(4)
	Yr 0-4	Yr 5-9	Yr 0-4	Yr 5-9
Subsidy-to-Debt Payment	0.685*	-0.615	0.066**	0.019
	(0.369)	(0.420)	(0.031)	(0.034)
Controls	Yes	Yes	Yes	Yes
District FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Obs.	6508	6508	6510	6510
F-stat	93.06	93.29	93.20	93.20

TABLE A8. Effect of Debt Relief on Test Scores - Robustness Checks Dropping the Top Enrollment Size Quartile.
This table reports coefficient estimates from the following second stage of the IV approach after dropping the school districts in the top enrollment size quartile as of 1997:
$\bar{Y}_{i,t} = \beta\widehat{FTD_{i,t}} + \Gamma C_{i,t} + \delta_i + \delta_t + \bar{u}_{i,t}$, where $\bar{Y}_{i,t}$ denotes the average of Y over a specified period. The dependent variables are standardized 8th-grade reading scores in columns 1 and 2 and math scores in columns 3 and 4. In particular, the dependent variables are the average between t and $t+4$ in columns 1 and 3, and between $t+5$ and $t+9$ in columns 2 and 4. $FTD_{i,t}$ is the percentage of annual debt service payments supported by the state. $\widehat{FTD_{i,t}}$ is the predicted value of $FTD_{i,t}$ from the first stage. Control variables in $C_{i,t}$ include the enrollment size quartile dummies, the local share of total revenue per pupil, a log of current expenditures per pupil, and cash holdings scaled by current expenditures. δ_i and δ_t are district dummies and year dummies, respectively. All variables are winsorized at the 1st and 99th percentile. Standard errors are presented in parentheses and are clustered at the district level. Significance levels are denoted by *, **, ***, which correspond to 10%, 5%, and 1% levels, respectively.

	Reading		Math	
	(1)	(2)	(3)	(4)
	Yr 0-4	Yr 5-9	Yr 0-4	Yr 5-9
Subsidy-to-Debt Payment	-0.100	0.199***	-0.038	0.390***
	(0.064)	(0.067)	(0.083)	(0.097)
Controls	Yes	Yes	Yes	Yes
District FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Obs.	6510	6510	6510	6510
F-stat	93.20	93.20	93.20	93.20

TABLE A9. Effect of Debt Relief on Non-test Outcomes - Robustness Checks Dropping the Top Enrollment Size Quartile.

This table reports coefficient estimates from the following second stage of the IV approach after dropping the school districts in the top enrollment size quartile as of 1997: $\bar{Y}_{i,t} = \beta\widehat{FTD_{i,t}} + \Gamma C_{i,t} + \delta_i + \delta_t + \bar{u}_{i,t}$, where $\bar{Y}_{i,t}$ denotes the average of Y over a specified period. The dependent variables are graduation rates in columns 1 and 2, college entrance exam participation rates in columns 3 and 4, and college enrollment rates in columns 5 and 6. In particular, the dependent variables are the average between t and $t+4$ in columns 1, 3, and 5, and between $t+5$ and $t+9$ in columns 2, 4, and 6. $FTD_{i,t}$ is the percentage of annual debt service payments supported by the state. $\widehat{FTD_{i,t}}$ is the predicted value of $FTD_{i,t}$ from the first stage. Control variables in $C_{i,t}$ include the enrollment size quartile dummies, the local share of total revenue per pupil, a log of current expenditures per pupil, and cash holdings scaled by current expenditures. δ_i and δ_t are district dummies and year dummies, respectively. All variables are winsorized at the 1st and 99th percentile. Standard errors are presented in parentheses and are clustered at the district level. Significance levels are denoted by *, **, ***, which correspond to 10%, 5%, and 1% levels, respectively.

	Graduation (%)		College Exam Tested (%)		College Enroll (%)	
	(1)	(2)	(3)	(4)	(5)	(6)
	Yr 0-4	Yr 5-9	Yr 0-4	Yr 5-9	Yr 0-4	Yr 5-9
Subsidy-to-Debt Payment	-2.437	7.105***	0.386	4.150	-1.706	4.520*
	(2.175)	(2.262)	(4.283)	(4.632)	(2.422)	(2.498)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
District FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	6510	6510	6509	6510	6510	6510
F-stat	93.20	93.20	93.12	93.20	93.20	93.20

TABLE A10. Effect of Debt Relief on Capital Expenditures - Robustness Checks Dropping the Top Oil Revenue Quartile.

