Public Schools and Their Pensions:

How Is Pension Spending Affecting U.S. School Districts?

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This project was funded by the Laura and John Arnold Foundation. The school district data collection was part of the National Study of Local Government Pension Costs, 2005-2016.

Abstract: State and local government decisions about how school funding is raised and allocated have profound impacts on American public education, and in recent years, experts have documented large increases in one type of spending in particular: public pensions. Because most data on school district pension expenditures are at the state level, it has so far been difficult to assess what changes local school districts have made in response. In this article, I analyze a new dataset of the annual pension expenditures of approximately 200 unified school districts across the United States from 2005 to 2016. Consistent with findings in the literature, I find that pension expenditures rose in real terms in most of them, but also that there has been significant variation in that growth. Moreover, in a descriptive analysis, I find that larger within-district pension expenditure growth is associated with 1) greater revenue growth in the subsequent year and 2) reductions in school district employment, mainly through reductions in the number of non-teaching staff. Finally, there is evidence that districts' responses to rising pension expenditures may depend on state political institutions, in particular whether the states have mandatory collective bargaining for teachers.

In the last few years, debates about critical race theory, remote instruction, and book banning have put America's local school boards in the national spotlight, but well before 2020 there was another challenge mounting for U.S. school districts: the cost of public employee pensions. The governing dilemmas generated by increasing pension costs arise more gradually than those created by the Covid-19 crisis, and the politics of the issue tend to be less partisan, but the implications for public education nonetheless stand to be profound. Decisions about how school funding is raised and allocated are central to the goals of increasing student achievement and closing learning gaps. And as school districts struggle with the health, behavioral, and learning challenges of providing education in the aftermath of a pandemic—challenges that many argue need to be met with more resources and school staff—districts' ability to address those needs is shaped by their financial capacity. School districts' pension costs and financial health are therefore critically important issues even if they are not often covered in national news media. Examining how districts have adjusted to changes in their pension costs is essential for understanding trends in American public education.

A growing number of studies have documented the large increases in education-related public pension costs across the country. For example, a Pew study of the School District of Philadelphia concludes that "the district is now paying more than it ever has into the retirement system" and that "the district now faces some tough budget decisions as a result" (Pew Charitable Trusts 2019, p. 1). A 2020 report on state finances by Equable finds that "the share of education spending going to pay pension costs has nearly doubled from 7.5% in 2001 to 14.4% in 2018" (Moody and Randazzo 2020, p. 3). Costrell (2015) reports that nationally, employer pension costs increased from $500 per pupil in 2004 to $1,000 per pupil in 2015. Still other studies examine multiple districts in a state at a point in time, such as one analysis of Maryland's

school districts in 2018, which concludes that district spending on teacher pensions exacerbates cross-district disparities in school funding (Marchitello 2019).

Researchers have also begun to examine whether and how these rising pension costs are affecting public education. In a detailed report on teacher pensions, Randazzo and Moody (2023) show that pension cost increases have greatly exceeded growth in K-12 education spending (see also Marchitello 2018). One implication of this, they explain, is that states and school districts are cutting back in other areas of education spending. Kim, Koedel, and Xiang (2021) assess the effects of pension cost increases more directly by linking state-level data on pension costs and salary expenditures. They find that since the Great Recession, increases in state pension costs are associated with reduced spending on teacher salaries (see also McGee 2016)—and that those changes are due to reductions in teaching staff, not changes in average teacher salaries.

These findings make important inroads into the study of how pension cost increases are affecting public education. But much remains to be examined. As Mihaly and Podgursky (2023, p. 57) put it, "increases in district and state pension costs can crowd out spending on teacher salaries, school building improvements, and programs to support students." To fully examine the consequences of rising pension expenditures for public education, it would be helpful to evaluate a number of possible ways school districts could be adjusting to these changes: for example, by reducing teaching staff, reducing non-teaching or support staff, adjusting salaries, or lowering spending in other areas. In addition, it would be useful to know whether some districts have responded by increasing revenue. Because many such decisions and adjustments are made at the district level, it would be advantageous for such an analysis to be done with district-level data. To date, however, district-level data on pension expenditures over time have not been available.

One exception is a 2019 Pivot Learning report that examines the finances of 98 school districts in California over a period of ten years and analyzes survey and interview data from school board presidents across the state. From their data on actual and projected pension expenditures, they find that district spending on CalSTRS (the state's teacher pension plan) more than doubled through 2018 and grew as a share of total district budgets, from 3.8% to 6.4%. District spending on CalPERS (for non-teacher employees) grew as well. They also find that the share of district spending going to teacher salaries declined over the same time period. And their survey data show that some of the most commonly cited ways California districts have responded to rising pension costs are deferring maintenance, increasing class sizes, and offering fewer enrichment classes like music and art. The authors' conclusion is bleak. They write, "Today's students are the ones who will experience fewer support services, fewer enrichment opportunities, and less individualized instruction—even as California's students are more diverse in terms of background and need than ever before" (Pivot Learning 2019, p. 3).

That report stands out for its coverage of a large number of school districts and years as well as its direct investigation of the local-level consequences of rising pension costs, but more research on these questions is needed. Do these effects extend beyond California? Is there a way to move the analysis beyond what district administrators say is happening to a more objective assessment of which budget categories are being most affected by changes in pension costs? Moreover, can one be confident that concurrent trends in school finances are due to rising pension expenditures and not something else?

In an attempt to answer these questions and examine trends in school districts' pension spending over time, I assembled a new dataset. I collected the annual financial reports of more than 200 school districts across the United States for a period of twelve years, from 2005 to

2016. Then, using information in the reports, I built a dataset that tracks how much each district spent on each of its pension plans in each year. My descriptive analysis of trends in the pension spending of this large, diverse, national sample of school districts shows patterns that align with those shown in analyses of state-level data. In most of the school districts in my sample, inflation-adjusted pension expenditures increased as a share of general revenue, per pupil, and per full-time equivalent employee during this period.

Having these district-level pension expenditure data is helpful for evaluating relationships between pension expenditure increases and school district outcomes. While most school districts contribute to one or two large state-administered pension plans, and most of those plans have uniform employer contribution rates, there is still considerable within-state variation in districts' pension expenditures. One reason is that pension benefits are a function of salaries, and salary expenditures are shaped by local policies and decisions, such as on salary schedules, employment levels, and the mix of employees (for example, by experience and employee type). Moreover, in some cases, districts have local plans or defined contribution plans, agreements about employer-paid member contributions (EPMC), or pension obligation bonds on which they are paying interest. Together, these factors generate within-state variation in district pension expenditures and their growth, making it valuable to have district-level, over-time data on the amounts school districts spend on retirement benefits.

I therefore connect this local pension expenditure dataset with annual data on school district staffing, enrollment, revenue, and expenditures from 2005 to 2017, available through the National Center for Education Statistics (NCES). By connecting these datasets, in a descriptive analysis, I can evaluate relationships between changes to pension expenditures and changes in school district revenue, staffing, and other spending. I find that on average, rising pension

expenditures are associated with both increases in revenue and staffing reductions. The dominant pattern, moreover, is that staffing reductions linked to pension expenditure increases are coming from non-teaching staff, such as support staff, rather than teachers. Moreover, there are signs that the relationship between pension expenditures and revenue depends on state political institutions—in particular, whether the state has mandatory collective bargaining for teachers.

Background on pensions

Nearly all the 14 million people who work full-time for U.S. state and local government are eligible for a traditional pension, and school district employees are no different. In retirement, teachers and other K-12 public school employees who have vested in the system receive a defined benefit for as long as they live, equal to a fraction of their final average salary times the number of years they worked for the government. Most are enrolled in large, state-operated pension plans, typically one plan for teachers and another for other school employees, but the arrangement varies by state and district. Some school districts also participate in locally-administered plans, although this is less common for school districts than for cities and counties.

In principle, the model for funding pensions is straightforward: they are supposed to be prefunded, with government employers (here, school districts and the state) and employees (teachers and other school employees) setting aside funds to pay for the retirement benefits earned each year. However, well before 2020, most state and local pension funds did not have sufficient assets to cover the retirement benefits that had been promised. Two broad categories of state and local government decisions contributed to this shortfall. First, over the years officials have made pension benefits more generous (Koedel, Ni, and Podgursky 2014; DiSalvo 2015), such as by increasing the benefit formula's multiplier or reducing the retirement age. Between 1999 and 2001 alone, 34 different states enacted a total of 97 new laws expanding pension

benefits for public employees (Anzia and Moe 2017). These changes have had long-lasting effects, because in many states, pension benefits can only be reduced for future hires—not for future years of work by current employees.

Second, state and local governments have consistently underfunded their pensions, setting aside too little money to pay for the benefits they have promised. The decline in asset values brought by the Great Recession played a large role in decreasing pension funding ratios (Munnell, Aubry, and Cafarelli 2015), but so did many different kinds of decisions by policymakers, including adopting unrealistic actuarial assumptions that make pension liabilities look smaller and keep contributions low (see, e.g., Novy-Marx and Rauh 2011; Aldeman 2020), failure to pay the amounts required for full funding (Anzia and Moe 2019), and politically-motivated investment decisions (Andonov, Hochberg, and Rauh 2018).

