Pensions in the Trenches:
How Pension Spending is Affecting U.S. Local Government

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Abstract: Some experts claim that U.S. local governments are experiencing dramatic increases in pension expenditures and that pension spending is crowding out government services. Others maintain that serious pension problems are limited. This issue is important to political scientists, urban scholars, and policy practitioners, but no existing studies—nor the datasets they rely on—allow evaluation of whether pension expenditures are rising or how they are affecting local government. This paper analyzes a new dataset of the annual pension expenditures of over 400 municipalities and counties from 2005 to 2016. I find that pension expenditures rose almost everywhere over this period, but there is significant variation in that growth. On average, local governments are not responding to rising pension spending by increasing revenue. They are instead shrinking their workforces. Moreover, I find that the magnitude of the employment reductions due to pensions varies with key features of the political environment.

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Over the last few decades, state and local policymakers have enacted changes to make government employees' pension benefits more generous, and they have also consistently underfunded those pensions—setting aside too little money to pay for them. As a result of these decisions and the investment losses of the Great Recession, U.S. public employee pensions as of 2017-18 were underfunded by somewhere between $1.24 trillion and $4 trillion, depending on the estimates used (Board of Governors of the Federal Reserve System 2018; Pew Charitable Trusts 2020). Because public pension benefits in most states are backed by strong legal guarantees (Monahan 2010), someone has to make up for these shortfalls.

Many experts claim that state and local governments are feeling the consequences in the form of rapidly rising pension expenditures. In at least a few local governments, such as San Diego and Detroit, rapidly rising pension costs have forced government officials to make painful decisions about future pension benefit levels, government service provision, and taxes (e.g, Erie, Kogan, and Mackenzie 2011). And some argue that the events unfolding in these cities are part of a larger trend—one affecting state and local governments almost everywhere. DiSalvo (2015) raises examples of pension-induced fiscal pressure in cities ranging from New York City to Scranton, Pennsylvania. Kiewiet and McCubbins (2014, p. 106) write that pension costs are one cause of "the onset of the New Fiscal Ice Age, a period in which a given level of state and local tax revenue purchases a considerably lower level of current services." California's nonpartisan Little Hoover Commission (2011, p. iii) has warned that "pension costs will crush government." And as the *New York Times* has put it, "many Americans may be forced to rethink what government means at the state and local level" because of rising pension costs (Walsh 2011).

Others argue that claims of widespread pension problems and fiscal crisis are exaggerated. Some point out that the experiences of cities like New York and San Diego are

atypical, and that most places are not experiencing such fiscal stress. As Munnell et al. (2013, p. 5) write, "The question is whether cities across the country are about to topple like dominoes. And whether pensions are the problem. The answer appears to be 'no' on both fronts." Others claim that the supposed crises in places like San Jose and Rhode Island are manufactured by political elites in order to impose an ideological, anti-worker agenda of austerity (e.g., Rivlin 2018). As Hinkley (2018, p. 60) writes, "Pushing austerity in the name of fiscal crisis has opened up legal, policy, and political avenues for focusing on public pensions—and other long-term obligations—as the central problem of urban fiscal health."

Given the state of the research literature, it is impossible to know which of these conclusions is closer to the mark. There is a large body of research on public-sector retirement policies (e.g., DiSalvo and Kucik 2017; Gorina 2018; Kiewiet 2010; Munnell 2012; Thom and Randazzo 2015), but it has not yet evaluated how pension expenditures have changed for a large number of local governments, nor has it evaluated how local governments are responding to any increases. There is also a literature on U.S. local political economy (e.g., Alesina et al. 1999; Hopkins 2009; Rugh and Trounstine 2011), but it has barely engaged in questions about the causes and consequences of legacy costs like pensions and retiree healthcare—even though they are likely an important component of spending in every local government.

Answering questions about pension spending growth and local governments' responses is important for a wide range of constituencies, including policymakers, policy practitioners, and citizens more broadly. Debates about public pensions tend to focus on quantities like unfunded liabilities and actuarial assumptions, which are technical, debatable, and hard to understand. In contrast, the questions I pose here are simple. My focus is on what has happened in local

governments in recent years and how that is affecting the citizens they serve—a focus that stands to advance the national conversation about pensions in a way that is easier to understand.

These questions are also of fundamental importance to urban scholars and scholars of American government because they are questions about what local government is, what it does, and how that may be changing. The nation's nearly 90,000 local governments spend roughly a quarter of all public money in the United States, provide services such as public education and public safety, and are responsible for local infrastructure like sewers and roads. The local political economy literature rightfully prioritizes these as important outcomes to be explained, and in doing so, it emphasizes the role of local-level factors like political institutions, partisanship, ideology, and race (e.g., de Benedictis-Kessner and Warshaw 2016; Gerber and Hopkins 2011; Tausanovitch and Warshaw 2014; Trounstine 2018). Yet when it comes to pension expenditures, local officials have only limited control; their pension costs are shaped by investment returns as well as local and state political decisions—many of which take time to have their full impact. Studying pensions in local government therefore calls for a focus on how local officials wrestle with and respond to changes in costs beyond their control.

This paper begins to answer these questions through analysis of a new dataset of the annual pension expenditures of over 400 municipal and county governments from 2005 to 2016, which I hand-collected from the cities' and counties' annual financial statements. This dataset is unlike any that existed before because it tracks actual local government pension expenditures over time, not just in the largest cities or in the cities with the biggest problems, but instead in a large, diverse set of cities and counties across the country. With these new data, we can see for the first time how cities' and counties' pension expenditures have changed over this period. In addition, by connecting these local pension expenditure data with U.S. Census data on local

government employment and finances, I evaluate whether growing pension expenditures are associated with increased revenue, employment reductions, or cuts to non-pension spending.

I find that between 2005 and 2016, city and county pension expenditures rose in real terms almost everywhere—in total, per employee, and as a share of general revenue—but also that there was substantial variation in the extent of the growth over that period. In an analysis of within-local government change over time, I find that larger increases in pension contributions are not associated with larger increases in revenue. Instead, they are associated with greater reductions in local government employment. Thus, the picture that emerges is one of rising local pension spending and cities and counties cutting back the size of their workforces in response. Moreover, this employment-reduction response appears to vary with some features of the political and institutional environment: it is more pronounced in places with restrictive tax and expenditure limitations and public-sector collective bargaining, but it does not vary significantly with local citizens' ideology and partisanship.

Background and Literature

Approximately 14 million people work full-time for U.S. state and local government, and almost all of them are eligible for a traditional pension. This means that government employees receive a defined benefit in retirement 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 state and local employees are enrolled in large, state-operated pension plans such as CalPERS in California and OPERS in Ohio, but many local governments operate their own plans. In principle, the model for funding pensions is straightforward: they are supposed to be prefunded, with government employers and employees setting aside funds to pay for the retirement benefits earned each year.

However, even before the Covid-19 recession of 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 and thus more expensive (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 government 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 did play a big role in decreasing pension funding ratios, but so did many different kinds of decisions by policymakers, including adopting actuarial assumptions that make pension liabilities look smaller than they actually are (see, e.g., Novy-Marx and Rauh 2011), failure to pay the amounts supposedly required for full funding (Anzia and Moe 2019), and politically-motivated investment decisions (Andonov et al. 2018).

There is good reason to expect these trends are affecting local governments' pension costs, but the existing literature has done little to study what local governments are experiencing or how they have responded. Research on public pensions has focused on outcomes related to large state and local pension *plans* (e.g., Mitchell and Smith 1994; Thom 2013). One prominent line of work attempts to explain variation in plans' funding ratios (e.g., Gorina 2018; Thom and Randazzo 2015). Another explores governments' actuarial assumptions and estimates what public pension liabilities are worth with different assumptions (e.g., NASRA 2011; Novy-Marx

and Rauh 2011; Stalebrink 2014; Vermeer, Styles, and Patton 2010). While plan-level outcomes presumably do have effects on the local governments that participate in those plans, so far the research literature has not directly studied those effects at the local government level.[1]

The likely reason is that there aren't any readily available data on pension costs in local government, except for local governments that operate their own pension plans (see, e.g., Dippel 2019). Nearly all of the aforementioned empirical work relies on the Public Plans Database developed by Boston College's Center for Retirement Research, which documents each state and large local plan's funded ratio, actuarial assumptions, required contributions, and more. Yet these plan-level data do not tell us about the pension expenditures of particular governments, most of which contribute to multiple pension plans—typically at least one state-operated plan and often one or more locally-administered plans. The problem is therefore a mismatch between the unit of analysis in available datasets—the pension *plan*—and the unit of analysis needed to study what local governments are experiencing—which is the local *government*. Because of this, we do not actually know how pervasive or pronounced any local pension cost increases have been so as to be able to assess how governments are responding.[2]

The U.S. local political economy literature would also seem to be a natural place to look for insights about how local governments have responded to pension cost changes, yet it has paid

[1] Using plan-level data to estimate how much local governments spend or should be spending on pensions is a difficult and imperfect exercise. See Munnell and Aubry (2016) for an example.

[2] Dippel (2019) analyzes U.S. Census data on locally-administered pension plans, but because most local governments contribute to state-operated plans (often in addition to local plans), those data do not capture the full amounts local governments contribute toward retirement benefits.

little attention to public pensions, in spite of their potential significance as a component of local spending and a driver of local fiscal decisions. Data scarcity is one likely reason for this. Another is an (often implicit) assumption in this literature that local officials have control over fiscal matters—which is appropriate for many studies of local politics (see Gerber and Hopkins 2011), but not if the focus is on local public pension costs.

When it comes to their pension expenditures, local officials usually do *not* have full or direct control. Instead, they are heavily constrained by both the decisions of *state* policymakers and choices made in the *past* by policymakers at the state and local levels. A salient question when it comes to local pension costs, then, is how local governments wrestle with and respond to changes in those costs. These questions are structurally similar to those that ask how city fiscal policies are shaped by state institutions (e.g., Sapotichne et al. 2015; Shi et al. 2018) or how governments respond to fiscal shocks (e.g., Poterba 1995), but those literatures in political economy and public administration barely investigate questions about local public pensions.

Data

To evaluate how local governments' pension spending has changed over time and how governments have responded, I assembled a new dataset. My goal was to collect several recent years of the pension contributions of a diverse set of local governments across the United States—and a set of local governments for which I have data on local fiscal and employment outcomes. There is no central repository for such information, so I set out to collect a large number of local governments' comprehensive annual financial reports (CAFRs), which detail what the governments contributed to each of their employee retirement plans in each year.

While CAFRs are the only reliable source of information on local governments' pension contributions, it can be difficult to locate them and sometimes costly to acquire them—especially

for years in the more distant past. Once the CAFRs are in hand, moreover, it takes time to find the relevant information and interpret it, first because most CAFRs are hundreds of pages long, and second because local governments are not always clear and consistent in the way they report their pension contributions. Collecting and reading the CAFRs of thousands of local governments for several decades would therefore have been prohibitively costly.

I therefore selected 236 municipal governments and 239 county governments from those that appear in the U.S. Census's Survey of Governments (SOG) Finance and Employment files for most years between 2005 and 2016. I first defined eight strata based on local government population, with the first stratum being governments with fewer than 10,000 residents and the last being those with more than 1 million. I then used random sampling with replacement to draw local governments from each stratum, weighting by population within strata.[3]

Next, I attempted to collect CAFRs for each of those governments for that twelve-year period. Most governments had at least some CAFRs on their websites, typically for the more recent years. When CAFRs were not available online, I requested the documents from the local

[3] The initial data collection began in the fall of 2015 and focused on municipal governments. At that time, 2012 was the latest year available in the SOG Finance files. The SOG Finance survey used one consistent sample of local governments for 2005-2008 and a different sample for 2009-2012. I determined which municipal governments were included in both of these samples and drew 236 municipal governments from that set. I used a similar process for selecting counties in spring 2018. At that time, the SOG Employment files were available through 2016 and the Finance files through 2015, so I drew a sample of counties that were included in both datasets for most of the years from 2005 to 2016. See the online appendix for more details.

governments, filing public information requests where necessary. I was able to obtain at least some years' CAFRs for 460 local governments, including 232 municipalities and 228 counties.

The most important piece of information I drew from the CAFRs was the amount the government contributed to each of its employee retirement plans in that year.[4] I included contributions to defined contribution (DC) plans as well as defined benefit (DB) plans, although DC plans are rare and typically make up a small share of total contributions. A small number of governments also fund other post-employment benefits (OPEB) from their pension fund contributions. I subtracted out funds going to OPEB whenever possible, but for a small number of plans, the pension contribution amounts include some OPEB expenditures.

My decision to start with 2005 was motivated by both practical constraints and consideration of trends in pensions and local government. It was important to include years before and after the Great Recession: first because the decrease in asset values during the recession led to calls for state and local governments to contribute more toward pensions, and second because of drops in local revenue. However, going back farther to 2000 would build in yet another period of negative investment returns (Brainard and Brown 2020), and going back even farther to the mid-1990s was not feasible given the cost and difficulty of acquiring CAFRs for years even as recent as 2005. Thus, while the dataset does not show what pension costs were before 2005, it does include years before, during, and after the Great Recession.

Three other features of the data collection are worth highlighting. First, most CAFRs did not clearly and consistently report whether there were employer-paid member contributions (EPMC) or, if there were, how much. Therefore, the retirement contributions discussed below do

[4] I provide a detailed account of the data collection and coding in the online appendix.

not include EPMC. Second, they also do not include contributions the local governments made using revenue from pension obligation bonds (POBs) or any interest paid on those bonds, even though both can be substantial. Third, the dataset tracks what governments actually paid toward retirement benefits—not what they should be paying. Given that my focus is on whether pension expenditures have risen over time and how that is affecting local government, the appropriate measure is what local governments are actually spending on pensions.

