Who Pays for Public Employee Health Costs?

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The cost of health care for state and local government employees is increasing rapidly, as it is for workers across the economy. Since state and local governments are large employers – one in seven people work in state and local government – these cost increases are materially important. Estimates suggest that state and local governments spent $70 billion on health insurance in 2001 (in 2012 dollars), and $117 billion in 2010.[1] The real increase was $130 per capita.

Adjusting to these cost increases is more difficult for state and local governments than for private businesses. One strategy that businesses use to address rising costs is to pass those costs back to workers, in the form of increased cost sharing for health insurance, less generous coverage, lower contributions to employee benefits, or smaller wage increases (Summers, 1989; Gruber, 1994; Kolstad and Kowalski, 2012). However, in a setting where wages and benefits are covered by union contracts – as is the case with a good share of state and local employees – the ability to effect these adjustments may be limited.

When wages and benefit packages cannot be adjusted, increases in health care spending are equivalent to an increase in input costs, much like a price increase for electricity would be. In private businesses, some of this cost increase would show up in higher prices. Prices are not as flexible in the public sector, however, since the price for state and local services is the tax rate. Tax increases may be directly constrained by institutions, as with property tax limits in California, or may be politically difficult. Debt issuance by state and local governments similarly faces institutional and political constraints. Limits to adjustment along these margins

[1] There are no official estimates of these amounts. We form them using reported health insurance takeup and premiums from the Medical Expenditure Panel Study.

leaves reductions in inputs, and with them the quality or amount of public service provision, as a residual response to increased benefit costs.

The incidence of rising benefit costs depends on which aspects of public budgets are constrained and which are relatively flexible. When compensation schemes, revenue, and debt issuance are fixed, cost increases may reduce the quality of public services (e.g., worse schools and more crime). Loose deficit-financing restrictions may allow burdens to be shifted onto future taxpayers. Cross-government transfer arrangements (e.g., revenue sharing across school districts) may similarly loosen the revenue-raising constraints faced by local governments. Finally, the strength of public sector unions may drive the extent to which benefit costs can be shifted back onto government employees. The question of which margins will yield is ultimately empirical. After further characterizing the relevant forces in Section 1, we thus turn to the data.

We undertake two types of empirical analysis. First, we examine state government premium data and policies governing how much state governments contribute to health insurance for state employees. We use these data to address the incidence question for workers: to what extent and under what conditions have state governments shifted the costs of health insurance back to workers, in the form of less generous coverage? We find that in recent years, health insurance premiums for state workers have grown materially less rapidly than premiums for comparable private sector employers. Further, the share of the health insurance premium paid by state workers has been constant or rising in the public sector, while it has fallen in the private sector. The growth in the employee share of premiums is particularly high in states with higher rates of public sector unionization, where the employee share started at a low base.

We next turn to an analysis of rising benefit costs in the context of school districts. In this setting we can more fully assess the effects of benefits on total compensation costs, total spending, revenue-raising, and a proxy, albeit a limited one, for student outcomes – the dropout rate. The analysis uses a simulated instrument constructed using districts' baseline benefit levels and regional growth in health expenditures. The instrument isolates the benefit growth that would be predicted absent endogenous changes to the generosity of benefits. Our initial finding, namely that this instrument strongly predicts actual benefit growth with a coefficient near 1, suggests that, at least on average, school districts did little to counteract benefit growth within the benefit package itself.

Looking both across districts and across employee groups within districts (e.g., across teachers, administrators, maintenance, and food service workers), we find that only a small fraction of increases in benefit costs are offset through reductions in wages. Each dollar in benefit growth is associated with an 85 cent increase in total compensation. The results thus provide evidence that the market for public sector workers deviates from the competitive, private-sector benchmark analyzed by Summers (1989), Gruber (1994), and Kolstad and Kowalski (2012).