School district pension expenditures data

School districts are likely feeling the consequences of these past decisions in the form of rising pension expenditures—both to pay for the larger benefits enacted in the past, and to make up for the growing funding shortfalls (Doherty, Jacobs, and Lueken 2017). To better understand how pension costs have changed in school districts across the United States, I set out to collect the annual financial reports of a large, diverse set of school districts—reports that detail what the governments contributed to each of their employee retirement plans in each year.

Collecting and acquiring information from school district financial reports is difficult, however. The reports can be hard to locate, especially for smaller districts and for years in the more distant past. Once the reports are in hand, moreover, it takes time to find the relevant information and interpret it. Most of these documents are long, and local governments are not always clear and consistent in the way they report their pension contributions. Thus, collecting

and reading the annual financial reports of thousands of school districts for several decades would have been prohibitively costly.

To balance these priorities—the need to include a large, diverse set of districts over time while still having a feasible data collection project—I selected a sample of 215 unified school districts for pension expenditure data collection. I drew these districts from those available in the U.S. Census's Survey of Governments (SOG) Finance and Employment files for years between 2005 and 2016.[1] The SOG Finance files include annual data for all public school systems that provide elementary or secondary education. The SOG Employment files, however, include only a sample of districts, so I drew a sample from the 325 unified school districts that are in the SOG Employment files for most years from 2005 to 2016.

Because the goal was to have a sample of districts varying in size, I divided the 325 districts into eight bins by student enrollment: the largest districts are those with more than 100,000 students enrolled, and the smallest districts have fewer than 5,000 students enrolled. I included in the sample all the school districts from the smallest two enrollment bins (less than 10,000 in enrollment) as well as the largest two enrollment bins (greater than or equal to 50,000 in enrollment). I then used random sampling with replacement, weighted by population, to select 40 school districts within each of the remaining enrollment bins (school districts with enrollment between 10,000 and 49,999). In order to have the sample span most states that have independent school districts, I added two districts from Massachusetts (which have nine years of data in the SOG Employment files), three from New Hampshire (one with eleven years of data and two with

[1] This was part of a larger project in which I selected samples of counties, cities, school districts, and special districts from the SOG data files. See the online appendix for details.

nine years), and three from Tennessee (with nine years of data).[2] A table in the online appendix presents the number of school districts in the sample broken down by size.

For each of these school districts, I attempted to collect twelve years of annual financial reports, from 2005 to 2016. Some school districts had at least some reports available on their websites, typically for the two or three most recent years, but some school districts' websites did not provide any reports at all.[3] For district-years for which the reports were not available online, research assistants contacted the districts to request the documents, filing public information requests where necessary. Many districts provided their reports at no charge; others provided them for a fee; and still others did not respond to the requests. I was able to obtain the complete set (twelve years) of reports with retirement contribution amounts from 164 school districts, or 76% of those in the sample. For an additional 45 districts, I collected reports from some years but not all. There were six districts for which I was unable to collect any reports and one more for which I was only able to acquire the report for 2016.

I attempted to draw several pieces of information from each report, most importantly the amount the district contributed to each of its employee retirement plans in that year. I included contributions to defined contribution plans as well as defined benefit plans, although defined

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[2] Alaska, Hawaii, Maryland, and North Carolina do not have independent school districts, and Virginia only has one. Those states are not included.

[3] School districts use different names for their reports. Most for this time period were called comprehensive annual financial reports, but as long as the format and content of the documents were similar—and if they included information on the retirement plans—I included them. Note these reports are now typically called annual comprehensive financial reports.

contribution plans are rare and typically make up a small share of total contributions. A small number of districts also fund other post-employment benefits (OPEB) from their pension fund contributions. I subtracted out funds going to OPEB whenever possible, but for a very small number of plans, the pension contribution amounts include some OPEB expenditures.

It is important to underscore that this is not a representative sample of school districts. That said, the goal of this study is to document changes in pension spending in school districts of varying sizes and in many states, and to evaluate whether changes in local pension spending within those school districts are associated with changes in school district finance and staffing outcomes. Because this dataset tracks the over-time pension contributions of a diverse set of school districts and links them to finance and employment data, it is well suited to the task. Even so, this caveat should be kept in mind in interpreting the results to follow.

A few other features of the data collection are worth highlighting. First, my goal was to collect school districts' total retirement plan contributions, including any amount of the districts' employee contributions paid by the local government (EPMC, or "pickup"), which can be substantial. Unfortunately, however, in most financial reports, it is difficult to discern whether the district is picking up any of the employees' share of contributions, and even when a report does indicate EPMC, the dollar value is typically not reported clearly and consistently. Therefore, I collected information about EPMC from the reports whenever possible, but I only include EPMC in the contribution amounts analyzed below when they are reported by the district every year. For any other districts that pay EPMC, the amounts I analyze are less than the districts' total pension contributions.

Second, pension obligation bonds (POBs) are less common for school districts than for cities, counties, and states, but there are a few school districts in this dataset (mostly in Oregon)

that either had outstanding POBs or issued POBs during the study period. Ideally, my tracking of districts' total pension expenditures would include any interest paid on those bonds, but the documents do not always report those interest payments clearly, so POB interest is only included when it could be done consistently within a district for all years in the dataset. In addition, because governments usually make a very large contribution to the pension fund in the year they issue POBs (using revenue from the bonds), I subtract the POB bond value from districts' total pension contributions in the year that they issued the POB.[4]

Third, the dataset tracks what the school districts actually paid toward retirement benefits, not what they should be paying. The actual expenditure figures are less debatable—they are just the numbers provided in the reports—and they are also the figures most appropriate for this study.[5] The questions at hand here are whether districts' pension expenditures have risen over time and how that is affecting school districts. The quantity of interest is therefore what the districts actually spent on pensions, because those are the numbers affecting their budgets.

Fourth, the raw pension expenditure data I collected are at the level of the plan, district, and year, but for the analysis, I sum the pension expenditures to the district-year level. Thus, if a district contributes to more than one plan on behalf of its employees, as most do (most commonly one state plan for teachers and another for other employees, but with a variety of

[4] See the online appendix for a detailed description of how this was handled for each case.

[5] Most major state-operated plans have a uniform contribution rate set by the state. In many cases, some of the employer contribution is paid by the state. Still, application of the uniform rate results in different contribution amounts by district because of variation in size, the mix of employees (who participates in which plan), and salaries (and thus payroll).

different arrangements across districts, as described in the online appendix), the totals for the different plans are summed for each district and year. I exclude three districts (covering five plans) entirely because the district did not report having made pension contributions in most or all of the years covered, and another two districts are excluded (two plans) because of inconsistent reporting of contributions over time. I exclude certain years of contributions from other districts because of limited or inconsistent reporting from year to year.[6] Importantly, because I am focused on the over-time changes within districts, I had to ensure the annual contribution amounts within districts are comparable to each other and include the same plans (unless a district phased out or introduced a new plan in a particular year). I therefore exclude the contributions of an additional 47 plans (out of 435 plans)—most of them small—for which the districts' financial documents did not consistently report contributions to the plan in every year the plan existed.[7] In addition, because of a change in Governmental Accounting Standards Board (GASB) rules, some districts' reported contributions for 2015 and 2016 are not comparable to their reported contributions for earlier years, in which cases I only include in the analysis contributions up through 2014. In total, the district-year dataset has 2,202 annual pension expenditure observations from 203 unique school districts, spanning 43 states and 381 plans.

Finally, the dataset only includes the contributions made by the school district—not any expenditures made by the state government on behalf of the district. This is important to note

[6] See the online appendix for details.

[7] I define a "plan" as specific to a school district. For example, if more than one district contributes to the same state-level plan, it is counted as a separate plan for each district in my accounting. See the online appendix for a list of the excluded plans.

because in some states, the state government—not the local district—makes the contributions to the teacher pension fund (see, e.g., Costrell, Hitt, and Schuls 2020). For districts in these states, the district itself usually does still make contributions to one or more other funds, so there are still district-level contributions included in this dataset. I include in the analysis all districts where the district is responsible for making some contribution to pensions. The online appendix includes a list of all school districts that are included in the analysis as well as further description of the dataset.

Trends in school district pension expenditures

I begin with an analysis of variation in the extent to which school districts' pension expenditures have changed over time. I focus mainly on changes within districts over time and less on variation in pension spending across districts because there are many sources of differences in the average amounts of contributions across districts.

To highlight some of that cross-district variation, in the online appendix, I present descriptive statistics on pension expenditures in 2005 and 2014 (all in 2016 dollars): per pupil, per full-time equivalent employee, and as a share of general revenue. One reason these amounts vary across districts has to do with the generosity of the benefit structure, but there many others, such as the size of the unfunded liabilities that are being paid down, the share of total employer contributions paid by the state (versus the district), the composition and tenure of district employees, and more. In addition, some school employees and their pension plans contribute to Social Security, while others do not (and thus do not get Social Security benefits), which affects total pension benefit and contribution amounts. Notably, however, if inclusion in Social Security is fixed within districts over time, it likely creates more cross-district variation in pension expenditures than variation within districts over time.