For the analysis to follow, I summed the retirement expenditures for all plans in each city- and county-year.[5] In total, the dataset has 5,085 annual pension expenditure observations from 442 unique governments,[6] spanning all 50 states plus Washington, DC. For 375 local governments, the dataset includes pension expenditure information for all twelve years from 2005 to 2016, and for the remaining 67, it includes pension expenditures for some.

Importantly, the cities and counties in the dataset should not be viewed as a representative sample of cities and counties in the United States.[7] However, the goal of this study is to document changes in local pension spending in cities and counties of varying sizes, and to

[5] I excluded plans that were inconsistently reported in the CAFRs year to year. Nearly all such plans were small relative to the governments' other plans. See the online appendix for details.

[6] The CAFRs for 13 counties and 5 municipalities did not have the requisite information on retirement plans to be included. See the online appendix for details.

[7] Most municipal governments in the United States are small, so a representative sample would contain mostly small municipalities. Another common approach in local politics research is to include the full population of cities above a certain size, but that wouldn't have yielded a sample diverse in size either.

evaluate whether changes in local pension spending within those cities and counties are associated with changes in local fiscal and employment outcomes. Because this dataset tracks the over-time pension contributions of a diverse set of 442 local governments and links them to Census finance and employment data, it is uniquely suited to the task.

Change in Local Pension Expenditures, 2005-2016

I begin with a descriptive analysis of how pension contributions have changed over time in the cities and counties in the dataset.[8] I adjust each year's total pension expenditures for inflation (to 2016 dollars) and calculate two additional variables for each local government and year: total pension expenditures as a share of general revenue, and total pension expenditures per full-time equivalent (FTE) employee.[9] Both variables are of interest, but the second is a clearer measure of pension-related fiscal pressure, because a local government's pension contributions are partially a function of how many employees it has: if a city hires more employees, its total pension contributions should increase because it is contributing on behalf of more people.[10] Thus, pension expenditures as a share of general revenue could be higher in some places because they have more employees, and that ratio could be increasing within a government because it is expanding its workforce. Pension contributions per employee, by contrast, takes into account the

[8] In the online appendix, I analyze variation in pension contributions across cities and counties.

[9] Data on revenue and FTE employment come from the U.S. Census. See the online appendix.

[10] This is not to say that pension costs are *only* a function of employment levels. Local pension costs are shaped by many factors, including benefit structures (which often vary by type of employee and date of hire), salaries, unfunded liabilities, and actuarial assumptions.

size of the workforce—and should generally be higher in governments and years where pension benefits are more generous or where the government is making up for larger funding shortfalls.

I first calculate percent growth in total pension contributions from 2005 to 2016 for the cities and counties for which I have comparable data for both years. The distribution is shown in the top left panel of Figure 1. The number is positive for 88% of cities and counties, and the median change is 56%. Particularly notable is the long right tail of the distribution. In 26% of the cities and counties, for example, pension spending more than doubled in twelve years.

The first figure only tells us so much, however, because rising pension spending could be a sign of a growing budget or public-sector workforce. In the top-right panel, therefore, I present the distribution of the change in pension expenditures as a proportion of general revenue from 2005 to 2016. It shows that pensions have grown as a share of revenue in 75% of the cities and counties, with a median change of 0.008 (or 0.8 percentage points). More notable, again, is the right tail: the top 25% of the cities and counties saw pension expenditures consume an additional 2.1% of general revenue or more, and the top 10% had pensions absorb an additional 3.7%.

In the bottom two panels, I show the within-government change in pension expenditures per local government employee, first for 2005 to 2016 (which features fewer governments due to missing employment data for 2005), and then on the right for 2007 to 2016 (to assess whether the same general pattern holds when I include a larger set of governments). Both show that the vast majority of cities and counties have seen increases in pension expenditures per employee. The median within-government change from 2005 to 2016 was $1,419 per employee, and in 25% of the cities and counties, per-employee pension expenditures increased by $3,542 or more.

Some might wonder whether pension expenditures as of 2016 were unusually high by historical standards, and without a longer time period of data, I cannot say for sure. It is possible

that some of the post-2005 pension expenditure increases reflect a return to historical norms. Strong investment returns during the late 1990s did lead some state and local governments to decrease their contributions through the early 2000s (NASRA 2019), and so by starting in 2005, I may have captured local governments at a period of historically low contributions. However, many state and local governments also increased pension benefits during the late 1990s and early 2000s. Moreover, some took "pension holidays," lowering their contributions below the required amounts. In later years, many pension funds also lowered their discount rates. All of these decisions, combined with the market losses during the Great Recession, helped to set the stage for future growth in state and local government pension expenditures.

Figure 2 helps to shed some light on this. There, I show a longer time period of pension expenditures for six cities for which older CAFRs were available online.[11] All but one (Upper Arlington, Ohio) show clear patterns of pension expenditure increases even over this longer time period. In all of the cities except Dubuque, Iowa, expenditures dip around the year 2000, and in San Francisco and Renton, Washington, expenditures in 2005 were lower than in 1995. But even in those latter two cities, after post-2005 pension expenditures returned to mid-1990s levels, they kept going up. In the other cities, moreover, pension expenditures were already higher in 2005 than they had been in the mid-1990s. Thus, while I cannot draw any broad conclusions from this small sample, the patterns of Figure 2 suggest that at least in some places, the pension expenditure increases of 2005-2016 were more a break from the past than a return to normal.

[11] Of the cities and counties in my dataset, there were only seven for which I could locate CAFRs online for years as early as 1995-1996. Pension expenditures for all seven are shown in the online appendix. Pension cost data are missing for Crowley, LA, in 1995.

Regardless of this bigger picture, what we can see in the larger dataset I have collected is that most cities and counties have experienced growth in their pension contributions since 2005. By themselves, these increases are important and relevant for local government budgets. And there is considerable variation in the extent of that growth.[12] An important next step is to analyze how local governments responded to those changes.

How Is Pension Spending Affecting Local Government?

Local governments might respond to pension cost increases in different ways. Some might increase revenue, some might decrease spending, and some might do both. My approach is to evaluate whether there are discernable trends in cities' and counties' responses—and any clear links between those trends and changes in local pension spending. In particular, I focus on whether larger pension spending increases are associated with larger increases in revenue, decreases in employment, or decreases in spending on items other than retirement benefits.[13]

Some insights and findings from the political economy literature suggest that local government responses will tilt more toward employment and spending reductions than revenue increases. First, a long line of public opinion research shows that most Americans do not like paying taxes and think their own taxes are too high (e.g., MacManus 1995; Page and Shapiro 1992), which makes raising revenue politically difficult. Even if taxes are increased to fund popular government services, most voters do not make a direct connection between the services they receive and the taxes they pay (Beck, Rainey, and Traut 1990; Sears and Citrin 1982).

[12] The online appendix evaluates local characteristics associated with greater growth.

[13] Some local governments can also issue POBs. In this dataset, 38 cities and counties had POBs, but only 13 issued them during the study period—too few to carry out an analysis.

Raising revenue might be even harder if the purpose is to fund pensions. In many places, pension spending has gone up not to pay for more services in the present but rather to make up for funding shortfalls—and thus to pay for services provided in the past.

By comparison, decreasing public employment and expenditures might be a more appealing and feasible option for policymakers. Incremental reductions in spending and service provision might be less likely to be noticed by citizens and less likely to be attributed to the decisions of local elected officials (Arnold 1990; Wilson 1995). Moreover, local officials looking for cost-savings have strong reasons to focus on employment levels and employee costs in particular: local government service provision is heavily dependent on the employees providing the services, a large share of local spending goes toward employee compensation, and as I've said, a local government's pension contributions are in part a function of its employment levels. For all of these reasons, officials confronting rising pension expenditures might find that reducing employment is the "least bad" option.

I first explore whether cities and counties tend to cope with rising pension spending by increasing revenue. I model two dependent variables, both from the U.S. Census SOG Finance files for 2005 to 2016: the log of total general revenue, and the log of total own-source general revenue, adjusted to 2016 dollars.[14] General revenue better captures the total revenue cities and counties have at their disposal, but own-source general revenue may more clearly reflect local government actions to increase revenue in response to rising pension costs. Throughout, the main

[14] Unfortunately, I know of no existing data on local government decisions about tax rates, assessments, or charges that cover all of the governments in this dataset.

independent variable of interest is logged pension expenditures per full-time equivalent employee.

Because I am focused on how cities and counties might be changing their general revenue in response to rising pension spending, I model the general revenue variables with OLS and fixed effects for each city and county, which partial out the influence of any time-constant characteristics of the local governments that lead them to have higher or lower general revenue and pension expenditures. I also include year fixed effects because there are likely secular trends that affect pension spending and general revenue in all cities. During the Great Recession, for example, required pension expenditures increased because of the decline in fund asset values, and at the same time, government revenues dropped. Including year fixed effects allows me to test whether greater-than-average increases in pension expenditures are associated with greater-than-average increases in general revenue. In addition, to account for variation in the state of the economy both within and across local governments, I include the unemployment rate in each local government and year.[15]

I lag the pension expenditure variable by one year so that I am estimating the relationship between pension expenditures in year *t-1* and general revenue in year *t*. This models government decision-making in a realistic way; presumably officials make decisions about next year's budget based on what they observe of this year's. Finally, because there might be other changes in the local jurisdiction that affect general revenue and may be correlated with pension cost increases, I

[15] The unemployment data are from the Bureau of Labor Statistics. For municipalities with fewer than 25,000 residents, I use the unemployment rate for the municipality's parent county.

include a series of time-varying local demographic variables: log per capita income, log population, percent urban, percent homeowners, and percent black, Asian, and Hispanic.[16]

The estimates from this model are shown in column 1 (general revenue) and column 2 (own-source general revenue) of Table 1. In both, the coefficients on pension expenditures per employee are close to zero and statistically insignificant. Certain other variables are related to general revenue, such as per capita income and population, and as expected, general revenue is lower when city and county unemployment is higher. However, there is no evidence of a link between rising pension spending and increasing general revenue. In cities and counties that experience greater-than-average increases in pension spending per employee, the next year does not bring greater-than-average increases in revenue.

Next I test whether rising pension expenditures have a negative relationship with local government employment. Modeling the relationship between pension spending and local employment is less straightforward than it might seem, because the independent variable of interest—pension expenditures per employee—itself has employment in the denominator. Lagging the pension cost variable by one year (as I did for the models of general revenue) helps to address the mechanical endogeneity of pension spending and employment in the same year—and again, it is a plausible model of government decision-making.

[16] These variables are from the U.S. Census Bureau. I lose a few observations for a few reasons: because pension costs for some city- and county-years are not comparable to other years within the same government, because of clear errors in the finance and employment data, or because of extreme changes in pension expenditures for a single year. See online appendix for details.

The dependent variables come from the U.S. Census SOG Employment files, which have information on full- and part-time government employment and payroll for 92% of the city- and county-years in the pensions dataset. I model them using the same approach as in columns 1 and 2, logging the dependent variables and including local government and year fixed effects and time-varying local demographics.

In column 3 of Table 1, I present the results of a model of logged full-time equivalent employment. The coefficient estimates suggest that rising pension expenditures have indeed led to an average reduction in public-sector employment: a 10% increase in pension expenditures per employee is associated with a 0.67% decrease in employment the following year. To get a sense of the magnitude of this effect, consider that the median increase in pension expenditures per employee from 2007 to 2016 was $1,203, and that is approximately a 25% increase from the 2007 median pension expenditure per employee ($4,901, see online appendix). The coefficient estimate in column 3 of Table 1 suggests that a 25% increase in pension expenditures is associated with a 1.67% decrease in local employment. Given that the median local government in this dataset had 10.13 full-time equivalent employees per thousand residents as of 2007, a 1.67% decrease represents the loss of 17 employees for a city or county of 100,000 people. Naturally, the model predicts larger employment losses for the cities and counties that experienced larger growth in pension expenditures.

If local governments are in fact reducing employment in response to rising pension contributions, there is good reason to expect the cuts will be greater among full-time employees than part-time local employees, because part-time employees often are not eligible for pensions. I explore this in columns 4 and 5 of Table 1. In column 4, the dependent variable is the log of the number of local governments' full-time employees. The coefficient on log per-employee pension

expenditures is negative and statistically significant, suggesting that a 10% increase in pension expenditures is associated with a 0.69% reduction in full-time employment.[17] When I instead model part-time employment, in column 5, the coefficient on pension expenditures is statistically insignificant.[18] Thus, growing pension expenditures are associated with declining numbers of full-time employees—not part-time employees.[19]

Finally, in column 6, I test for a link between rising pension expenditures and capital outlays. This is an important dimension of local government activity because it relates to its investments in construction and the purchase of land, equipment, and existing buildings, and because I can be confident that these expenditures do not include pension spending.[20] On average, I find that larger increases in pension spending are not associated with greater reductions in capital outlays in these local governments: the coefficient on per-employee pension expenditures is statistically insignificant.[21] Thus, results in Table 1 suggest that local

[17] When I add logged general revenue as a predictor, the results are substantively unchanged. See the online appendix.

[18] The number of observations is smaller because some localities have no part-time employees.

[19] Local governments could also reduce hours worked by part-time employees, but when I model part-time employee payroll, which reflects hours, I find no significant relationship with pensions.

[20] For many spending variables in the SOG Finance files, it is not clear whether they include pension expenditures, and it would be problematic to analyze the effects of rising pension costs on expenditure variables that might include those very pension costs.

[21] However, when I limit the model to only municipal governments, I find a negative, statistically significant relationship. This may be because city governments typically spend a larger share of

governments respond to rising pension expenditures with employment reductions—more so than revenue increases or reductions in capital outlays.

Does the Political Context Matter?

Next, I consider whether local governments' responses to rising pension expenditures vary with the local political environment. While a number of political factors could matter, here I carry out a preliminary analysis of three that seem especially relevant: collective bargaining and union strength, the degree to which local governments are constrained by TELs, and the partisan or ideological leanings of local residents.