This table reports coefficient estimates from the following second stage of the IV approach after dropping the school districts in the top oil revenue quartile as of 1997:
$\bar{Y}_{i,t} = \beta\widehat{FTD_{i,t}} + \Gamma C_{i,t} + \delta_i + \delta_t + \bar{u}_{i,t}$, where $\bar{Y}_{i,t}$ denotes the average of Y over a specified period. The dependent variable is the log of capital spending per pupil. In particular, the dependent variables are the average between t and $t+4$ in column 1, and between $t+5$ and $t+9$ in column 2. $FTD_{i,t}$ is the percentage of annual debt service payments supported by the state. $\widehat{FTD_{i,t}}$ is the predicted value of $FTD_{i,t}$ from the first stage. Control variables in $C_{i,t}$ include the enrollment size quartile dummies, the local share of total revenue per pupil, a log of current expenditures per pupil, and cash holdings scaled by current expenditures. δ_i and δ_t are district dummies and year dummies, respectively. All variables are winsorized at the 1st and 99th percentile. Standard errors are presented in parentheses and are clustered at the district level. Significance levels are denoted by *, **, ***, which correspond to 10%, 5%, and 1% levels, respectively.

	Log Cap pp		Log Current Exp. pp	
	(1)	(2)	(3)	(4)
	Yr 0-4	Yr 5-9	Yr 0-4	Yr 5-9
Subsidy-to-Debt Payment	1.304***	-0.817*	0.069**	0.018
	(0.411)	(0.440)	(0.033)	(0.034)
Controls	Yes	Yes	Yes	Yes
District FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Obs.	6510	6510	6510	6510
F-stat	81.74	81.74	81.74	81.74

TABLE A11. Effect of Debt Relief on Test Scores - Robustness Checks Dropping the Top Oil Revenue Quartile.

This table reports coefficient estimates from the following second stage of the IV approach after dropping the school districts in the top oil revenue quartile as of 1997:
$\bar{Y}_{i,t} = \beta\widehat{FTD_{i,t}} + \Gamma C_{i,t} + \delta_i + \delta_t + \bar{u}_{i,t}$, where $\bar{Y}_{i,t}$ denotes the average of Y over a specified period. The dependent variables are standardized 8th-grade reading scores in columns 1 and 2 and math scores in columns 3 and 4. In particular, the dependent variables are the average between t and $t+4$ in columns 1 and 3, and between $t+5$ and $t+9$ in columns 2 and 4. $FTD_{i,t}$ is the percentage of annual debt service payments supported by the state. $\widehat{FTD_{i,t}}$ is the predicted value of $FTD_{i,t}$ from the first stage. Control variables in $C_{i,t}$ include the enrollment size quartile dummies, the local share of total revenue per pupil, a log of current expenditures per pupil, and cash holdings scaled by current expenditures. δ_i and δ_t are district dummies and year dummies, respectively. All variables are winsorized at the 1st and 99th percentile. Standard errors are presented in parentheses and are clustered at the district level. Significance levels are denoted by *, **, ***, which correspond to 10%, 5%, and 1% levels, respectively.

	Reading		Math	
	(1)	(2)	(3)	(4)
	Yr 0-4	Yr 5-9	Yr 0-4	Yr 5-9
Subsidy-to-Debt Payment	-0.079	0.256***	0.106	0.441***
	(0.065)	(0.069)	(0.087)	(0.101)
Controls	Yes	Yes	Yes	Yes
District FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Obs.	6510	6510	6510	6510
F-stat	81.74	81.74	81.74	81.74

TABLE A12. Effect of Debt Relief on Non-test Outcomes - Robustness Checks Dropping the Top Oil Revenue Quartile.

This table reports coefficient estimates from the following second stage of the IV approach after dropping the school districts in the top oil revenue quartile as of 1997: $\bar{Y}_{i,t} = \beta\widehat{FTD_{i,t}} + \Gamma C_{i,t} + \delta_i + \delta_t + \bar{u}_{i,t}$, where $\bar{Y}_{i,t}$ denotes the average of Y over a specified period. The dependent variables are graduation rates in columns 1 and 2, college entrance exam participation rates in columns 3 and 4, and college enrollment rates in columns 5 and 6. In particular, the dependent variables are the average between t and $t+4$ in columns 1, 3, and 5, and between $t+5$ and $t+9$ in columns 2, 4, and 6. $FTD_{i,t}$ is the percentage of annual debt service payments supported by the state. $\widehat{FTD_{i,t}}$ is the predicted value of $FTD_{i,t}$ from the first stage. Control variables in $C_{i,t}$ include the enrollment size quartile dummies, the local share of total revenue per pupil, a log of current expenditures per pupil, and cash holdings scaled by current expenditures. δ_i and δ_t are district dummies and year dummies, respectively. All variables are winsorized at the 1st and 99th percentile. Standard errors are presented in parentheses and are clustered at the district level. Significance levels are denoted by *, **, ***, which correspond to 10%, 5%, and 1% levels, respectively.

	Graduation (%)		College Exam Tested (%)		College Enroll (%)	
	(1)	(2)	(3)	(4)	(5)	(6)
	Yr 0-4	Yr 5-9	Yr 0-4	Yr 5-9	Yr 0-4	Yr 5-9
Subsidy-to-Debt Payment	4.126*	4.607**	2.401	0.597	2.418	2.582
	(2.289)	(2.198)	(4.248)	(4.486)	(2.399)	(2.490)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
District FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	6510	6510	6508	6508	6510	6510
F-stat	81.74	81.74	81.53	81.83	81.74	81.74