As a first glance at the data, in Figure 1, I plot the distribution of the percent change in districts' per-pupil pension expenditures from 2005 to 2014 for the 170 districts that have comparable data for both of those years.[8] One finding of note is that the percent change is positive for 86% of the school districts: pension expenditures per pupil grew in real terms between 2005 and 2014 in over four-fifths of these school districts. The distribution in Figure 1 also has a long right tail, showing that a small number of districts had very large growth in per-pupil pension expenditures from 2005 to 2014. Of the districts that had more than 200% growth, most are in Washington State, but the list also includes the school districts in Chicago and Philadelphia. This pattern in the outliers highlights two important features of the district-level pension expenditure data: first, that a large amount of the variation in pension expenditure growth is cross-state variation, and second, that there is some within-state variation across districts, which in some cases (such as Chicago) occurs because districts contribute to local plans.[9]

[8] As explained above, some districts' reported pension expenditures in 2016 are not comparable to those of 2005 because of a change in GASB reporting rules. In Figures 1–3, therefore, I present within-district growth in pension expenditures from 2005 to 2014 so as to include a larger number of districts with comparable pension expenditure amounts in the two years.

[9] The online appendix provides more detail about the composition of plans within districts, such as the fact that eleven districts in this dataset contributed to local plans during this period. Regressing within-district 2005-to-2014 change in per-pupil pension expenditures on state fixed effects yields an R-squared of 0.946. State fixed effects explain a smaller share of the variation in

Examining the per-pupil percentage change in pension expenditures only reveals so much about what is happening in school districts, however, because pension expenditures can increase for a variety of reasons, some of which are not a signal of possible fiscal stress. For example, if a district grows and employs more people, its pension expenditures *should* go up because it is contributing on behalf of more employees. In Figure 2, therefore, I present the distribution of the within-district change in pension expenditures per full-time equivalent (FTE) employee from 2005 to 2014.[10] Change in per-employee pension expenditures is arguably the best measure of the fiscal pressure school districts are feeling from pensions because it is calibrated to the number of employees in the district. If this number increases, that indicates that for a given level of employment, the district is paying more toward pensions, either because the benefits are more expensive, because the district and state are making up for funding shortfalls, or both.

Figure 2 paints a clear picture of the trend in per-employee pension expenditures: 82% of the districts experienced increases from 2005 to 2014 (inflation adjusted). The median increase in per-employee pension expenditures from 2005 to 2014 was $944. (As a benchmark, the median district in this sample spent $3,458 per FTE staff member in 2005; see online appendix Table A4.) Moreover, in 25% of the districts, the increase was more than $2,110, and in the top 10%, it was over $5,476. Viewed as a whole, then, this sample shows that per-employee pension

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per-employee pension expenditure change, shown in Figure 2 (R-squared is 0.82), and change in pension expenditures as a share of general revenue, shown in Figure 3 (R-squared of 0.62).

[10] For a small number of district-years, the NCES FTE staff numbers appear to have errors, so I exclude them for this analysis. See the online appendix for details.

expenditures have increased in most of these districts, but the within-district changes are variable.

In Figure 3, I show the distribution of the change in pension expenditures as a proportion of district general revenue between 2005 and 2014. This, too, is a useful metric because it can indicate whether pension spending is growing faster than revenue. Even if that is the case, however, it is not necessarily a sign of pension-induced fiscal pressure, because it could simply reflect that the district is hiring more employees and contributing on behalf of more people. Regardless, Figure 3 shows that in 85% of the districts in this sample, pension expenditures grew faster than general revenue between 2005 and 2014. In 2005, pension contributions amounted to 3.8% of general revenue in the median district in the sample (online appendix Table A4), with the top 10% of districts spending more than 7.2% of general revenue on pension contributions (not shown). From 2005 to 2014, in the median district, pension expenditures consumed an additional 1.2% of general revenue. In some districts, moreover, the growth was substantial. In the top 10% of school districts, for example, pension expenditures increased by more than 4.2% of general revenue from 2005 to 2014.

Consistent with findings in the existing literature, then, the general pattern of pension expenditures in these school districts is one of increases over time. Some of the increases have been modest, but in a large number of districts, inflation-adjusted pension expenditures have risen regardless of whether examined per pupil, per employee, or as a share of general revenue.

Rising pension expenditures and school district outcomes

The primary advantage of having access to district-level pension expenditure data over time is that they enable an examination of how school districts have responded to changes in their retirement expenditures. If a district is spending more on pensions—particularly more on

pensions for each of its employees—then something has to shift in response. Very few school districts have issued POBs, so either they must be finding additional revenue or reducing spending in other areas (or both). Naturally, different districts and states can respond in different ways, applying varying mixes of cuts and funding increases, but the question I ask here is whether there are discernible trends in how school districts have responded. I do that by analyzing quantitatively whether pension expenditure increases in a district are associated with increases in revenue or decreases in staffing or other categories of spending.

I examine an array of dependent variables, including school district revenue, staff, salary expenditures, and two categories of non-personnel expenditures. For the main dependent variables, I start by describing over-time trends for these districts and evaluating whether they vary with changes in pension spending. Then, to assess whether larger within-district pension spending increases are associated with larger changes in these school district outcomes, I use OLS to model the district funding, staffing, and spending variables, with the main explanatory variable being pension expenditures per employee. I log this main independent variable to reduce the right skew in its distribution, and I also lag it by one year because that is a reasonable model of government decision-making: pension spending in year *t-1* is likely factored into the policy and budget decisions of year *t.* Lagging the pension expenditure variable by one year also helps to address the mechanical endogeneity of pension expenditures per employee and staffing levels in the same year, as I discuss below when I turn to models of school district staffing.

Also key to the modeling approach is the inclusion of both school district and year fixed effects. Different districts spend widely varying amounts on pensions for their employees for a variety of reasons, including different benefit levels, different state funding assumptions and practices, and because districts are held responsible for different proportions of overall pension

contributions. The school district fixed effects partial out the effect of any time-invariant district characteristics associated with their pension expenditure levels and their revenue, staffing, and other expenditures (the dependent variables). Moreover, there are likely secular trends in pension expenditures and these outcomes. For instance, during the Great Recession, state and local revenue decreased at the same time that many local governments were called on to make larger pension contributions (to make up for funding shortfalls, and because of pension reforms). The year fixed effects account for any such annual trends that are constant across districts.

While there are also time-varying characteristics of districts that could plausibly be correlated with both pension expenditures per employee as well as staffing, revenue, and other spending outcomes, it is theoretically unclear what they would be or how they would be correlated with the other variables in the models. One variable that is important to consider is the size of the district: as enrollment in a district grows, one would expect to see revenue and staffing increases, and possibly changes in per-employee pension expenditures as well. In the models, then, I either include the log of total district enrollment as a predictor or model the outcomes in per-pupil terms. While it is less clear how they would affect the estimates, I also run separate models including a set of additional district variables, including the share eligible for free and reduced price lunch, the share with a written Individualized Education Program (IEP), and the share of students who are Black, Hispanic, Asian, and American Indian or Alaskan Native.[11] Data for all of these independent variables come from the NCES; summary statistics

[11] I have also estimated these models including the percentage of students who are English language learners (see online appendix), but that variable has a large number of missing observations, so it is excluded from the main models presented here.

are in the online appendix. Throughout, I cluster the standard errors by state, expecting the error term to be correlated among districts within the same state.

Revenue

I start with an analysis of school district general revenue. For school districts, inflation-adjusted general revenue per student tended to rise from 2005 to 2009, decrease from 2010 to 2013, and then rise again after 2014. In this sample, median general revenue per student was $11,179 as of 2009 (in 2016 dollars). The median then fell to $10,934 by 2013 and exceeded the pre-recession high by 2016, reaching $12,072. There is variation across districts, however. From 2005 to 2017, general revenue per student increased in 75% of the districts and decreased in the remaining 25%. Moreover, of those districts that saw increased revenue over these years, the extent of revenue growth varied dramatically; see Figure A1 of the online appendix.[12] One question, then, is whether there is any detectable link to rising pension spending: are rising local-level pension expenditures associated with increases in revenue?

Because of the political difficulty of raising revenue, it is possible that school districts with greater pension spending increases will *not* see corresponding revenue increases. In my analysis of city and county governments, I found no relationship between growth in pension expenditures and growth in general revenue (Anzia 2022). But school districts are different from cities and counties in important ways, perhaps making it more likely that some pension spending growth would be offset by more revenue. First, it may be easier for local school districts to pass revenue increases than cities and counties. Second, school districts rely much more on

[12] Figure A1 of the online appendix presents the distribution of the change in inflation-adjusted general revenue per pupil between 2005 to 2017.

intergovernmental revenue than cities and counties—particularly from the states. For the median district-year in this sample, about half of general revenue comes from state government, with most of the remaining amount coming from local sources and typically about 10% coming from the federal government. Thus, because of the different nature of school district funding and local school district politics, it is possible that pension spending increases have been met with revenue increases, unlike in most cities and counties.