First, it is important to consider collective bargaining and union strength because the topic at hand is public pensions—an important part of public employee compensation. In general, local government employees that are better organized and more politically active should be in a better position to secure favorable policies (Moe 2011). In many places, moreover, public-sector unions have collective bargaining, meaning that local government employers and employees must negotiate and reach legally-binding agreement on matters related to compensation and working conditions. These factors may affect how local officials respond to rising pension contributions, although the direction of any such effect is theoretically ambiguous. Politically active groups of employees may be better able to stave off employment reductions and persuade officials to raise revenues instead. But if raising revenue is too politically difficult, local officials needing to cut spending in places with collective bargaining might actually be

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total revenue on capital outlays than counties—on average 27% for cities as opposed to 10% for counties—which makes capital outlays a more obvious place for cities to cut costs.

more likely to reduce employment levels—because they may have fewer politically workable levers for keeping costs down in other ways, such by as limiting salary increases.

A second relevant political condition is the extent to which cities and counties are constrained by TELs. These fiscal institutions, imposed by the states, can be another factor limiting local officials' options for responding to rising pension costs. Empirical studies on the effects of TELs find that they make it harder for local officials to raise revenue and thus work to limit local spending (e.g., Poterba and Rueben 1995; Dye, McGuire, and McMillen 2005). Thus, we might expect cities and counties more heavily constrained by state TELs to be less likely to respond to pension cost increases by increasing revenue and more likely to reduce employment and spending.

Third, the American politics literature in general and recent work in the local politics literature in particular place heavy emphasis on the role of ideology and partisanship in shaping policy, particularly spending. Some studies find evidence that the partisanship of local officials matters for local policy (e.g., de Benedictis-Kessner and Warshaw 2016, 2020), and other work finds an association between citizen ideology or partisanship and local spending (Einstein and Kogan 2016; Tausanovitch and Warshaw 2014). Extending these findings to local public pensions, one might predict that cities and counties with more liberal or Democratic residents should be more likely to increase revenue (and less likely to decrease employment or spending) in response to pension cost increases. But there are also reasons to question this. At the state level, decisions about public pensions tend *not* to divide along party lines (Anzia and Moe 2017, 2019). It is possible, then, that local politicians' responses to rising pension costs won't divide along partisan lines either.

As an illustration of these dynamics, consider West Covina, California: a majority Democratic city with public-sector collective bargaining in a state with a strong TEL. Rising pension costs have been a factor contributing to West Covina's significant budget shortfalls in the last decade (Yee 2019). The city recently put forward a ballot measure to increase the sales tax, but it failed at the polls (Singgih 2020). To close its budget gaps, the city has gradually reduced employment, often by leaving vacant positions unfilled (e.g., *San Gabriel Valley Tribune* 2011). And the 2018-19 budget arrangement helps to show that city officials are limited in their ability to reduce costs in other ways, such as through salaries: to balance its budget, the city made 10% cuts to almost all city departments (Wong 2018), but the cuts to the fire department had to be less than 10% because any more would have necessitated salary reductions—and that would have required negotiations with the firefighter union (Yee 2018).

To explore these possibilities, I combine the pension cost dataset with existing datasets of collective bargaining, TEL restrictiveness, and citizen partisanship. First, to measure the presence of local collective bargaining, I rely on two datasets assembled by Anzia and Moe (2015, 2016). The first contains indicators of whether police officers and firefighters in municipal governments have collective bargaining; these data are available for 176 of the 227 city governments in my dataset.[22] For the remaining municipal governments, and for all county governments, I code local governments as having collective bargaining if state law requires bargaining for police, firefighters, and other local employees.[23]

[22] Cities are coded as having collective bargaining if either police officers or firefighters do.

[23] No existing datasets track collective bargaining or union membership for all local governments, but both are heavily shaped by state collective bargaining laws: states that require

I focus on two of the dependent variables from Table 1: own-source general revenue and full-time employment. To evaluate whether the relationship between rising pension expenditures and these outcomes varies with the presence of collective bargaining, I interact the pension expenditure variable with the indicator for collective bargaining. Figure 3 presents the coefficient estimates and 95% confidence intervals for logged pension expenditures; the full model estimates are presented in the online appendix.

Figure 3 shows that regardless of whether the local government has collective bargaining, there is no significant relationship between pension expenditures and revenue increases. However, collective bargaining does make a difference to the employment estimates. For local governments without collective bargaining, the coefficient on the pension expenditures variable remains negative, but it is smaller than before and statistically insignificant. For governments with collective bargaining, the relationship is large and negative: a 10% increase in per-employee pension expenditures is associated with about a 0.78% decrease in full-time local government employment. Thus, the relationship between pension spending and employment reductions is more pronounced in places with collective bargaining, consistent with an account in which local governments with collective bargaining have less capacity to constrain costs by other means.

One final question relevant to union strength has to do with *which* employees are most affected by rising pension contributions. Public safety employees (particularly police and fire protection employees) are some of the best organized and most active groups in local politics

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government employers to bargain with their employees tend to have local governments with collective bargaining and high union membership rates (Flavin and Hartney 2015; Moe 2011).

(Anzia and Moe 2015), and it may be that their political strength helps to insulate them from pension-related employment reductions. The estimates in Figure 3 suggest that that is the case.[24] In places with collective bargaining, increases in pension expenditures per employee are associated with reductions in public safety employment, but the magnitude of that relationship is larger for non-public safety employees.

Next I evaluate whether local responses to rising pension expenditures vary with the strength of TELs. I turn to a widely-used index of local TEL severity as of 2005 developed by Amiel, Deller, and Stallmann (2009), which incorporates information on the type of TEL, its scope and restrictions, and the provisions and established methods for exemptions and overrides. The index ranges from 0 (e.g., New Hampshire) to 38 (Colorado), with higher values indicating more restrictive TELs. I interact this measure of local TEL severity, centered around its mean, with the pension expenditure variable, evaluating whether local governments more constrained by TELs are less likely to increase revenue and more likely to reduce employment in response to pension expenditure increases. The main estimates are shown in columns 1 and 2 of Table 2; the full estimates are in the online appendix.

The estimates in column 1 show little sign that local governments are responding to pension cost increases by increasing revenue, regardless of how constrained they are by local TELs. The coefficient on log pension expenditures is statistically insignificant, suggesting that in

[24] These estimates are from models of the logged full-time employment levels of public safety employees (police protection, fire protection, and corrections) and non-safety, non-education employees. (Very few of these local governments handle education, but in the cities and counties that do, the education employees are a large share of the total workforce, so I exclude them.)

local governments with average TELs, pension cost increases are not associated with revenue increases. Moreover, the coefficient on the interaction term is negatively signed but not significant. Thus, the association between pensions and revenue does not vary significantly with the strength of local TELs.

In column 2, however, I find that stricter TELs matter for the relationship between pension expenditures and local government employment. The coefficient on pension expenditures shows that in a local government with average TEL severity, a 10% increase in per-employee pension expenditures is associated with a 0.68% reduction in full-time employment. The coefficient on the interaction term is also negative and significant, indicating that the relationship between pension expenditures and employment reductions is more pronounced in places with stricter local TELs. For example, for a local government with a TEL that is 10 points (roughly a standard deviation) higher than average, a 10% increase in pension contributions is associated with about a 0.89% reduction in full-time employment.

Finally, I turn to an assessment of whether local partisanship or ideology influences responses to rising pension expenditures. My main measure of partisanship is local-level presidential vote share for Barack Obama in 2008,[25] centered around its mean. In column 3 of Table 2, I interact this measure with the pension expenditure variable in a model of logged own-source revenue. There is no evidence of a stronger relationship between pension expenditures and revenue increases in more Democratic cities and counties. In column 4, I model the

[25] These data come from a variety of sources, including Tausanovitch and Warshaw (2013). City-level presidential election returns were not available for a few cities; for them, this variable equals presidential vote in the parent county. See online appendix for details.

relationship between pension contributions and full-time employment, interacting per-employee pension expenditures with the measure of partisanship. The estimates do not suggest that officials representing more Democratic constituencies are more likely to avoid employment reductions in dealing with rising pension expenditures.[26] In fact, the coefficient on the interaction term in column 4 is negative (p=0.14), suggesting that pension-induced employment reductions may be even more pronounced in more Democratic constituencies.

The reason for this is probably that more Democratic cities and counties are more likely to have public-sector collective bargaining. In column 5, where I model full-time employment with the pension expenditure variable interacted with all three of these local conditioning variables—collective bargaining, local TEL severity, and Democratic presidential vote—the coefficient on the interaction with Democratic presidential vote is negative but insignificant. However, I still find that pension expenditures are significantly related to employment reductions in cities with collective bargaining: adding together the coefficients on log pension expenditures and its interaction with collective bargaining yields a statistically significant estimate of -0.072. Stronger TELs are still associated with greater reductions as well: in column 5, the coefficient on the interaction of pension expenditures and TEL restrictiveness is negative and significant.

Conclusion

Up to this point, there has been a great deal of research on public pensions, but it has been focused on funding ratios, unfunded liabilities, investment returns, and changes to benefit formulas—not on what local governments are experiencing or how they are adjusting. Experts

[26] Both of these results are substantively the same when I replace the presidential vote variable with the Tausanovitch and Warshaw (2013) citizen ideology scores. See the online appendix.

have made a variety of claims about how pension costs are or are not transforming local government, but without a large-scale, data-based study of local governments' pension expenditures. Meanwhile, the local politics literature has mostly ignored pensions, even though employees' retirement benefits are an important part of local government budgets everywhere.

One contribution of this paper is therefore its description of local governments' pension expenditures from 2005 to 2016. I set aside generalizations about whether local governments are in crisis or whether political elites are manufacturing crisis and simply focus on summarizing local governments' pension expenditures as reported in their CAFRs. I find a trend in those data: pension expenditures mostly rose over that twelve-year period. In some places they rose a little, and in others they rose a lot. Different readers can interpret these changes as good, bad, or neutral. Regardless, the takeaway is that cities and counties were spending more on pensions—in real terms, per employee and as a share of general revenue—in 2016 than they were in 2005.

Some of the increases between 2005 and 2016 are probably a return to pension expenditure levels of the past, but it also looks as though once those expenditures returned to mid-1990s levels, they kept going up. Pension costs in some places were also projected to increase further in years beyond 2016 (Hartman 2020). And that was before the Covid-19 crisis. The 2020 recession has so far brought steep investment losses for many public pension funds (Glass and Vanatta 2020), portending further employer contribution increases in the coming years. And this comes at a time when state and local government revenues have cratered and other costs have risen (Belz and Sheiner 2020). It is too soon to say how exactly this will play out, but it seems clear that state and local policymakers will continue to face difficult decisions going forward—decisions about how raise revenue, how to pay for pension obligations and other costs, how to protect workers, and how to keep government operating.

The second contribution of this paper is its quantitative analysis of how local governments responded to rising pension expenditures during the period 2005 to 2016. In theory, they could have responded in a variety of ways, using different combinations of revenue increases, cuts to employment, cuts to other spending, or issuing POBs. In practice, however, there was a trend of reducing local government employment, not of increasing revenue. And because so much of what local governments do involves employees providing services, this suggests that pension expenditures are crowding out public service provision.

As with my descriptive analysis of local pension expenditure changes, this is not an assessment of what local governments *should* do but rather an analysis of what they *did* do. Some will lament that the response hasn't been more in the direction of increasing revenue, some will propose that more of the cuts should come from public safety, and some will argue that the response should instead have been to make large reductions to pension benefits or OPEB. Those are important policy discussions to have. But my goal here was to assess how local governments actually responded, and to provide some rationale for why they responded the way they did.

The political and institutional constraints local policymakers face are clearly an important part of the story. For example, raising revenue and reducing pension benefits are both politically and legally difficult. It makes sense, moreover, that the states with restrictive TELs are the ones with the strongest relationship between rising local pension costs and reductions in employment.

But other aspects of the politics of pensions are more counterintuitive—and cut across standard ideological and partisan lines. One might think more Democratic, liberal cities and counties would be more likely to respond to pension expenditure increases by increasing revenue and staving off employment reductions. But they are not. Also, debates about public pensions are often framed as pitting pro-employee, pro-pension interests against anti-pension, anti-public-

worker interests, but my findings here suggest that that's an overly simplistic characterization. From one perspective, public-sector unions have incentives to advocate for better benefits and lower employee contributions, because that is in their members' interests (Anzia and Moe 2015; DiSalvo 2015). In the longer run, however, absent greater revenue, local governments' payments for those benefits can limit their ability to grow or even maintain employment—or to increase salaries—which isn't good for public employees or their unions (Anzia and Moe 2019). One takeaway from my study is that as local governments spend more on pensions, in some cases they have fewer jobs to offer.

And a pension-induced reduction in local government employment is not just significant for the employees. Local governments are responsible for providing goods and services that affect the day-to-day lives of everyone living in the United States, such as public education, water service, transit, sewers, public safety, parks, and libraries. If it becomes harder for local governments to carry out its functions, everyone stands to be impacted—especially those most dependent on public provision of those goods and services.

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Figure 1: Within-city and county change in pension expenditures

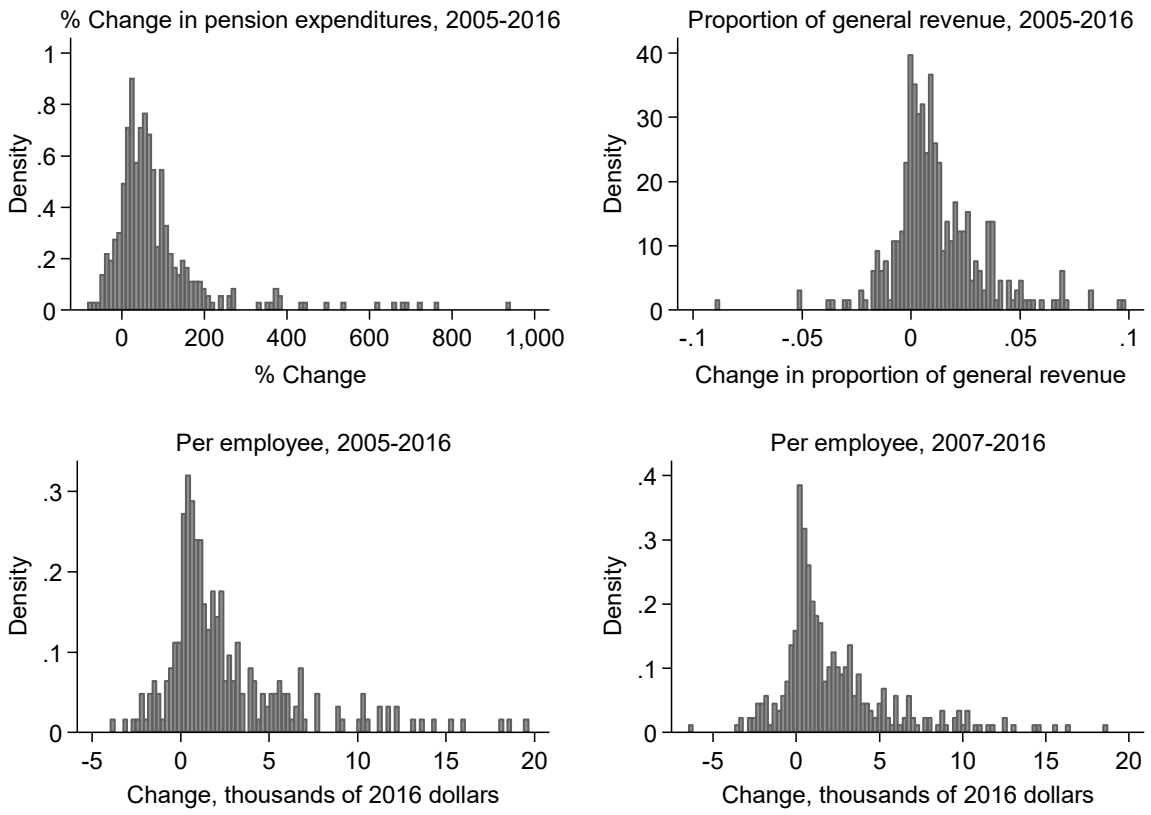

Figure 2: Comparison to the mid-1990s

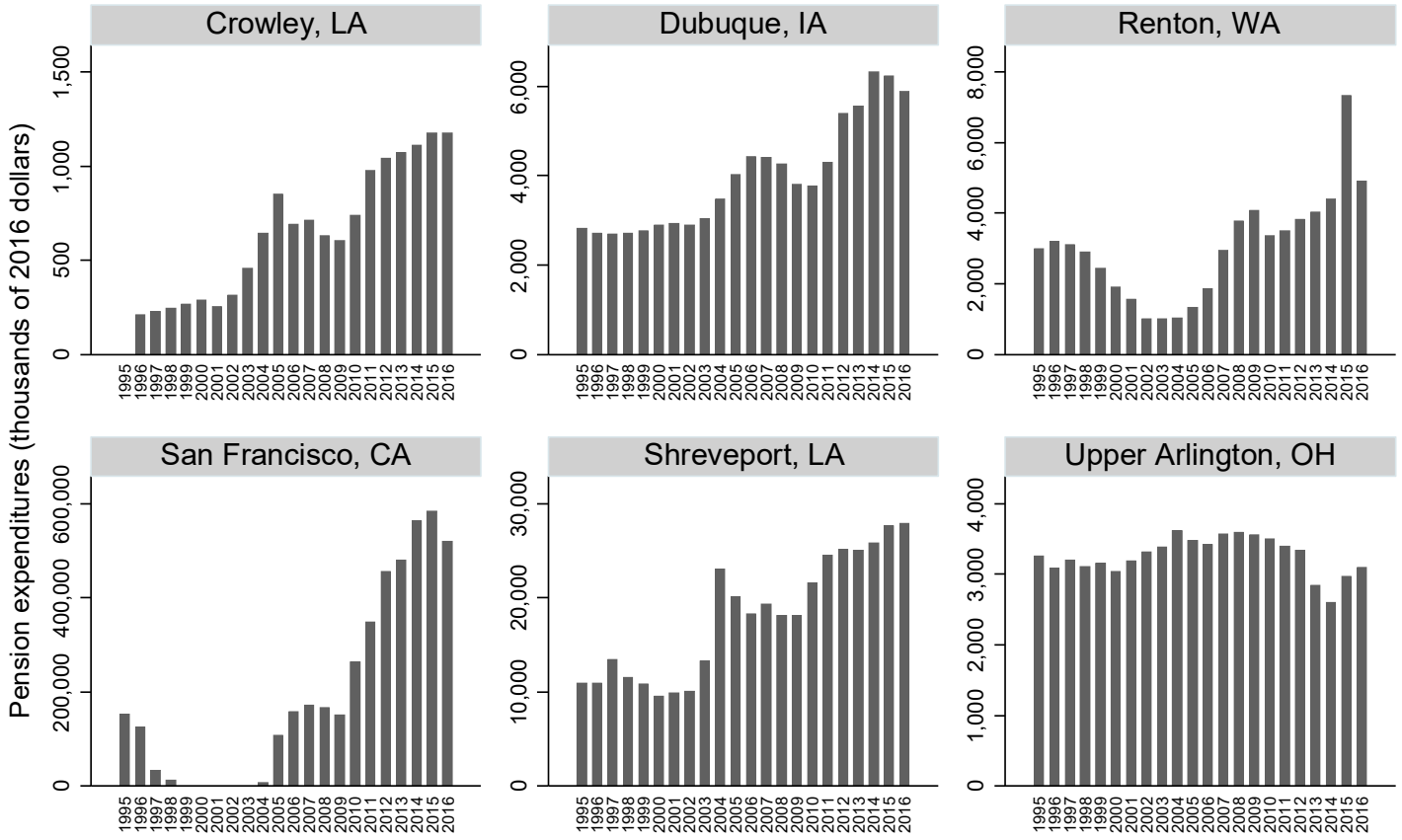

Figure 3: Collective bargaining, public safety, and non-public safety

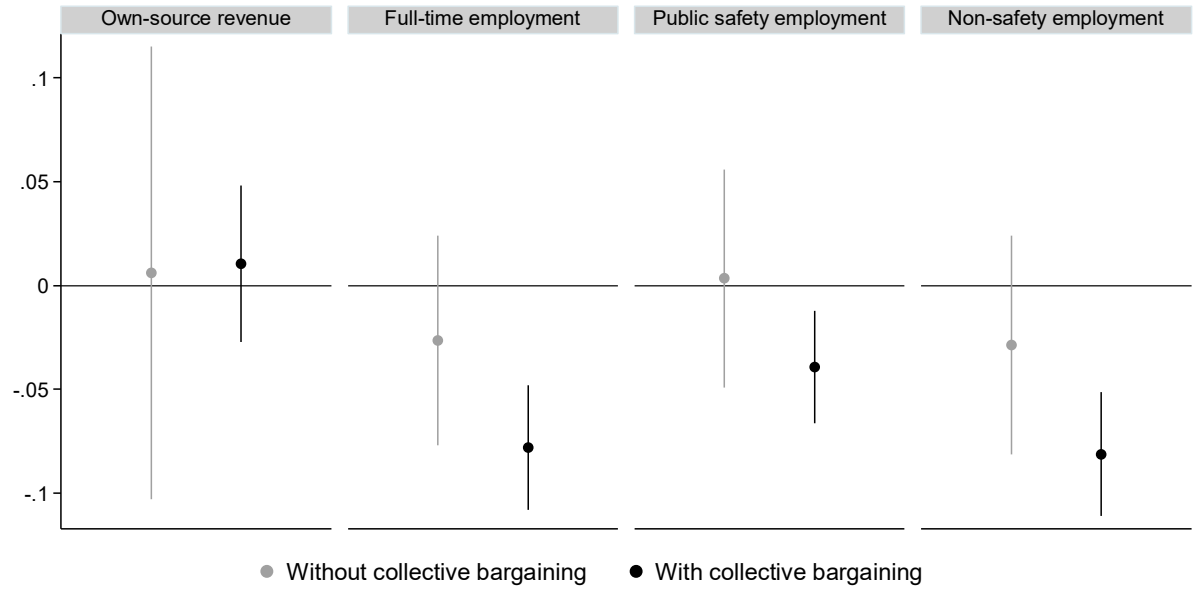

Table 1: Local government pension expenditures, revenue, and employment

	General revenue (1)	*Own-source revenue* (2)	*FTE employment* (3)	*Full-time employment* (4)	*Part-time employment* (5)	*Capital outlays* (6)
Ln(pension exp.)	0.003	0.01	-0.067***	-0.069***	-0.01	-0.014
	(0.021)	(0.018)	(0.014)	(0.014)	(0.039)	(0.093)
Ln(income per capita)	0.736***	0.717***	0.339***	0.363***	0.075	1.725**
	(0.200)	(0.196)	(0.091)	(0.105)	(0.254)	(0.772)
Ln(population)	0.334**	0.296*	0.364***	0.366***	-0.842***	-0.163
	(0.142)	(0.151)	(0.106)	(0.107)	(0.187)	(0.543)
% Urban	0.091	0.327	0.517**	0.558**	1.22	-1.052
	(0.492)	(0.505)	(0.250)	(0.250)	(1.181)	(1.488)
% Homeowner	0.089	0.025	0.01	0.018	0.18	0.489
	(0.240)	(0.273)	(0.140)	(0.144)	(0.457)	(1.471)
% Black	1.169	1.233	0.726*	0.662*	2.05	3.154
	(0.814)	(0.779)	(0.401)	(0.361)	(1.373)	(3.566)
% Asian	0.223	-0.059	0.166	0.023	-0.263	-1.827
	(0.510)	(0.550)	(0.631)	(0.631)	(1.210)	(3.177)
% Hispanic	0.401	0.211	-0.047	-0.154	0.539	2.406
	(0.387)	(0.467)	(0.337)	(0.340)	(1.111)	(2.003)
% Unemployment	-0.943**	-0.591	0.079	0.179	0.627	-0.81
	(0.414)	(0.585)	(0.196)	(0.228)	(0.819)	(2.226)
R-squared	0.995	0.994	0.998	0.998	0.942	0.891
Observations	4,108	4,108	4,054	4,054	4,020	4,045

Notes: Standard errors clustered by state in parentheses. All models include local government and year fixed effects. *p<0.10, **p<0.05, ***p<0.01

Table 2: Local TELs and partisanship

	Own-source revenue (1)	*Full-time employment* (2)	*Own-source revenue* (3)	*Full-time employment* (4)	*Full-time employment* (5)
Ln(pension expenditures)	0.044	-0.068***	0.011	-0.064***	-0.04
	(0.036)	(0.013)	(0.020)	(0.013)	(0.031)
Local TEL * Ln(pension exp.)	-0.002	-0.002**			-0.002*
	(0.001)	(0.001)			(0.001)
Dem. presidential vote * Ln(pension exp.)			-0.04	-0.118	-0.053
			(0.124)	(0.078)	(0.092)
Collective bargaining * Ln(pension exp.)					-0.032
					(0.036)
R-squared	0.994	0.998	0.994	0.998	0.998
Observations	4,097	4,043	4,108	4,054	4,043

Notes: Standard errors clustered by state in parentheses. All models include local government and year fixed effects and the time-varying controls from Table 1. *p<0.10, **p<0.05, ***p<0.01

Online Appendix for

"Pensions in the Trenches: How Pension Spending is Affecting U.S. Local Government"

Table of Contents

1. Sample Selection

The primary goal of this research was to collect data on local governments' pension contributions and to link those data to information on governments' employment and finances. The first step was therefore to identify a data source for local government employment and finances. I used the data provided in the U.S. Census's Surveys of Government (SOG) for this purpose. The U.S. Census collects finance and employment information for all governments during its census every five years, but it also collects the information from a sample of governments during years in between censuses. I assembled all of the SOG data for municipal governments and counties for 2005 to 2016. I then selected a subset of those local governments for pension contribution data collection.

Municipal governments

The initial data collection began in the fall of 2015 and focused solely on municipal governments. At that time, 2012 was the latest year available in the SOG Finance files. For the SOG Finance survey between 2005 and 2012, the U.S. Census used one consistent sample of local governments for the 2005-2008 time period and a different sample for the 2009-2012 time period. I determined which municipal governments were included in both of these samples and then drew 236 municipal governments from that set. I defined eight strata based on municipal government population, with the first stratum being cities with fewer than 10,000 residents and the last being cities with more than 1 million residents. I then used random sampling with replacement to draw 40 municipal governments from each stratum, weighting by population within strata. This produced a sample of 236 cities from all 50 states as well as Washington, DC. Several cities (especially large cities) were selected more than once, which is why the number of unique cites in the sample is less than 320.

County governments

In March 2018, I selected a sample of county governments for data collection using an approach similar to the one I used for municipal governments. At that time, the SOG Employment files were available through 2016, and the SOG Finance files were available through 2015. I identified 421 counties that appeared in both the Employment and Finance files for all available years. I selected a sample of those as follows: First, I included in the sample all of the counties from the smallest two population bins (<25,000 in population) as well as all of the counties from the largest population bin (>=1,000,000 in population). Second, I used random sampling with replacement, weighted by population, to select 40 counties within each of the remaining population bins (counties with population between 25,000 and 999,999). Third, I added to the set of small counties using the following procedure: I identified all counties that had at least 9 years of data in the 2005-2016 SOG Employment files and 11 years of data in the 2005-2015 SOG Finance files. I added all such counties with less than 10,000 in population to the sample, and I added all counties with 10,000-24,999 in population to the sample if they had at least 10 years of data in the SOG Employment files. Fourth, in order to have the sample span all U.S. states with county governments (Rhode Island and Connecticut do not have county governments), I added all counties from Hawaii, Idaho, and Kentucky that appear in all 12 years of SOG Employment data and all 11 years of SOG Finance data.