As an initial assessment of whether there is a link between pension spending increases and revenue increases, in Figure 4, I plot the percent change in district general revenue from the previous year against the percent change in pension expenditures per employee from the previous year. I include all years from 2006 to 2016 but exclude the 2015–2016 observations for districts where 2015–2016 reported contribution amounts are not comparable to those of 2005–2014.[13] The bivariate relationship is slight but positive, with a correlation of 0.11. Next, in Figure 5, I examine longer-term within-district trends: The horizontal axis shows the change in districts' pension expenditures per employee from 2005 to 2014 (up to $10,000); as I did for Figures 1–3, I use 2014 as the later comparison year so as to include a larger number of districts. The vertical axis shows the change in per-pupil general revenue from 2006 to 2015—thus for a time period shifted forward by one year. Figure 5 also shows a slight positive relationship. There

[13] Because there are some cases of very large annual increases in pension contributions (as well as some large changes in general revenue), Figure 4 excludes any values of annual change in revenue or annual change in pension expenditures per employee that are 1.5 times the interquartile range above the third quartile or below the first quartile.

is some sign, then, that districts with greater pension expenditure increases may have experienced somewhat greater general revenue growth.

In Table 1, I present the estimates from the OLS models, which analyze year-to-year variation. Column 1 shows results of a model of logged general revenue regressed on logged pension expenditures (lagged by one year), logged enrollment, and district and year fixed effects.[14] The model in column 2 adds the other controls. All models in the table are estimated with district revenue data from 2006 to 2017—and thus pension expenditure data from 2005 to 2016—but for districts where the 2015–2016 pension expenditure data were not comparable to earlier years, those district-year observations are excluded from the analysis.

In both of the first two models, the estimated coefficients on logged pension expenditures per employee are positive and statistically significant at the 5% level. In column 1, it is 0.068, suggesting that on average, a 10% increase in pension expenditures per employee is associated with a 0.68% increase in district general revenue. In column 2, when I add the other controls, the coefficient on logged pension expenditures per employee changes only modestly.

Logging the variables in the models has the advantage of reducing significant skew in their distributions, especially pension expenditures per employee, but one would also like to have a sense of the magnitude of this relationship in dollar terms. To that end, in column 3, the dependent variable of the model is per-pupil general revenue, in 2016 dollars, and the independent variable is lagged pension expenditures per employee (not logged). I exclude cases

[14] In the online appendix, I show results without district fixed effects and with state fixed effects.

with very large values of the independent variable.[15] The estimates show that, on average, a $100 increase in pension expenditures per employee is associated with a $16.50 increase in general revenue per student.

In columns 4 through 6 of Table 1, I re-estimate the model from column 1 for major components of school district revenue separately: total revenue from local sources;[16] local property tax revenue specifically, which makes up a large majority of local revenue in most districts; and total revenue from the state government. The results in column 4 show that a 10% increase in pension expenditures per employee is associated with an average 0.68% increase in total local revenue (p=0.106, two-tailed). Moreover, when I focus on property tax revenue in column 5, the estimates suggest that a 10% increase in pension expenditures per employee is associated with roughly a 1.07% increase in property tax revenue the following year. The results do not change substantively when I model the revenue outcomes per pupil, as in column 3, or add the full set of controls (see online appendix).

In column 6, the dependent variable is logged revenue from the state. This is important to examine both because districts receive a large share of revenue from states and because, as discussed earlier, many states contribute to districts' pensions. If a state's pension contributions increase—which would not be tracked in these data—the result could be less money flowing

[15] Specifically, I exclude cases that have values that are more than 1.5 times the interquartile range above the third quartile. The estimates of this model are sensitive to the inclusion of these observations; see the online appendix Table A9.

[16] This includes local property taxes, local non-property taxes, any investments, and revenue from food service, student activities, sales of textbooks, and any transportation and tuition fees.

from the state to its school districts for other spending purposes. In column 6, the results are suggestive of a possible positive relationship between pension contribution changes and changes in revenue from the state (p=0.127, two-tailed), but it is difficult to parse out the precise nature of these state-local dynamics with this empirical design. Results in the online appendix indicate no relationship between pension expenditures and revenue from the federal government.

To some extent, then, there is an overall trend of increases in per-employee pension spending being associated with revenue growth—and more of that revenue growth appears to be from local sources, particularly property taxes. Importantly, however, the earlier analysis showed that pension expenditures have risen faster than general revenue in most districts, suggesting that even with revenue increases, districts might still be under pressure to limit costs in other ways.

Staffing

Similar to the general pattern of school district revenue, staff per pupil in the typical district decreased during and after the Great Recession but then rebounded, recovering to pre-recession levels by 2017. In the median district in 2005, there were 12 FTE staff per 100 students. Figure A2 in the online appendix shows the distribution of change in the staff-per-pupil ratio from 2005 to 2017. For most districts in the sample, the staff-to-student ratio was larger in 2017 than in 2005, but there is considerable variation. In 38% of the districts, the ratio shrank from 2005 to 2017.

The LOWESS plot in Figure 6 provides an initial look at the relationship between districts' changes in pension expenditures and changes in staff per student. The horizontal axis is again each district's change in pension expenditures per employee from 2005 to 2014 (up to $10,000), and the vertical axis shows the districts' changes in staff per student for a time period

shifted forward one year (2006 to 2015). The negative relationship between the two is a preliminary sign of a contraction in staffing levels connected to pension expenditure growth.

In Table 2, I begin by modeling the log of the total number of FTE staff in the district for the years 2006 to 2017. I use the same modeling approach as in Table 1, including district and year fixed effects, logged pension expenditures per employee in the previous year, and time-varying district-level controls.[17] Column 1 presents estimates of the model that only includes logged enrollment as a control, and column 2 presents the results of the model with the full set of time-varying controls. Both sets of estimates show that larger pension expenditure increases per employee are associated with larger staffing reductions the following year. On average, a 10% increase in pension expenditures per employee is associated with a 0.81% to 0.88% decrease in FTE employment the following year. In column 3, the dependent variable is total staff per 100 students, and pension expenditures per employee is not logged. The coefficient estimate indicates that a $100 increase in pension expenditures per employee is associated with a reduction of 0.02 staff members per 100 students.

Are there signs that certain categories of school district employees are disproportionately associated with changes in pension expenditures? To illustrate the typical composition of a school district's staff, Figure 7 presents the median FTE staff per student in several categories reported in the NCES database. Teachers are the largest category of school district employee,

[17] Again, observations for 2015 and 2016 are excluded for districts where the pension expenditure figures reported are not comparable to those of 2005–2014. Also, in the online appendix, I show the main model estimates without fixed effects, then with state rather than district fixed effects.

making up roughly half of all staff in the typical school district. Figure 7 is also useful as an illustration of the composition of school districts' non-teaching staff, including student support staff, administrative staff, and other support staff. The largest category of student support staff is instructional aides, and the typical district also has smaller numbers of student support services staff (which includes attendance officers and providers of health, psychology, speech pathology, audiology, or social services and their supervisors), guidance counselors, librarians and media specialists and their support staff, and school and district instructional coordinators. The typical district also has administrators and administrative support staff at the district and school level, and the NCES reports a large category called "other support services staff," which includes support staff not included in other categories, including cafeteria workers and bus drivers.

In columns 4–8 of Table 2, I analyze whether changes in pension expenditures per employee are associated with changes in staffing levels in different categories, beginning with models of the log of the number of teachers. The estimates in column 4 show no discernible relationship between the size of pension expenditure changes and reductions in teaching staff; the coefficient on logged pension expenditures per employee is statistically insignificant. While this does not rule out the possibility that certain districts are addressing rising pension expenditures by increasing class sizes and decreasing the number of teachers, it does indicate no clear association among school districts in this sample. Instead, it appears that pension-induced staff reductions are concentrated among non-teaching staff. In column 5, I model the log of total non-teaching staff and estimate a significant, negative coefficient on districts' pension expenditures. On average, in this sample, a 10% increase in pension expenditures per employee is associated with a 1.64% decrease in non-teaching staff in the district.

Finally, in columns 6 through 8, I estimate separate models for all student support staff (such as instructional aides and guidance counselors), administrative staff, and other support staff (the large category that includes cafeteria workers and bus drivers). The coefficient in column 6 is negative (p=0.12, two-tailed), suggesting a negative relationship between pension expenditure increases and student support staff. There is no discernible relationship for administrative staff. The largest negative coefficient is in column 8, for other support staff. Thus, the overall pattern in this sample of districts is one of rising pension expenditures associated with non-teaching staff reductions, with those reductions concentrated among support staff.

Other spending

A third area to explore is whether pension expenditure increases are prompting reductions in other spending categories. A seemingly natural place to start is with salaries and the question: is growth in pension expenditures associated with slower growth in employee salaries? While this question is straightforward, however, answering it with quantitative empirical analysis is difficult. Even if over-time data on local salary schedules were readily available for these districts, pension benefits are partly a function of salaries, such that when salaries increase, the normal cost of pensions does as well. This makes it difficult to disentangle the two. In addition, in the majority of these districts, salary schedules are subject to bargaining, and contracts are typically negotiated and set once every two to three years. One implication is that a salary increase agreed to in time *t-2* would presumably also set salaries for *t-1* and *t* —and would be correlated with pension contributions in time *t-1* as well. This complicates the modeling strategy of lagging pension expenditures by one year. On top of this, local salary schedule data are not available; the best information on salaries in the NCES data is district salary expenditures, which are also shaped by the number of staff.