2. Collection of Comprehensive Annual Financial Reports (CAFRs)

For each of these local governments, I attempted to collect the comprehensive annual financial reports (CAFRs) from 2005 to 2016. The first round of CAFR collection took place between September 2015 and June 2016 and focused on municipal governments from 2005 to 2014. The second round of CAFR collection was done between January 2018 and May 2019 and focused on counties for 2005 to 2016 as well as municipal governments for 2015 and 2016. Many local governments had at least some CAFRs available on their websites, typically for the two or three most recent years, but some local governments' websites did not provide any CAFRs at all. For government-years for which the CAFRs were not available online, research assistants contacted the local governments to request the documents, filing public information requests where necessary.

In total, I obtained complete CAFRs with retirement plan information for 2005 to 2016 for 161 (68%) of the 236 municipal governments. (I also collected a full set of CAFRs for an additional municipality—Springdale, Utah—which was not in the original sample.) For an additional 20 cities, I obtained either the full CAFRs or the retirement section of the CAFR for all twelve years. For some city-years, I either could not obtain the CAFR or the CAFR did not report how much the city contributed to its pension plans that year. However, for the 55 cities for which I did not get full CAFRs or the necessary retirement section for all 12 years, I obtained CAFRs for at least some of the years for 50 of them. Therefore, there were only 5 municipalities for which I was unable to obtain any retirement expenditure information at all. For one city—Pinedale, WY—I only have the CAFR for 2015, so I did not include it in the pension expenditures dataset.

Of the 239 counties selected, I obtained complete CAFRs for 2005 to 2016 for 176 counties, or 74%. For an additional 52 counties, I obtained CAFRs for some but not all years. There were only 11 counties for which I could not obtain any CAFRs. For an additional 13 counties, the CAFRs didn't include the requisite pension contribution information, so they are excluded from the pension expenditures dataset described below.

3. Data on local government pension expenditures

I used the information in the CAFRs to assemble a dataset of how much each local government contributed to each of its employee retirement plans each year.

In most CAFRs, the information about the government's contributions to its employees' retirement plans is available in the Notes to the Financial Statements. While different CAFRs present the information in different formats—with some providing tables and others describing pension costs in a narrative—most CAFRs provide certain key pieces of information: the retirement plans to which the local government contributed on behalf of its employees (most have more than one), some background on plan history and eligibility criteria, each plan's Annual Pension Cost or Actuarially Required Contribution, and the amount of the employer contribution to each plan in that year. I collected several pieces of information from each CAFR, but the main one is the amount the local government contributed to each of its employee retirement plans in that year.

My goal was to collect local governments' *total* retirement plan contributions, including any amount of the government employee contributions paid by the local government (typically called Employer-Paid Member Contributions, EPMC, or "pickup"). However, I discovered that in most CAFRs, it is difficult to discern whether the government is picking up any of the employees' share of contributions, and even when a CAFR does indicate the presence of EPMC, the dollar value of any EPMC is typically not reported clearly and consistently. Most likely, getting reliable information about the prevalence and cost of EPMC would require access to local governments' collective bargaining agreements, which is beyond the scope of this study. I collected information about EPMC from the CAFRs whenever possible, but because it was not reported consistently across local governments or within local governments over time, I do not include EPMC in the main analysis of the paper. Thus, for any local governments that pay EPMC, the amounts I analyze are lower than the amounts the government actually spent on pensions.

Some states fund their other post-employment benefits (OPEB)—such as retiree healthcare—using money local governments contribute to their pension funds. My focus here is on pensions and related retirement benefits, not on OPEB. Therefore, wherever possible, I subtracted any funds going to OPEB from the retirement expenditure amounts reported in the dataset, as long as I could consistently do that for all years within a government-plan. However, for a few government-plans, I was not able to back out the funds going to OPEB, and so there are a small number of cases in which OPEB expenditures are included. In those cases, the retirement expenditure amounts are higher than the amounts the government actually spent on non-OPEB retirement benefits.

Pension obligation bonds posed a challenge for the data collection process. These bonds, commonly referred to as POBs, are taxable bonds issued by governments to pay their obligations to their pension plans. When a local government issues POBs, it typically makes a very large one-time payment to its pension fund using the bond revenues, with the hope being that the investment returns on those revenues will exceed the cost of servicing the debt. In terms of their pension expenditures, when a government issues POBs, it looks as though it is suddenly spending much more on pensions. In my data collection, research assistants read both the complete retirement plan section and the long-term debt section of each CAFR to determine whether the local government had issued POBs in the past, had outstanding POBs, or issued POBs that year. Where reported, I tracked the amount of the bond revenue. For the analysis in the paper, in any case where the city or county issued POBs in a particular year, I subtract the amount of the bond revenue from the amount contributed to the plan that year. I list those cities and counties below.

Also, given that the goal is to track local governments' total pension spending in each year, it would make sense to include the amount spent on servicing that debt. However, there was no simple way to consistently track local government expenditures on debt service: most CAFRs do not break out POB servicing payments into principal and interest. I did track POB interest payments wherever possible, but for the analysis in the paper, the amounts do not include any interest payments on pension-related debt. Therefore, for local governments paying interest on POBs, the amounts analyzed in the paper are lower than the amounts the governments were actually spending on their employees' retirement benefits.

In cases where the state government or some other local government contributed funds toward a city's or county's pensions, those state contributions were not included. The amounts I recorded represent the contributions from the local government itself.

In some cases, even if I did not obtain a CAFR for a particular local government and year, I was able to locate the city's or county's contributions to that plan for that year using another years' CAFR.

Here are the main variables I recorded in the local pension expenditure datasets:

- The amount of the employer contribution paid to the plan that year, in thousands of dollars
- The amount of the required employer contribution to the plan, whether the ARC, the APC, or some other statutorily or contractually required contribution, in thousands of dollars
- The proportion of the required contribution that was paid
- An indicator for whether the plan is a defined benefit or defined contribution plan. Hybrid plans are coded according to whether they are mostly DC or DB.
- An indicator for whether the plan is locally administered or administered by the state
- Indicators for the types of employees included in the plan (such as public safety or general employees)
- The amount of POB proceeds for the plan that year, where applicable, in thousands of dollars. If the government issued POBs but did not indicate which of its plans the proceeds went toward, I assigned the proceeds to the government's largest plan.
- The amount of POB interest paid, in thousands of dollars, where applicable
- The amount the employer paid in EPMC, in thousands of dollars, where applicable

This data collection project produced datasets with information at the level of the local government, pension plan, and year: one for municipal governments and one for counties.

4. Aggregating pension contribution data by local government and year

For the paper, I aggregate the data by local government and year, summing the contributions going toward all retirement plans for each city or county and year. Because my goal is to use these data to analyze how pension contributions have changed within local governments over time, it was important to consider whether any changes observed within cities and counties represented meaningful changes as opposed to changes in how pensions were reported. For that reason, I made some adjustments to the data before and after aggregating them.

First, contributions to some plans were not consistently reported from year to year. For example, a city might report contributions to one of its plans for the first six years but then stop reporting any contributions to the plan. In those cases, sometimes the CAFR explains that the plan was discontinued or merged into another plan, in which case I would still include it. However, other times the CAFR provided no explanation, opening up the possibility that the city was just no longer reporting those contributions (but was for its other plans). In other cases, a county might start reporting contributions toward a plan in later years that hadn't been reported in earlier years. Sometimes the CAFR would explain that it was a new plan, but other times it appeared that these

were not new plans but were simply being reported for the first time. For the cases where it appears the reporting standard changed—meaning that contributions for the plan were reported in some years but not others—I generally dropped the plan from the data before aggregating contributions by government-year. That way I could ensure that I was aggregating contributions in a way that could be compared from year to year within governments.

I first assigned a unique code to each local government and plan combination. (In some cases, contributions to a plan were broken down into parts in one year but not another. For example, in some years, a California city's contributions to CalPERS were broken into public safety and non-public safety employee categories, and in other years only one number was given for all CalPERS participants. In those cases, I assigned unique plan codes to each of the component parts and to the aggregated figures.)

In total, I dropped 106 plans before aggregating by government-year, which is about 9% of those reported in the dataset. Nearly all of the plans were small (in terms of dollars contributed) relative to the other plans in the same local governments that were consistently reported. Many of them reported having $0 in contributions for the years they were reported. Table A1 below lists each of the plans that were dropped, with a brief explanation of why they were excluded. Four cities were dropped from the analysis entirely through this step. Therefore, in total, the city and county by year dataset includes 227 municipal governments and 215 county governments.

In addition, there were some cases for which contributions to one or more large plans were missing for one or two years at the beginning or end of the study period (such as 2005-2006 or 2015-2016). There are also some cases in which the 2015-2016 figures appear not to be comparable to those of earlier years because of the GASB change. Rather than exclude these plans from the government-year sums for all years, I simply drop those city- or county-years from any analysis in which I'm examining within-government changes in pension contributions over time. The complete list of those cases is as follows:

- Chandler, AZ: The pension contribution figures for 2015-2016 may include OPEB and disability, but earlier years do not.
- San Diego, CA: The 2005 data are missing one plan, and in 2006 there was a large spike in contributions due to legal settlements.
- Golden, CO: The 2016 data are missing one large plan.
- Chillicothe, OH: OPEB stopped being included in the pension contribution amounts in 2015-2016.
- Beaverton, OR: The 2015-2016 contribution amounts appear not to be comparable to earlier years because of the GASB reporting change.
- Seattle, WA: The data for 2016 are missing contributions to the city's largest plan.
- San Buenaventura, CA: The 2015-2016 contribution amounts appear not to be comparable to earlier years because of the GASB reporting change.
- Broward County, FL: The contribution amounts for 2013-2016 are not comparable to those of earlier years.
- Hawaii County, HI: The 2005 contribution amount is not comparable to those of 2006-2016.
- McHenry County, IL: The 2016 data are missing contributions from one plan.
- Mecklenburg County, NC: The 2005 data are missing contributions from a large plan.

- Moore County, NC: The 2005 data are missing contributions for most of the county's plans.
- Cuyahoga County, OH: The 2015-2016 data are missing contributions for most of the county's big plans those years.
- Multnomah County, OR: The 2015-2016 contributions appear not to be comparable to earlier years because of the GASB reporting change.
- Washington County, OR: The 2015-2016 contributions appear not to be comparable to earlier years because of the GASB reporting change.
- Sweet Water County, WY: The 2005 data are missing contribution data for the county's biggest plans.
- Middlesex County, NJ: The 2015-2016 contributions appear not to be comparable to earlier years because of the GASB reporting change.

A few other exceptional cases are as follows:

- Riverside County, CA: The county issued POBs in 2005, and once the POB revenue is subtracted from the annual contribution amount (described above), the contribution amount is much lower than the contributions in later years.
- Little Rock, AR: The city has many plans, and most have contributions reported in some years but not others. It is difficult to tell which years' summed contributions are comparable to one another. For any comparisons within cities over time, I exclude Little Rock entirely.

Finally, there are seven government-year observations with pension contribution amounts that diverged considerably from those in surrounding years in the same government. These contribution amounts are accurate, but in the main analysis I exclude them. They are:

- Montgomery County, AL, in 2009
- Mountain Brook, AL, in 2007
- Plymouth County, MA, in 2010 and 2016
- Robeson County, NC, in 2015 and 2016
- Alpena County, MI, in 2016

I adjusted all pension contribution amounts for inflation, to 2016 dollars. Two observations from New Bern, NC, were recoded as missing because contributions were small but not exactly $0, and the amounts are unknown. Evanston, IL, changed its budget year to calendar year in 2011, and so there are actually two rows for that city and year. I included only the first row for 2011.

For cities and counties that issued POBs between 2005 and 2016, I subtracted the POB revenue from the contribution amounts for those years. The cities and counties to which this applies are Oakland, CA; Stockton, CA; Lexington, KY; St. Louis, MO; Dallas, TX; El Paso, TX; Houston, TX; Montpelier, VT; Riverside County, CA; Sacramento County, CA; San Bernardino County, CA; Santa Clara County, CA; and Knox County, TN.

5. Survey of Governments Employment and Finance files

To these government-by-year pension contribution data I merged in Employment and Finance data from the U.S. Census's Survey of Governments (SOG). Many (43%) of the municipal governments in the pension dataset do not have corresponding data in the 2005 and 2006 Employment files, but nearly all municipal governments do for 2007-2016, as do almost all counties for 2005-2016. Variables that use these employment data—such as employment per capita or pension expenditures per employee—are therefore missing for several local governments in 2005 and 2006.

Some cities and counties show sudden, extreme changes in their employment figures in the data from an early period to a late period, which almost certainly reflect changes in how local employment was reported rather than meaningful reductions or increases in employment. For these cities and counties, I only include the employment figures from either the early period or the late period so that within-city and county figures are comparable. Specifically, I exclude the employment figures for the following governments and years:

- Bannock County, ID for 2009-2016
- Birmingham, MI for 2016
- Boone County, WV for 2014-2016
- Memphis, TN for 2014-2016
- Menomonee Falls, WI for 2016
- Virginia, MN for 2013-2016
- Morgan County, WV for 2012-2016
- Warren, MI for 2014-2016
- Vergennes, VT for 2015
- Shelby County, TN for 2014
- Miami Gardens, FL for 2005-2007
- Williston, ND for 2014-2016

The SOG Finance data were reported in one format for 2005-2012 and a new format for 2013-2016. For the last four years, all revenue and expenditure totals must be generated by calculating sums of the various components. In particular, to analyze local general revenue and own-source general revenue, I had to add together all of relevant categories of revenue in each city and county. Data in the SOG Finance files are reported in thousands of dollars; I adjust everything for inflation as I did with the pension expenditures data.

There are thirteen cities and counties in MS, AK, and MO for which the 2012 general revenue and own-source general revenue values are much lower than those in surrounding years, such that they likely reflect errors. I exclude those cases (for 2012 only) from the analysis. They are as follows:

- Clay County, MO
- Covington County, MS
- Fairbanks North Star Borough, AK
- George County, MS
- Greene County, MS

- Grenada County, MS
- Hinds County, MS
- Matanuska-Susitna Borough, AK
- St. Louis County, MO
- Wayne County, MS
- Kodiak Island Borough, AK
- North Slope Borough, AK
- Northwest Arctic Borough, AK

6. City and county demographic data

The data on demographic characteristics of these cities and counties come from the U.S. Census Bureau's Census of Population and American Community Survey (ACS). The demographic variables include city and county population by year, income per capita, percent living in urban and rural areas, percent of population living in occupied housing units who are owners and renters, and the percent of the population that is white, black, Asian, and Hispanic.

The data for population come from the decennial census in 2010 and are ACS estimates for years in between. I used the 5-year ACS estimates wherever possible. Some of the smaller local governments were not included in the ACS estimates, and for those I used data from the 2000 and 2010 censuses and interpolated within local governments over time. Income per capita comes from the ACS, although when I had to interpolate within cities or counties, I also used the 2000 income per capita numbers from the 2000 census. The data on urban and rural population are from the 2000 and 2010 censuses. I calculated percentages living in urban areas and rural areas and interpolated within cities and counties over time. The data on race and ethnicity are from the ACS. The population counts for white, black, and Asian are counts of people of one race, and the counts for Hispanic include all people identifying as Hispanic.

Data on city and county-level unemployment rates by year come from the Bureau of Labor Statistics (BLS). BLS does not make available city-level unemployment rates for cities with fewer than 25,000 residents, so for those cities I use the unemployment rate of the parent county. This was the case for 73 cities in the dataset. I am also missing unemployment data for 52 local government-years in the dataset.

7. City and county presidential vote and ideology

The data on presidential vote share and ideology come from a variety of sources. The main variable I use for this purpose is *dem_voteshare_2008*, which has a value for every city and county in the dataset. It is constant within cities and counties over time. It measures the proportion of total votes in the city/county received by Barack Obama in 2008. I constructed this variable using a few different sources, as follows, with more details about each data source below.

1 – Tausanovitch and Warshaw (2013) replication data
2 – State government reporting
3 – County-level data (Tausanovitch and Warshaw 2013)
4 – Alasksa House District data (MIT)

1 – Tausanovitch and Warshaw (2013) replication data
These values are from the "City-Level Preference Estimates" and "County-Level Preference Estimates" datasets downloaded from americanideologyproject.com.

2 – State government reporting
These values come from various state- and county-level data sources, predominantly Secretary of State websites.

3 – County-level data (Tausanovitch and Warshaw 2013)
For those cities and towns for which city- or town-level data were not available, county-level data were used as a substitute. County-level values come from the same Tausanovitch and Warshaw replication dataset as in (1).

4 – Alaska House District data
For Alaskan Boroughs, data are used from the 40 Alaska State House voting districts. The relevant districts for each borough were identified using data from the Statistical Atlas (statisticalatlas.com) as follows:

- Fairbanks North Star Borough: AK-1, AK-2, AK-3, AK-4, AK-5, AK-6
- Kodiak Island Borough: AK-32
- Matanuska-Susitna Borough: AK-7, AK-8, AK-9, AK-10, AK-11, AK-12
- North Slope Borough: AK-40
- Northwest Arctic Borough: AK-40

2008 Presidential election data were taken from county-level presidential election returns from the Harvard Dataverse/MIT Election Data Lab.

8. Public-sector union membership and collective bargaining data

There are no modern sources of data on collective bargaining or public-sector union membership for all local governments in the U.S. One of the only local-level sources of data on collective bargaining is the dataset compiled by Anzia and Moe (2015), which combines data from Law Enforcement Management and Administrative Statistics (LEMAS), the ICMA's Labor Management Relations Surveys, and the 1977 Census of Governments to create indicators of whether municipal governments have collective bargaining for police officers and firefighters. I use those data for the 176 municipal governments in my pension expenditures dataset that are also in the Anzia and Moe dataset.

For the remaining cities and all counties, there are no local-level data on the presence of collective bargaining, but the presence of local-level collective bargaining and public-sector union membership rates are heavily influenced by state laws governing labor-management relations. Moe (2011), for example, shows that states with laws mandating collective bargaining for teachers have higher teacher union membership rates and greater collective bargaining coverage in school districts.

I therefore rely on the data on state public-sector collective bargaining laws from Anzia and Moe (2016). Those data track, by state, whether five groups of government employees are covered by

a law requiring employers to engage in collective bargaining if those employees form a union: state employees, teachers, police, firefighters, and other local employees. In the paper, for the remaining cities and all counties, I code them as having collective bargaining for local employees if there is a state law requiring collective bargaining for police, firefighters, and other local employees. I code a state as not having collective bargaining for local employees if any of those groups are not covered by a mandatory bargaining law.
As I describe in the paper, this is a reasonable proxy for local-level collective bargaining. For the 176 cities for which I have both the local and state-level variables, there are 94 that are in states with mandatory collective bargaining, and 100% of those cities are coded as having local-level collective bargaining. Of the remaining cities that are in states that don't mandate collective bargaining, only 35% have collective bargaining according to the local-level indicators.

In some of the analysis to follow, I also use data on public-sector union membership by state. Those public-sector union membership data come from the calculations of Anzia and Moe. The estimates are calculated using Current Population Data from 2000 to 2010 using the methodology of Hirsch and MacPherson (2003), although the Anzia-Moe estimates only include individuals who work full-time for state and local governments (no part-time employees or federal government employees). The estimates are constant within states over time.

9. Tax and expenditure limit data

For the analysis of tax and expenditure limits, I use an index of local TEL severity developed by Amiel, Deller, and Stallmann (2009). Their index incorporates information on the type of TEL, its scope and restrictions, and the provisions and established methods for exemptions and overrides. I use the most recent year of the index available: 2005 (which corresponds to the earliest year of my pension expenditures dataset). The local TEL index ranges from 0 (e.g., New Hampshire) to 38 (Colorado) and is constant within states over time.

10. Outliers excluded from Figure 1

The plots shown in Figure 1 of the paper exclude a small number of outliers. The first plot on the top left excludes Monmouth County, New Jersey, which only contributed $900,000 toward pensions in 2005 but contributed $26,245,000 in 2016. The top right figure excludes Plymouth County, Massachusetts. The two bottom plots exclude Pembroke Pines, Florida, and the bottom right figure also excludes San Jose, California, and Joliet, Illinois.

11. Cross-sectional variation in local pension expenditures

Table A2 presents descriptive statistics for pension expenditures as a share of general revenue and per FTE employee as of the year 2007—an early year in the dataset and one for which I have pension expenditure data and employment and finance data for most of the 442 local governments. That year, the median local government in the dataset spent $4,901 per full-time equivalent employee on pensions, amounting to 3.1% of its general revenue, but there was considerable variation across cities and counties. In the top 25%, pension expenditures were more than $7,726 per employee and 4.7% of general revenue. And there is substantial right skew in the distributions of these variables. The top 5% of cities and counties were spending more than $15,183 per employee and more than 7.7% of general revenue on pensions. In the top 1% of

these local governments, pension expenditures in 2007 were more than 10% of general revenue and over $21,728 per employee. Clearly, then, even as of 2007, U.S. cities and counties varied significantly in their pension costs.

Table A3 explores the correlates of local pension expenditures per employee and as a share of general revenue as of 2007. I use OLS to regress city and county pension expenditures as of 2007 on a series of state and local variables.

First, there is some reason to expect that local pension costs might be higher in local and state governments with strong public-sector unions and mandatory collective bargaining. Public employees' salaries tend to be higher in cities with unionized employees and collective bargaining (e.g., Anzia and Moe 2015)—even if there is debate about whether that relationship is causal (e.g., Paglayan 2019)—and employees' pension benefits are a function of their final average salaries.[1] Public-sector unions also have incentives to push for higher benefits in other ways, such as by increasing the multiplier. However, if pension *underfunding* is more pronounced in states with stronger unions (Anzia and Moe 2019), then that should affect the relationship as well—and the direction of any such effect is theoretically ambiguous. On the one hand, local pension contributions themselves would tend to reflect a greater tendency to underfund in heavily unionized states (suggesting they should perhaps be lower), but on the other hand, cities and counties in heavily unionized states would eventually be called on to contribute more to make up for greater accumulated shortfalls (suggesting they should perhaps be higher). It is also not clear whether to expect local governments with strong unions to spend a larger share of their budgets on pensions: they may dedicate larger sums to employee-related costs, but they may also have larger budgets overall. It is an empirical question, then, whether local governments in places with collective bargaining and stronger unions have higher pension expenditures. In this analysis, the measure of union strength is the proportion of state and local government employees who are members of unions in each local government's home state, and the measure of collective bargaining equals 1 if police, firefighters, and other local employees in the state are covered by a duty-to-bargain law and 0 if any of them are not.

Second, I include log per capita income in the local jurisdiction, expecting pension spending to be higher in places with higher cost of living. Because more liberal cities and counties might be more supportive of greater pension spending, I also include local presidential vote share for Barack Obama in 2008. DC plans are often touted as less expensive for governments than DB plans, so I include a variable equal to the proportion of the local government's annual retirement expenditures that went to DC plans. Munnell (2012) proposes that local governments with larger numbers of plans or more locally-operated plans may have lower funding levels, so I control for the number of plans in the locality as well as the share of pension expenditures that went to locally-operated plans. Finally, I include the proportion of the annual pension expenditures that also went to paying for OPEB, expecting it might be associated with higher overall contribution amounts.

[1] Munnell (2012) examines the normal cost of pensions as a proportion of payroll, which would mask such a difference if both pension costs and payroll are higher in places with strong unions.

These are the variables for which there is reason to expect a relationship to local pension contributions, but in all models I also add a series of variables that have been emphasized in the literature on local politics: the log of the city or county's population and the proportions of local residents who are living in urban areas, who are homeowners, and who are black, Asian, and Hispanic. To explore whether there are average pension expenditure differences between cities and counties, I include a binary indicator for counties. Standard errors are clustered by state.

Column 1 of Table A3 presents the estimates for the model of local pension expenditures as a share of general revenue in 2007. The coefficient on union membership is statistically indistinguishable from zero, showing that cities and counties in states with stronger unions did not spend a significantly larger share of their general revenue on pensions than local governments in states with weaker unions. The estimates do show that greater use of DC plans is associated with spending a smaller share of general revenue on pensions, and that more urban areas and cities spend a greater share on pensions than more rural areas and counties. None of the other coefficients are statistically significant.

In column 2, I model logged pension costs per employee in 2007 (in thousands of 2016 dollars), and there I estimate a positive association with the strength of public-sector unions. A few of the other variables are also significantly associated with higher pension costs per employee, including per capita income, larger population, more urban population, larger shares of Asian and Hispanic residents,[2] and being a municipal as opposed to a county government. Interestingly, more liberal cities do not pay higher pension costs per employee, nor do local governments with more plans or more locally-operated plans.

In column 3, I replace the union membership variable with an indicator for whether the local government is in a state that requires government employers to collectively bargain with their employees if those employees form a union. The estimated coefficient on *Collective bargaining* is 0.16, suggesting that as of 2007, shifting from a non-duty-to-bargain state to a duty-to-bargain state is associated with a 17% increase in pension expenditures per employee.

12. Predictors of pension expenditure growth over time

In Table A4, I explore characteristics of local governments and their retirement plans that might predict greater or lesser growth in pension spending, regressing the pension expenditures variables shown in Figure 1 on the same set of independent variables as in Table A4.

Column 1 presents the estimates for the model of change in pension expenditures as a share of general revenue. It shows that the increases have tended to be bigger in cities and counties with higher public-sector union membership: an increase of 10 percentage points in union membership is associated with a 0.19-percentage-point greater increase in the proportion of general revenue going to pension expenditures between 2005 and 2016. In column 2, I model the change in pension expenditures per full-time equivalent employee from 2005 to 2016 (in thousands of 2016 dollars), and I again find a statistically significant positive relationship between public-sector union strength and growth in pension spending. Here, a 10-percentage-

[2] This is a California effect: when I add an indicator for whether the local government is in California, these two coefficients are no longer statistically significant.

point increase in union membership is associated with additional pension spending growth of $395 per employee over this twelve-year period. I find the same pattern in column 3, where I replace the union membership variable with the indicator for collective bargaining, and in column 4, where I model growth in pension spending per employee from 2007 to 2016.
Two other clear findings that emerge are that pension spending has grown more slowly in localities that rely more on DC plans and more rapidly in places with more locally-operated plans. In column 4, for example, I find that cities and counties with 50% of their retirement spending going to DC plans had pension spending growth that was $1,424-per-employee less from 2007 to 2016 than those with 0% spending on DC plans. The same model estimates suggest that local governments with 50% spending on locally-administered plans had an additional $1,234 increase in pension expenditures per employee than governments with all state-operated plans.