In spite of these challenges of modeling and interpretation, as a step toward completing the picture, in columns 1–3 of Table 3, I model district salary expenditures, first logged (columns 1 and 2), and then per pupil (column 3). The pension expenditure variable in column 1 is lagged by one year, as in the models above, and so the model includes district salary expenditures for the years 2006 to 2017. The estimates show that on average, within districts, pension expenditures have a slight positive relationship to salary expenditures the following year. Because earlier salary agreements could have led to both pension contribution increases as well as salary increases the following year, in column 2, I lag pension expenditures by two years (which limits the estimation to the years 2007 to 2017). The coefficient estimate in column 2 is indistinguishable from zero. In column 3, I also find a null relationship between pension expenditures and per-pupil salary expenditures the following year. In the online appendix (Figure A3), moreover, I show that the relationship between within-district overtime growth in pension expenditures per employee (for the period 2005 to 2014) and growth in per-pupil salary expenditures (for the period 2006 to 2015) is essentially flat.

Finally, in columns 4 and 5 of Table 3, I examine two dependent variables that capture spending on non-personnel budget items: logged total capital outlays in the district, which includes spending on construction and public buildings, and logged expenditures for textbooks used for classroom instruction, both for years 2006 to 2017. The model of capital outlays does not show that larger increases are associated with reductions in capital expenditures. In column 5, moreover, the coefficient estimate is negative but not significant ($p=0.189$, two-tailed). Thus, there are few signs that rising pension expenditures are associated with reductions in non-personnel spending in these areas. Instead, the clearest trends are that rising pension expenditures

are associated with some revenue increases as well as staffing decreases, the latter concentrated more among non-teaching staff.

State variation in the associations with rising pension expenditures

Because this dataset covers almost all states with independent school districts—and thus states and school districts with a diverse set of political conditions—it is worth exploring whether the responses to rising pension expenditures depend on those conditions. A number of state and district-level characteristics could be important, but here I look at three variables that are especially relevant to the topic at hand: whether local governments in the state are constrained by tax and expenditure limits (TELs), whether they are in more conservative or liberal counties, and whether the state mandates collective bargaining for teachers.

State TELs are important to consider because they could potentially limit local officials' options for responding to rising pension expenditures. Research on the effects of TELs finds that they make it more difficult for officials to raise revenue and may work to limit local spending (e.g., Poterba and Rueben 1995; Dye, McGuire, and McMillen 2005). It could be, then, that school districts more constrained by TELs would be less likely to respond to rising pension spending by increasing revenue and possibly more likely to respond by reducing staffing or other spending.

In research on local politics, moreover, the partisan and ideological leanings of local residents have been shown to be correlated with local government revenue and spending. Cities whose residents lean Democratic in presidential elections and have more liberal positions on national policy issues tend to raise and spend more overall (Tausanovitch and Warshaw 2014; Einstein and Kogan 2016). One possibility is thus that school districts in more Democratic,

liberal areas are more likely to respond to rising pension spending with revenue increases and are less likely to cut back on staffing or other spending.

Finally, districts' collective bargaining status is an important factor to consider for two reasons. The first is because of its importance to how matters of school policy are decided, including employee compensation and sometimes some staffing matters (e.g., Strunk and Grissom 2010). In states like California and Illinois, school district officials must come to agreement with teachers' and other school employees' unions on district policies regarding the salary schedule and many fringe benefits. Compared to school districts without mandated collective bargaining, these district officials might have less flexibility in how they reduce costs to respond to rising pension expenditures, such as by giving smaller salary increases. Second, state collective bargaining laws are highly correlated with teacher union membership rates (Moe 2011, Hartney 2022). It may be that in states with mandatory collective bargaining and well-organized teachers' unions, there is greater political pressure to increase funding to public schools to stave off employment reductions and make room for salary growth. At the local level, stronger teachers' unions might be able to help push through revenue increases. At the state level, teachers' unions with more political clout might be more successful in advocating for increased state funding to local school districts. It is therefore worth exploring whether the response to rising pension spending is different for school districts in places with collective bargaining than in places without.

It is notoriously difficult to collect data on the political and institutional environments in local school districts, and there are currently no available data on the tax environment, partisanship, or collective bargaining status of each school district. Instead, for the strength of TELs, I use a state-level dataset developed by Amiel, Deller, and Stallmann (2009), which

incorporates information on the type of TEL a state has, its scope and restrictions, and the provisions and established methods for exemptions and overrides. The resulting index ranges from 0 (e.g., New Hampshire) to 38 (Colorado), with higher values indicating more restrictive TELs. As a measure of local partisanship and ideology, I use the vote share received by Barack Obama in the school district's county in 2012.[18] For collective bargaining status, state laws on teacher collective bargaining are a good proxy: in states where there is a duty-to-bargain law for teachers, virtually all school districts in the state have collective bargaining (see Moe 2011). I therefore use data on state collective bargaining laws as of 2012 from Anzia and Moe (2016): a binary indicator of whether the state requires collective bargaining for teachers. Fifteen of the states in this dataset do not require collective bargaining, including many states in the South and Mountain West. The remaining 28 states have duty-to-bargain laws for teachers.

In Table 4, I focus on two main dependent variables—general revenue and total FTE staff, both from 2006 to 2017—and interact the lagged pension expenditures variable with each of the three political variables: first TEL strength (columns 1 and 2), then partisanship (columns 3 and 4), and finally collective bargaining status (columns 5 and 6). The estimates in column 1 show that the association between pension contribution increases and revenue increases does not vary significantly with the strength of state TELs. For a school district in a state with an average-strength TEL, the coefficient on logged pension expenditures is 0.08 and significant at the 5% level, and the interaction between TEL strength and the pension expenditures variable is small and insignificant. Nor does the association with staffing vary by TEL strength, as shown in

[18] The data come from Tausanovitch and Warshaw (2014). I also use their measure of county-level citizen ideology; see the online appendix.

column 2. In column 3, moreover, I examine whether districts in Democratic counties have a larger association between pension expenditures and increasing revenue, but I find no such relationship. It also does not appear that districts in more Democratic counties have a stronger relationship between pension expenditures and staffing reductions (column 4).

The one model in which the interaction term is significant is column 5: the model of general revenue with pension spending interacted with the indicator for mandatory collective bargaining for teachers. In districts in non-mandatory bargaining states, increasing pension expenditures are not associated with significantly larger revenue increases: the coefficient on pension expenditures per employee is statistically insignificant. However, the interaction of collective bargaining and pension expenditures is 0.082 and significant at the 5% level, indicating that the revenue growth relationship to rising pension expenditures is more pronounced in states with collective bargaining. In column 6, I return to the model of total FTE staff to evaluate whether districts in states with collective bargaining had more or less reduction in employment associated with rising pension spending. I find that in states with and without collective bargaining, larger pension expenditure increases are linked to larger staff reductions the following year. In states without mandatory bargaining, a 10% increase in pension spending per employee is associated with a 1.14% drop in employment the following year. In districts with mandatory bargaining, it is associated with a 0.77% decrease. However, the coefficient on the interaction term is statistically insignificant, and so those pension-associated staff reductions are not significantly more pronounced in states without collective bargaining.

In sum, regardless of whether the state has mandatory bargaining for teachers, a strong TEL, or a more Democratic-leaning constituency, rising pension expenditures are associated with larger staff reductions. However, districts in states with collective bargaining also have a

positive relationship between pension expenditure increases and revenue increases. One reason for this could be that teachers and other school employees in states with collective bargaining have high rates of unionization and are very active in state and local politics (Hartney 2022). Perhaps because of their greater political strength in these contexts, public employee unions are able to stave off some school expenditure cuts by pressuring for greater revenue.

Conclusion

Researchers and practitioners in recent years have been warning about rising retirement costs in school districts and the consequences for public education. Detailed analyses of single districts—usually large, urban districts like Philadelphia and Chicago—have pointed to the dramatic increases in district pension expenditures and the other changes in staffing and spending that have happened concurrently. Some experts have expressed concern about state teacher pension funding ratios as well as the rising proportion of state funding that is being put toward shoring up teachers' and other state pension funds. Recent detailed studies show that growth in state expenditures on school pensions has drastically outpaced growth in K-12 spending more generally (e.g., Randazzo and Moody 2023). And a report of pension expenditures in California school districts lays out how school administrators are feeling pressure from these changes—and what they report their school districts are doing to make room for the required increases in pension contributions (Pivot Learning 2019).

With the data available, it has so far been difficult for researchers to analyze how these pension expenditure increases are associated with district-level outcomes of interest. In any given year, revenue, staffing, and salary policies are shaped by numerous political and economic forces, and in any given district, there is some tug-of-war over how resources will be allocated.

Thus, while some have expressed concern over how retirement costs are reshaping public education, it has been difficult to analyze the particulars of how districts may be adjusting.

This article presents new data on the over-time pension expenditures of approximately 200 school districts across the United States, spanning a period of twelve years before, during, and after the Great Recession. In the first part of the analysis, I summarized the longer-term changes in those expenditures—per pupil, per employee, and as a share of general revenue. Not all school districts have experienced real growth in their pension expenditures, but the vast majority have. And while the growth has been modest in some districts, in others it has been substantial. Thus, as others have shown, pension expenditure growth is putting pressure on many school districts' budgets.