Table A1: Plans dropped before aggregating by local government and year

City / County	Plan	Reason for excluding
Hot Springs, AR	Arkansas District Judge Retirement System	Missing data for 2015-2016; not reported in those CAFRs
Hot Springs, AR	Arkansas Public Employees Retirement System (Hot Springs Advertising and Promotion Commission)	Missing data for 2015-2016; not reported in those CAFRs
Little Rock, AR	Local Police and Fire Retirement System	For 2012-2014, the city was still contributing, but the amounts aren't reported. Police and fire amounts reported together through 2015, separately for 2016.
Little Rock, AR	Local Police and Fire Retirement System- Police	This is for 2016 only, same as previous plan but only for police.
Little Rock, AR	Local Police and Fire Retirement System-Fire	This is for 2016 only, same as previous plan but only for fire.
Chandler, AZ	Elected Officials' Retirement Plan	Small plan, no amounts reported in CAFR for 2015-2016.
Gilbert, AZ	Elected Officials' Retirement Plan	Not mentioned in CAFRs after 2014
Gilbert, AZ	Volunteer Firemen's Pension and Relief Fund	0 contributions for all years; no mention after 2014.
Marana, AZ	Corrections Officers Retirement Plan	Smaller plan. Not mentioned in 2005-2007 CAFRs but does not appear to be new.
Marana, AZ	Elected Officials' Retirement Plan	Smaller plan. Not mentioned in 2005-2007 CAFRs but does not appear to be new.
Mesa, AZ	Arizona State Retirement System Defined Contribution Plan	Only reported in 2014
Mesa, AZ	Elected Officials' Retirement Plan	Missing 2015-2016 because they stopped reporting on it; small plan.
Peoria, AZ	Elected Officials' Retirement Plan	Small plan, not reported after 2014.
Phoenix, AZ	Elected Officials' Retirement Plan	Only reported up through 2014; small plan.
Scottsdale, AZ	Elected Officials' Retirement Plan	Only reported through 2014
Oakland, CA	Oakland Municipal Employees Retirement System	No contributions to this plan throughout
San Jose, CA	Defined Contribution Plan	Ends in 2011, no amounts known.
Denver, CO	Public Employees' Retirement Association of Colorado Plan	Only appears for 2015-2016; small plan
Golden, CO	City of Golden Police and Fire Pension Plan	Missing contribution amounts for 2016.
Middletown, DE	Deferred Compensation Plan	Only 2007-2016 and contributions are 0 for all years.
Carterville, GA	Optional Defined Contribution Retirement Plan	Only have 2015-2016

Blue Island, IL	Illinois Municipal Retirement Fund - Sherrif Law Enforcement Personnel	Had 0 contributions for all years
Alexandria, LA	Policemen's Pension and Relief Fund	Only 2005 reported and 0 contributions
New Orleans, LA	Police Pension Fund	0 contributions all years and only reported through 2014
Presque Isle, ME	Defined Contribution Pension Plan	Missing 2015-2016; those years not reported in CAFRs. Plan is not small.
Detroit, MI	General Retirement System (GRS)	Defaulted on POBs and stopped paying
Detroit, MI	General Retirement System (GRS)- Component I (new plan)	Only 2015-2016 available
Detroit, MI	Policemen and Firemen Retirement System (PFRS)	Defaulted on POBs and stopped paying
Detroit, MI	Policemen and Firemen Retirement System (PFRS)-Component 1 (new plan)	Only 2015-2016 available
Greenville, NC	Firemen and Rescue Squad Workers' Pension Fund	Only 2013-2016 are available, and city contributions are 0 because of state contributions.
High Point, NC	Firemen's and Rescue Squad Workers' Pension Fund	0 in contributions 2006-2016
New Bern, NC	Law Enforcement Officers Special Separation Allowance	Missing data from 2005-2009
Wilson, NC	Firemen's and Rescue Squad Workers' Pension Fund	City does not make any contributions
Manchester, NH	NHRS Related Supplementary Benefits Plan	Contributions unknown and likely very small, marked as 0
Newark, NJ	Defined Contribution Retirement System	No contributions throughout
Hamilton, OH	Metropolitan Pension Plan	Not reported for all years and is a small plan.
Moore, OK	City of Moore 457 Deferred Compensation Plan	No contributions made
Port Arthur, TX	Port Arthur Firemen's Relief and Retirement Fund	Have contribution amounts for 2009-2016, but don't have the contributions from the other city plan, which is much larger.
Port Arthur, TX	Texas Municipal Retirement System	Only have contributions from 2014-2016, earlier years don't report amounts
San Antonio, TX	Principal Mutual Life Insurance Company	Only have contributions from 2005-2007. It looks like this is the same plan as San Antonio Water System Retirement Plan, which is missing data for 2015-2016 and is a large plan.
San Antonio, TX	San Antonio Water System Retirement Plan	Missing contribution data for 2015-2016, and is a large plan
Springville, UT	Defined Contribution Plan	Only 2012-2016 available. Reporting for this city changes every year and so numbers are unreliable.
Springville, UT	Firefighter's Retirement System	Only 2008-2016.Reporting for this city changes every year and so numbers are unreliable.

Springville, UT	Local Government Contributory Retirement System	Only 2008-2016. Reporting for this city changes every year and so numbers are unreliable.
Springville, UT	Local Government Noncontributory Retirement System	Only 2008-2016. Reporting for this city changes every year and so numbers are unreliable.
Springville, UT	Public Safety Division Noncontributory Retirement System	Only 2008-2016. Reporting for this city changes every year and so numbers are unreliable.
Kent, WA	Firemen's Relief and Pension System	0 in local contributions; funded by state tax
Madison, WI	Madison Public Library Foundation Pension Plan	DC plan, new in 2012, but not reported 2015-2016 and very small
Magnolia, AR	Local Police and Fire Retirement System (LOPFI)	Only have 2016; for earlier years, CAFRs don't have contribution amounts
Magnolia, AR	Arkansas Public Employees Retirement System	Only have 2016; for earlier years, CAFRs don't have contribution amounts
O'Fallon, IL	Firemen's Pension Fund	Started being reported in 2015; only have contributions for 2015-2016 from 2017 CAFR
North Slope Borough, AK	Alaska PERS Defined Contribution Plan	Starts in 2007. Amounts for 2014-2016 include OPEB while earlier years do not.
Cochise County, AZ	Elected Official Retirement Plan	Only 2014-2016 reported although it existed before.
Cochise County, AZ	The Corrections Officer Retirement Plan (CORP)	Only have 2005-2007 and 2014-2016 even though it existed in between. Some years include health care costs.
Mohave County, AZ	Elected Official Retirement Plan	Only have 2014-2016 even though it was there before.
Pima County, AZ	Elected Official Retirement Plan	Only have 2014-2016 even though it was there before.
Pima County, AZ	Public Safety Personnel Retirement System (PSPRS)- Pima County Attorney Investigators	Contribution amounts unknown.
Orange County, FL	Orange County Library District Defined Benefit Plan	Missing data for 2012-2016.
Orange County, FL	Orange County Library District Defined Contribution Plan	Only 2007-2011 available and not clear why
Orange County, FL	Orange County Library District Money Purchase Pension Plan	Only 2007-2011 available and not clear why
Cobb County, GA	401/457 Defined Contribution Plan	Only have 2015-2016 but has been in operation since 2010
Cook County, IL	Forest Preserve District Pension Fund	Missing certain years of data even though it likely existed throughout
Macon County, IL	Decatur Public Building Commission Retirement Plan	Don’t have data for 2005, and it's small relative to other plans
Seward County, KS	Kansas Police and Fireman's Retirement System (KP&F)	Missing 2005-2009 and 2013-2014
Plaquemines Parish, LA	District Attorneys' Retirement System	Starts in 2006, missing data for several years
Plaquemines Parish, LA	Firefighters' Retirement System of Louisiana	Starts in 2006, missing data for several years

Grand Traverse County, MI	Grand Traverse County Road Commission Discretely Presented Component Unit	Missing 2016 and it's small
Grand Traverse County, MI	Pension Plan--Grand Traverse Pavilions, Municipal Employees Retirement System (MERS)	Missing 2005 data. Not a small plan.
Grand Traverse County, MI	Road Commission Component Unit--Municipal Employees Retirement System of Michigan (MERS)	Missing 2016 and it's small
Oakland County, MI	County's Public Employees' Retirement System (PERS)	Only 2005 available, and 0 contributions
Oakland County, MI	Road Commission for Oakland County Retirement System--"The System"	Only have 2005 data
Greene County, MO	County Employees' Retirement System (CERF)	Only have contributions for 2014-2016 even though it was contributing in earlier years.
Richland County, MT	Defined Contribution Plan	Only 2016 available, not clear what contributions are but likely 0
Eureka County, NV	Judicial Retirement System of the State of Nevada (JRS)	Started in 2007 but missing 2015-2016
Monmouth County, NJ	Defined Contribution Retirement Program	Only have 2008-2009
Salem County, NJ	Defined Contribution Retirement Program	Only have 2008-2011
Dutchess County, NY	New York State and Local Employees' Retirement System (ERS) -- Resource Recovery Agency Compenent Unit	Missing 2012-2014
Dutchess County, NY	New York State and Local Employees' Retirement System (ERS) -- Water and Wastewater Authority Component Unit	Missing 2012-2014
Niagara County, NY	Teachers Insurance and Annuity Association and the College Retirement Equities Fund (TIAA-CREF) -- Niagara County Community College Component Unit	Missing 2006, 2015-2016
Oneida County, NY	New York State and Local Employees' Retirement System (ERS) Authority	Only 2005-2014 available and within that missing 2012-2014
Oneida County, NY	New York State and Local Employees' Retirement System (ERS) Solid Waste Management Authority	Only have 2015-2016 and it was probably just not reported in earlier years (but we don't know)
Oneida County, NY	Teachers Insurance and Annuity Association and the College Retirement Equities Fund (TIAA/CREF)	Disappears from CAFRs as of 2012, not clear why
Durham County, NC	North Carolina Firemens' and Rescue Squad Workers' Pension Fund	Only have data for 2014 and 2015, very small
Edgecombe County, NC	Register of Deeds' Supplemental Pension Fund	Only have data for 2007-2016 and is very small
Edgecombe County, NC	Supplemental Retirement Income Plan for Law Enforcement Officers	Only have data for 2007-2016; not small.
Haywood County, NC	Register of Deeds' Supplemental Pension Fund	Reporting starts in in 2009 and is small

Haywood County, NC	Supplemental Retirement Income Plan for Law Enforcement Officers	Reporting starts in in 2009 and is small
Haywood County, NC	Supplemental Retirement Income Plan for Non-Law Enforcement Personnel	Have very few years of data
Iredell County, NC	Register of Deeds' Supplemental Pension Fund	No data for 2005-2006
Iredell County, NC	Supplemental Retirement Income Plan for Law Enforcement Officers	No data for 2005-2006
Grand Forks County, ND	North Dakota Public Employees' Retirement System (NDPERS) Water Resource District	Missing certain years and very small
Wayne County, OH	Ohio Public Employees Retirement System (OPERS) member-directed plan	Only 2009 available
Clackamas County, OR	Oregon Public Employees Retirement System (PERS)- Housing Authority	Missing 2015-2016, relatively small
Multnomah County, OR	Multnomah County Library Retirement Plan	Missing years
Hamilton County, TN	Hamilton County Employees' Pension Plan	0 in contributions for all years
Shelby County, TN	Tennessee Consolidated Retirement Systems (TCRS)	Not available until 2014
Salt Lake County, UT	Tier 2 - Defined Contribution Plans	No contribution information available
Utah County, UT	Tier 2 Public Employees DC Only System	Only have data for 2015-2016 and is small
Utah County, UT	Tier 2 Public Safety and Firefighter DC Only System	Only have data for 2015-2016 and is small
James City County, VA	Virginia Retirement System (VRS) - School Professionals	Large plan but amounts not listed in later CAFRs
Loudoun County, VA	Volunteer Fire and Rescue Retirement System	Missing 2016 information
Kitsap County, WA	Law Enforcement Officers and Firefighters' Retirement System (LEOFF) - Plan 1	0 contributions throughout
Jackson County, WV	Emergency Medical Services Retirement System	Only have contributions for 2007-2016, may have contributed to earlier years but not reported.
Wood County, WV	Emergency Medical Services Retirement System	No contribution information available
Dane County, WI	Wisconsin Retirement System - DCHA Employees	Only have data through 2012
Branch County, MI	Municipal Employees' Retirement System (MERS) - Maple Lawn Medical Care Facility	No contribution info available

Table A2: City and county pension expenditures in 2007

	Proportion of general revenue	Per full-time equivalent employee (2016 dollars)
1%	0.003	$308
5%	0.006	$609
25%	0.018	$2,619
50%	0.031	$4,901
75%	0.047	$7,726
95%	0.077	$15,183
99%	0.109	$21,728
Mean	0.035	$5,945
SD	0.026	$4,996
N	410	409

Table A3: City and county pension expenditures in 2007

	Proportion of general revenue	Per full-time equivalent employee (thousands of 2016 dollars, logged)	
	(1)	(2)	(3)
Union membership	-0.001	0.454	
	(0.010)	(0.249)	
Collective bargaining			0.16
			(0.103)
Ln(income per capita)	0.014	0.5	0.497
	(0.014)	(0.246)	(0.254)
Democratic presidential vote	0.006	-0.136	-0.143
	(0.012)	(0.338)	(0.352)
% DC plans	-0.02	-0.27	-0.294
	(0.006)	(0.164)	(0.178)
Number of plans	0.001	0.01	0.013
	(0.001)	(0.027)	(0.027)
% Local plan	0.008	0.131	0.142
	(0.005)	(0.097)	(0.099)
% also funding OPEB	0.001	0.145	0.16
	(0.006)	(0.099)	(0.099)
Ln(population)	-0.0002	0.07	0.078
	(0.002)	(0.039)	(0.039)
% Urban	0.012	0.397	0.396
	(0.006)	(0.221)	(0.223)
% Homeowner	0.014	0.054	0.029
	(0.015)	(0.381)	(0.396)
% Black	-0.007	-0.183	-0.238
	(0.011)	(0.283)	(0.303)
% Asian	0.013	0.812	1.007
	(0.025)	(0.454)	(0.458)
% Hispanic	0.026	0.694	0.618
	(0.019)	(0.361)	(0.364)
County	-0.013	-0.443	-0.457
	(0.004)	(0.114)	(0.114)
Constant	-0.129	-4.608	-4.56
	(0.132)	(2.230)	(2.282)
R-squared	0.26	0.46	0.46
Observations	410	409	409

Notes: Standard errors clustered by state in parentheses.