More importantly, this article analyzes whether within-district growth in pension contributions is associated with changes in several key district outcomes: general revenue, employment levels, salary expenditures, and two non-personnel spending areas. This is one way of evaluating whether certain trends in district finances and staffing are empirically linked to the magnitude of changes in their pension expenditures. I find that they are. School districts with greater pension expenditure increases have seen greater growth in their revenue—but only in states where there is mandatory collective bargaining for teachers. But pension spending growth is also associated with staffing reductions. On the one hand, there is little to no trend of reductions in teaching positions associated with pension spending growth. On the other hand, there is a clear trend of reduction in non-teaching staff, such as support staff.

Importantly, this should not be viewed as an assessment of what should be happening or what should be done going forward but rather an evaluation of what *is* and *has been* happening, based on analysis of data presented in the districts' own financial reports. It provides a more

complete picture of how pension spending is related to school district fiscal and staffing outcomes than has been possible in the past. And it illustrates the tradeoffs of pension cost growth for states, school districts, teachers, other school employees, and of course the students themselves. What can and should be done going forward will continue to be debated. But because of this analysis, we can see more clearly what is at stake, not just in the future—as is so often the case in debates about pensions—but in the present and past.

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Table 1: Revenue

	Ln(General revenue)		*General rev. per pupil*	*Ln(Local revenue)*	*Ln(Property tax revenue)*	*Ln(State revenue)*
	(1)	(2)	(3)	(4)	(5)	(6)
Ln(Pension exp. per employee)	0.068**	0.067***		0.068	0.107**	0.05
	(0.026)	(0.024)		(0.041)	(0.044)	(0.032)
Pension exp. per employee			0.165**			
			(0.079)			
Ln(Enrollment)	0.809***	0.842***		0.533***	0.50***	1.217***
	(0.092)	(0.082)		(0.132)	(0.168)	(0.210)
% Free/reduced lunch		0.001				
		(0.026)				
% IEP		0.513***				
		(0.151)				
% Black		-0.239				
		(0.238)				
% Latino		-0.257				
		(0.288)				
% Asian		-0.268				
		(0.347)				
% American Indian		0.099				
		(0.720)				
R-squared	0.9966	0.9967	0.8941	0.9931	0.9925	0.9888
Observations	2,161	2,077	2,086	2,161	2,087	2,161

Notes: Standard errors clustered by state in parentheses. All models include district and year fixed effects. *Pension exp. per employee* is logged in all but column 3. Column 3 excludes outliers on *Pension exp. per employee*. *p<0.10, **p<0.05, ***p<0.01 (two-tailed).

Table 2: Staffing

	Ln(Total FTE staff)		*Staff per 100 students*	*Ln(Teachers)*	*Ln(Non-teaching staff)*	*Ln(Student support staff)*	*Ln(Admin. staff)*	*Ln(Other support staff)*
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Ln(Pension exp. per employee)	-0.081**	-0.088**		-0.005	-0.164**	-0.11	-0.009	-0.252***
	(0.032)	(0.033)		(0.019)	(0.073)	(0.069)	(0.104)	(0.048)
Pension exp. per employee			-0.0002***					
			(0.0001)					
Ln(Enrollment)	0.911***	0.911***		0.902***	1.078***	1.032***	1.132***	0.962***
	(0.072)	(0.080)		(0.062)	(0.166)	(0.199)	(0.189)	(0.286)
% Free/reduced lunch		0.006						
		(0.027)						
% IEP		0.197						
		(0.242)						
% Black		-0.014						
		(0.304)						
% Latino		0.234						
		(0.353)						
% Asian		0.002						
		(0.376)						
% American Indian		1.809*						
		(0.956)						
R-squared	0.994	0.9941	0.8513	0.9975	0.9732	0.9537	0.9658	0.9393
Observations	2,141	2,057	2,066	2,130	2,138	2,145	2,148	2,014

Notes: Standard errors clustered by state in parentheses. All models include district and year fixed effects. *Pension exp. per employee* is logged in all models except (3). *p<0.10, **p<0.05, ***p<0.01 (two-tailed).

Table 3: Other expenditures

	Ln(Salary expenditures)		*Salary expenditures per pupil*	*Ln(Capital outlays)*	*Ln(Textbook expenditures)*
	(1)	(2)	(3)	(4)	(5)
Ln(Pension exp. per employee)	0.03*	0.025		0.139	-0.221
	(0.017)	(0.020)		(0.178)	(0.165)
Pension exp. per employee			0.011		
			(0.030)		
Ln(Enrollment)	0.982***	0.977***		-0.017	0.644*
	(0.094)	(0.098)		(0.550)	(0.321)
R-squared	0.9975	0.9975	0.9111	0.8054	0.8173
Observations	2,161	2,033	2,086	2,160	1,673

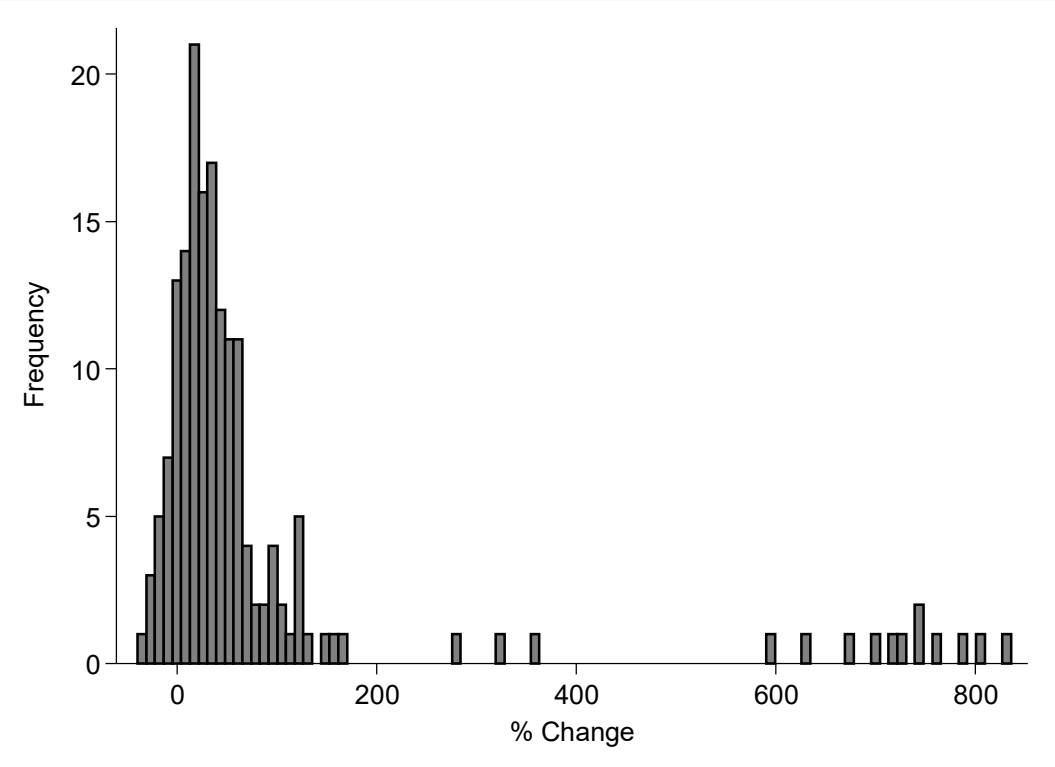
Notes: Standard errors clustered by state in parentheses. Models include district and year fixed effects. *Pension exp. per employee* is logged in all but (3). It is lagged by one year in all but (2), where it is lagged by two years. *p<0.10, **p<0.05, ***p<0.01 (two-tailed).

Table 4: Political conditions

	Ln(General revenue) (1)	*Ln(Staff)* (2)	*Ln(General revenue)* (3)	*Ln(Staff)* (4)	*Ln(General revenue)* (5)	*Ln(Staff)* (6)
Ln(Pension exp. per employee)	0.08**	-0.071*	0.068**	-0.086**	-0.003	-0.114**
	(0.030)	(0.039)	(0.029)	(0.032)	(0.047)	(0.045)
TEL * Ln(Pensions)	-0.002	-0.002				
	(0.002)	(0.002)				
Democratic vote * Ln(Pensions)			0.008	0.147		
			(0.095)	(0.109)		
Collective bargaining * Ln(Pensions)					0.082**	0.037
					(0.040)	(0.039)
Ln(Enrollment)	0.818***	0.919***	0.809***	0.916***	0.810***	0.912***
	(0.088)	(0.070)	(0.091)	(0.073)	(0.089)	(0.070)
R-squared	0.9967	0.9941	0.9966	0.9941	0.9967	0.9941
Observations	2,161	2,141	2,155	2,135	2,161	2,141

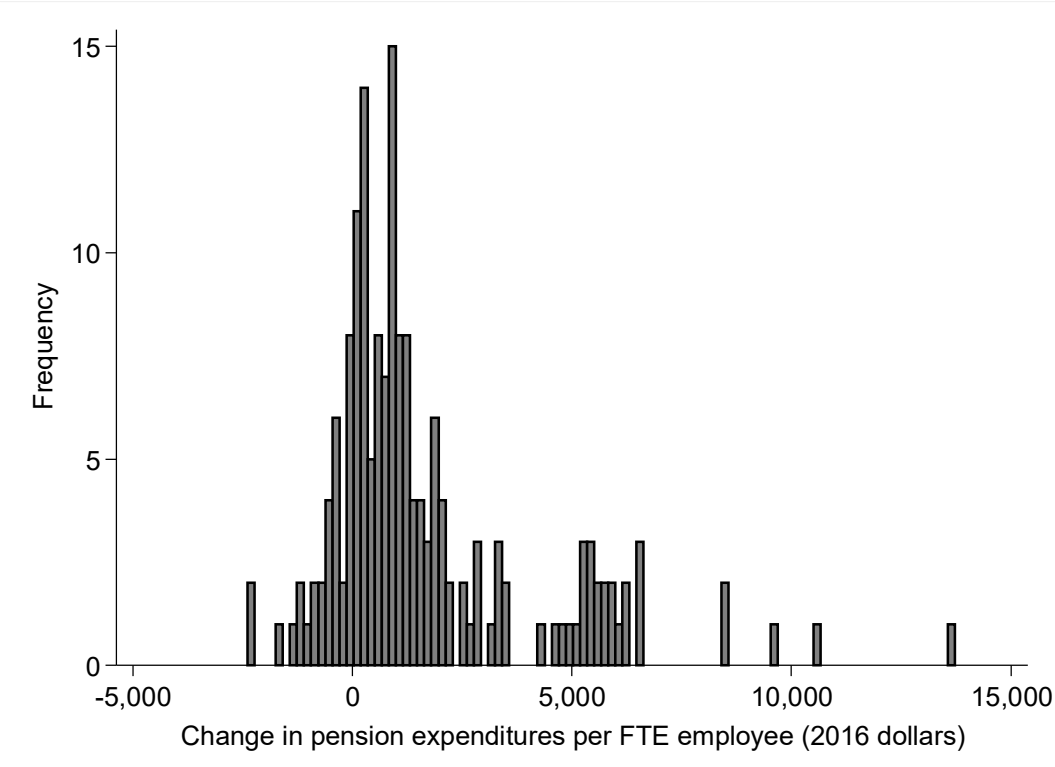
Notes: Standard errors clustered by state in parentheses. Models include district and year fixed effects. *p<0.10, **p<0.05, ***p<0.01 (two-tailed).

Figure 1: Percent change in real pension expenditures per pupil, 2005–2014



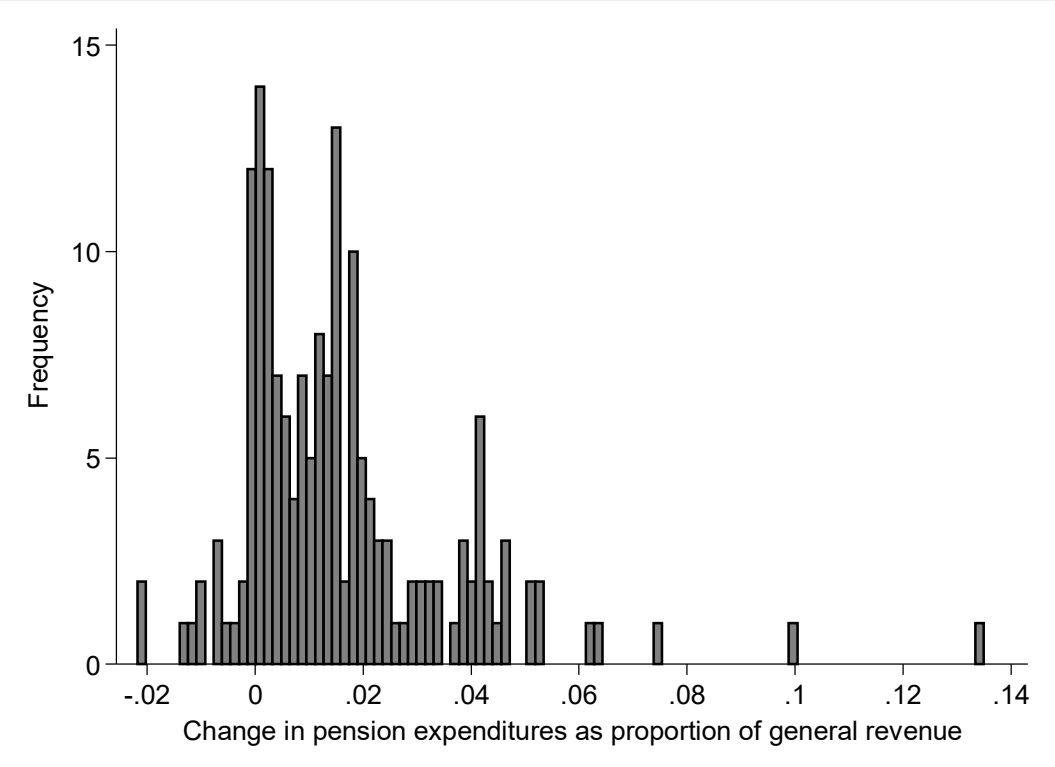
Notes: The figure shows the percent change in real per-pupil pension expenditures from 2005 to 2014. Because of changes to GASB reporting requirements, for several districts, the pension expenditures reported in 2015–2016 are not comparable to those reported in 2005.

Figure 2: Change in per-employee pension expenditures, 2005–2014



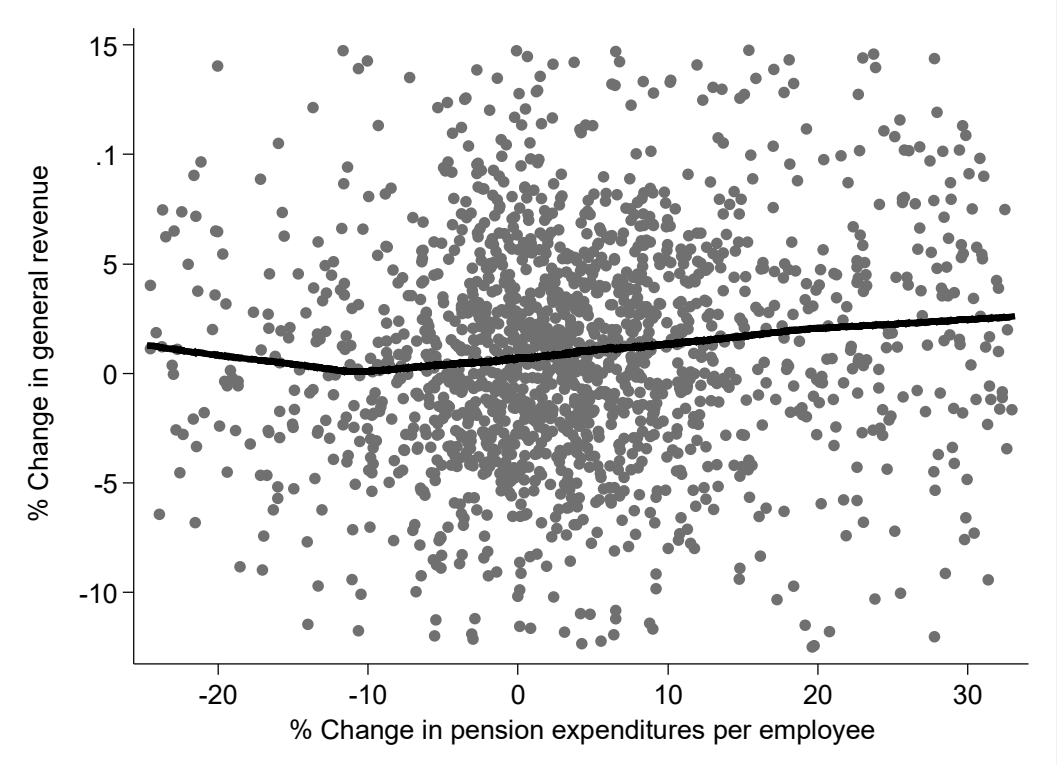
Notes: The figure shows the change in real per-employee pension expenditures from 2005 to 2014 (in 2016 dollars). Because of changes to GASB reporting requirements, for several districts, the pension expenditures reported in 2015–2016 are not comparable to those reported in 2005.