Table A4: Within-city and county change in pension expenditures

	Proportion of general revenue, 2005-2016	Per employee, 2005-2016 (thousands)		Per employee, 2007-2016 (thousands)
	(1)	(2)	(3)	(4)
Union membership	0.019	3.953		3.002
	(0.009)	(1.345)		(1.066)
Collective bargaining			0.884	
			(0.570)	
Ln(income per capita)	0.001	1.017	0.783	0.006
	(0.005)	(1.218)	(1.245)	(0.860)
Democratic presidential vote	-0.011	-0.546	0.579	-0.086
	(0.012)	(2.024)	(2.425)	(1.877)
% DC plan	-0.012	-3.004	-3.308	-2.848
	(0.006)	(0.999)	(1.039)	(0.930)
Number of plans	0.001	0.134	0.15	0.079
	(0.001)	(0.125)	(0.126)	(0.107)
% Local plans	0.013	1.689	1.835	2.469
	(0.005)	(0.653)	(0.656)	(0.549)
% also funding OPEB	0.014	1.241	1.441	1.521
	(0.007)	(0.916)	(0.849)	(1.264)
Ln(population)	-0.001	0.085	0.17	-0.073
	(0.002)	(0.271)	(0.264)	(0.213)
% Urban	-0.003	-0.543	-0.613	-0.944
	(0.006)	(1.136)	(1.097)	(0.873)
% Homeowner	0.012	-0.447	-0.143	0.335
	(0.017)	(2.756)	(2.791)	(2.345)
% Black	0.025	-0.023	-1.318	1.86
	(0.014)	(1.643)	(1.768)	(1.744)
% Asian	0.039	13.746	15.664	8.534
	(0.017)	(3.499)	(3.329)	(4.193)
% Hispanic	0.024	5.977	5.092	4.709
	(0.016)	(2.745)	(2.993)	(1.887)
County	-0.002	-0.836	-0.855	-1.098
	(0.004)	(0.666)	(0.677)	(0.508)
Constant	-0.01	-11.006	-9.24	1.101
	(0.043)	(10.276)	(10.797)	(7.428)
R-squared	0.21	0.42	0.4	0.34
Observations	348	265	265	351

Notes: Standard errors clustered by state in parentheses.

In Table A5, I evaluate whether there is a link between rising pension spending and expenditures on part-time employee payroll. The dependent variable is total payroll expenditures for part-time employees. I find no association between the size of a local pension spending increase and a decrease in expenditures on part-time employees.

Table A5: Pension spending and part-time payroll expenditures

Ln(Pension expenditures per employee)	0.008
	(0.045)
Ln(income per capita)	0.49
	(0.272)
Ln(population)	0.102
	(0.276)
% Urban	0.704
	(1.269)
% Homeowner	0.167
	(0.564)
% Black	0.847
	(1.397)
% Asian	0.52
	(1.667)
% Hispanic	1.22
	(1.159)
% Unemployment	-0.351
	(0.722)
R-squared	0.95
Observations	4,020

Notes: Standard errors clustered by state in parentheses. Model includes fixed effects for local government and year.

Table A6 presents the full estimates from the models summarized in Figure 2 of the paper.

Table A6: Collective bargaining, public safety and non-public safety

	Own-source general revenue (1)	*Full-time employment* (2)	*Public-safety employment* (3)	*Non-public-safety employment* (4)
Ln(pension expenditures)	0.006	-0.027	0.003	-0.029
	(0.054)	(0.025)	(0.026)	(0.026)
Collective bargaining * Ln(pension exp.)	0.004	-0.052	-0.043	-0.053
	(0.057)	(0.027)	(0.027)	(0.028)
Ln(income per capita)	0.718	0.36	0.248	0.35
	(0.195)	(0.105)	(0.103)	(0.115)
Ln(population)	0.296	0.364	-0.682	-0.638
	(0.152)	(0.104)	(0.086)	(0.108)
% Urban	0.33	0.521	0.998	0.235
	(0.510)	(0.247)	(0.471)	(0.255)
% Homeowner	0.025	0.017	-0.289	0.087
	(0.273)	(0.144)	(0.208)	(0.152)
% Black	1.235	0.647	0.347	0.637
	(0.778)	(0.361)	(0.410)	(0.410)
% Asian	-0.062	0.058	0.231	-0.132
	(0.552)	(0.616)	(0.702)	(0.620)
% Hispanic	0.208	-0.124	-0.106	-0.194
	(0.467)	(0.338)	(0.314)	(0.343)
% Unemployment	-0.588	0.138	0.168	0.179
	(0.582)	(0.215)	(0.234)	(0.238)
R-squared	0.994	0.998	0.98	0.987
Observations	4,108	4,054	4,033	4,054
Ln(pension exp.) + Collective bargaining * Ln(pension exp.)	0.011	-0.078	-0.039	-0.081
	(0.019)	(0.015)	(0.013)	(0.015)

Notes: Standard errors clustered by state in parentheses. All models include local government and year fixed effects. Dependent variables are logged.

Table A7 presents the full estimates from Table 2 of the paper.

Table A7: Local TELs and partisanship

	Own-source revenue (1)	*Full-time employment* (2)	*Own-source revenue* (3)	*Full-time employment* (4)	*Full-time employment* (5)
Ln(pension expenditures)	0.044	-0.068	0.011	-0.064	-0.04
	(0.036)	(0.013)***	(0.020)	(0.013)***	(0.031)
Local TEL * Ln(pension exp.)	-0.002	-0.002			-0.002
	(0.001)	(0.001)**			(0.001)*
Dem. presidential vote *			-0.04	-0.118	-0.053
Ln(pension exp.)			(0.124)	(0.078)	(0.092)
Collective bargaining *					-0.032
Ln(pension exp.)					(0.036)
Ln(income per capita)	0.708	0.356	0.716	0.361	0.354
	(0.195)***	(0.104)***	(0.195)***	(0.104)***	(0.104)***
Ln(population)	0.297	0.364	0.296	0.368	0.364
	(0.151)*	(0.104)***	(0.151)*	(0.104)***	(0.101)***
% Urban	0.311	0.526	0.311	0.509	0.485
	(0.504)	(0.246)**	(0.516)	(0.248)**	(0.245)*
% Homeowner	0.029	0.015	0.023	0.012	0.012
	(0.270)	(0.139)	(0.273)	(0.142)	(0.138)
% Black	1.261	0.592	1.219	0.621	0.568
	(0.813)	(0.373)	(0.774)	(0.364)*	(0.377)
% Asian	0.001	0.101	-0.045	0.066	0.129
	(0.557)	(0.622)	(0.549)	(0.614)	(0.609)
% Hispanic	0.191	-0.163	0.215	-0.14	-0.136
	(0.455)	(0.329)	(0.469)	(0.340)	(0.328)
% Unemployment	-0.635	0.141	-0.607	0.131	0.1
	(0.584)	(0.205)	(0.577)	(0.213)	(0.195)
R-squared	0.994	0.998	0.994	0.998	0.998
Observations	4,097	4,043	4,108	4,054	4,043

Notes: Standard errors clustered by state in parentheses. All models include local government and year fixed effects and the time-varying controls from Table 1. *p<0.10, **p<0.05, ***p<0.01

In a footnote of the paper, I discuss how the estimates in the model of logged capital outlays indicate a negative, significant relationship between pension expenditures and capital outlays in city governments but not in county governments. I present those results in Table A8.

Table A8: Capital outlays, cities and counties separately

	Cities	*Counties*
	(1)	(2)
Ln(pension expenditures)	-0.258	0.224
	(0.127)	(0.149)
Ln(income per capita)	2.316	1.291
	(0.652)	(1.074)
Ln(population)	-0.068	-0.658
	(0.563)	(0.698)
% Urban	3.82	-1.409
	(7.330)	(1.693)
% Homeowner	-0.229	0.717
	(1.185)	(2.650)
% Black	4.384	-1.191
	(3.506)	(6.942)
% Asian	-3.638	5.238
	(2.796)	(5.706)
% Hispanic	4.383	-2.59
	(2.618)	(3.081)
% Unemployment	-2.001	0.434
	(1.833)	(3.799)
R-squared	0.91	0.87
Observations	1,910	2,135

Notes: Standard errors clustered by state in parentheses. Models include local government and year fixed effects. Dependent variable is logged.

In Figure A1, I present the pension expenditures for a seventh city whose 1995-1996 CAFRs I was able to locate online: Mountain Brook, AL. (See Figure 2 of the paper.) Mountain Brook elected to make large extra contributions in 2001 and 2007, which makes it difficult to see the general trend in the data, which is why I excluded it from Figure 2 of the paper. However, the city's pension expenditures as of 2016 were indeed higher than in 1996.

Figure A1

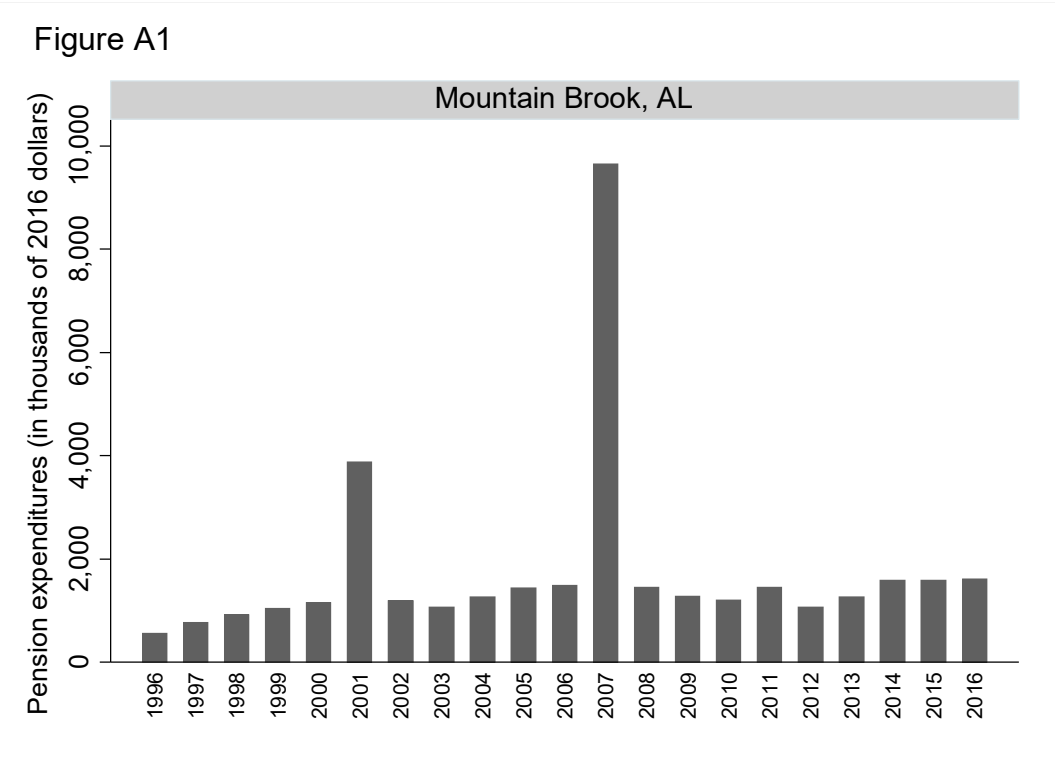

Table A9 presents the estimates of the main employment results of the paper (Table 1, columns 3 and 4) including logged general revenue as a predictor.

Table A9: Employment models with general revenue as a predictor

	FTE	*Full-time employment*
	(1)	(2)
Ln(pension exp.)	-0.066	-0.068
	(0.014)***	(0.014)***
Ln(income per capita)	0.243	0.266
	(0.069)***	(0.084)***
Ln(population)	0.321	0.321
	(0.107)***	(0.106)***
% Urban	0.504	0.55
	(0.236)**	(0.236)**
% Homeowner	-0.027	-0.027
	(0.135)	(0.142)
% Black	0.492	0.418
	(0.416)	(0.374)
% Asian	0.158	0.006
	(0.622)	(0.621)
% Hispanic	-0.045	-0.152
	(0.332)	(0.330)
% Unemployment	0.194	0.3
	(0.170)	(0.197)
Ln(general revenue)	0.142	0.149
	(0.029)***	(0.028)***
R-squared	0.998	0.998
Observations	4,009	4,009

Notes: Standard errors clustered by state in parentheses. Models include fixed effects for local government and year.

Table A10 presents estimates from the models of Table 2 of the paper but replacing Democratic presidential vote with the Tausanovitch and Warshaw (2013) citizen ideology scores.

Table A10: Ideology

	Own-source revenue (1)	*Full-time employment* (2)
Ln(pension exp.)	0.007	-0.066
	(0.022)	(0.014)***
Ideology * Ln(pension exp.)	-0.027	0.034
	(0.059)	(0.039)
Ln(income per capita)	0.797	0.47
	(0.205)***	(0.108)***
Ln(population)	0.348	0.305
	(0.133)**	(0.107)***
% Urban	0.528	0.558
	(0.513)	(0.266)**
% Homeowner	0.33	0.034
	(0.355)	(0.176)
% Black	0.797	1.014
	(0.451)*	(0.512)*
% Asian	0.43	0.017
	(0.676)	(0.581)
% Hispanic	0.372	0.101
	(0.423)	(0.309)
% Unemployment	-0.595	-0.115
	(0.601)	(0.192)

Notes: Standard errors clustered by state in parentheses.
Models include fixed effects for local government and year.

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