Figure 3: Change in pension expenditures as proportion of general revenue, 2005–2014



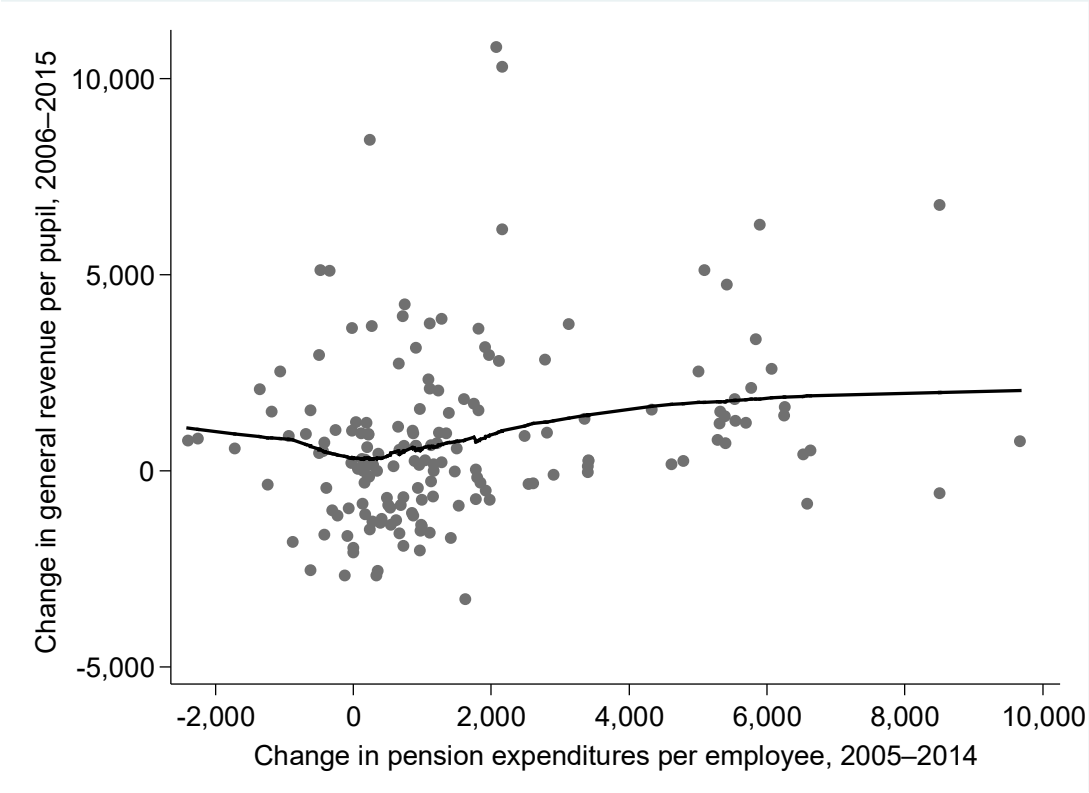
Notes: The figure shows the change in pension expenditures as a proportion of general revenue from 2005 to 2014. Because of changes to GASB reporting requirements, for several districts, the pension expenditures reported in 2015–2016 are not comparable to those reported in 2005.

Figure 4: Annual change in general revenue and pension expenditures per employee



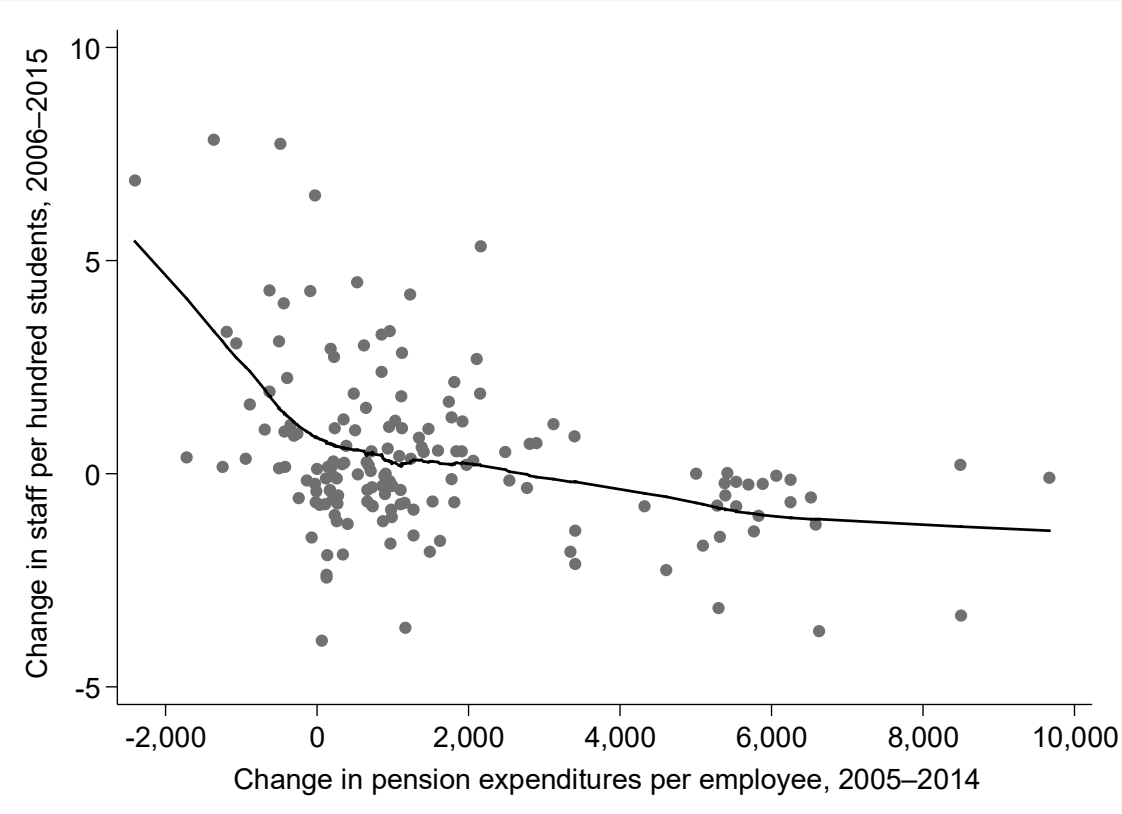
Notes: The figure shows the annual percent change in district general revenue from the previous year and the annual percent change in pension expenditures per employee in the previous year. Each point is a district-year from the period 2006 to 2016. For any districts where 2015–2016 pension expenditures are not comparable to those of earlier years, the district's 2015–2016 observations are excluded. The figure excludes values of annual change in revenue or annual change in pension expenditures per employee that are 1.5 times the interquartile range above the third quartile or below the first quartile.

Figure 5: Changes in pension expenditures and general revenue per pupil



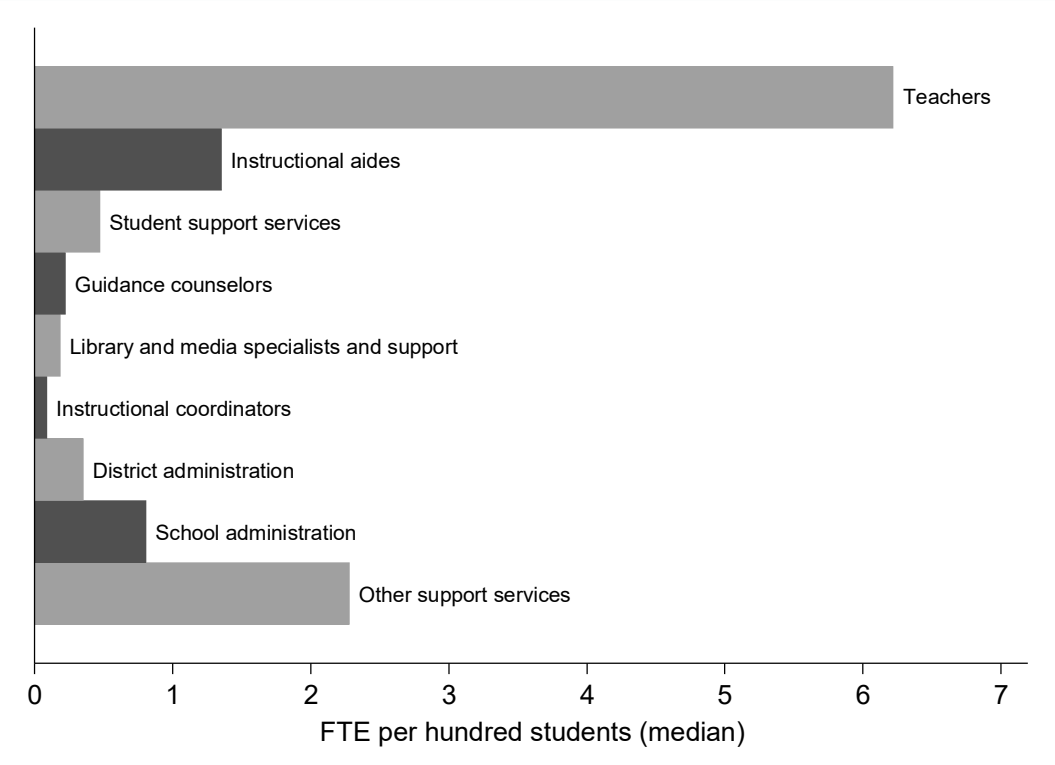
Notes: The figure shows the change in general revenue per pupil for each district from 2006 to 2015 against the district's change in pension expenditures per employee from 2005 to 2014. Each point represents a district.

Figure 6: Changes in pension expenditures and staff



Notes: The figure shows the change in number of staff per hundred students for each district from 2006 to 2015 against the district's change in pension expenditures per employee from 2005 to 2014. Each point represents a district.

Figure 7: Composition of school district staff



Notes: The figure depicts the median number of FTE staff per hundred students for districts in the sample and years 2005 to 2017.