We next analyze how school districts finance these increases in benefits. To our initial surprise, we find that benefit-driven increases in employee compensation were financed by transfers from higher levels of government. A detailed inspection of these revenues reveals them to come from sources subject to significant discretionary reporting (Cullen, 2003). One third of the relevant dollars are associated with "categorical aid" for students classified as having special needs or requiring remedial education. The remainder consists largely of aid associated with the operation of discretionary programs, vague "Unspecified" aid, and general formula assistance.

Consistent with the conceptual analysis in Section 1, we find that the strength of teachers' unions mediates school districts' responses to benefit growth. The relationship between simulated benefit growth and actual benefit growth is strongest in school districts with strong teachers' unions. Districts with weak unions appear to have offset increases in health care costs much more through reductions in the generosity of benefits. Inflows of categorical aid also appear to be mediated by union strength. The same is true of inflows of general formula assistance, though this result is imprecisely estimated.

Finally, we find that benefit growth was associated with declines in student performance as measured by dropout rates. The reorganization of students required to increase flows of categorical aid may thus have worked to students' detriment. As we estimate this final result with moderate precision on a sample severely constrained by data limitations, it should be treated with caution.

The remainder of the paper is structured as follows. The first section characterizes the avenues through which increases in government health costs can be absorbed by public budgets. The second section examines the impact of state government health premiums for state contributions to health care for their workers. The third section considers the impact of increased health insurance costs on school budgets. The last section concludes.

I. The Incidence of Public Sector Health Benefits

We use an accounting framework to enumerate the channels through which the incidence of public sector health benefits may be distributed. In private labor markets, analysis of the incidence of benefits is facilitated by assumptions related to competition, profit maximizing firms, and market clearing (Summers, 1989). In this paper's public sector context, a variety of standard assumptions may fail to hold. Our framework does not require taking stands regarding the operation of the markets for government services and public sector labor. Instead, it lays out the channels through which budgets may respond to benefit costs, allowing the data to describe which channels are more and less active.

Public goods and services are produced according to a production function that takes labor, *L*, and non-labor input, *X*:

$$G = f(L, X). \quad (1)$$

The budget constraint is described by:

$$T + D = L \cdot [w + p_b b] + X, \quad (2)$$

where *T* is tax revenue, *D* is the deficit (or surplus when negative), *w* is the wage, *b* is the quantity of a non-wage benefit (e.g., health insurance or pension obligations), and p_b is the unit cost of that benefit. The non-labor input has been normalized to have a price of 1. Differentiating and rearranging, we write the budget's response to a change in the cost of non-wage benefits as follows:[2]

$$dp_b Lb = -dL \cdot [w + p_b b] - dwL - dbLp_b - dX + dT + dD. \quad (3)$$

Faced with an increase in the price of benefits, there are 6 possibilities. The government can reduce employment (dL), reduce wages (dw), reduce the generosity of the benefit package (db), reduce spending on non-labor inputs (dX), increase taxes (dT), or add to the deficit (dD). Each of these will affect finances, with changes in prices mediated by the relevant quantities, and vice versa.

The incidence of rising benefit costs depends on which of the above margins adjust the most. Reductions in either wages or the generosity of benefits shifts these costs back onto workers. Tax increases are borne by current taxpayers, while deficit increases may either be

[2] Allocating a change in health care costs across prices and quantities is not as conceptually straightforward as implied above. For current purposes, we intend only to allow for the possibility that an increase in cost driven by one dimension of the health benefit might be offset through a decrease in its generosity. We do not mean to imply that increases in health care costs can be described entirely as valueless price inflation.

borne by future taxpayers or shifted onto future public workers. Reductions in inputs, and by extension in public production, will be borne in part by the beneficiaries of the relevant public services.

The flexibility of the first three terms of equation (3) depends on the valuation of health insurance by workers, the nature of employment contracts, and the power of unions. When workers fully value health benefit increases and wages are flexibile, the sole margin to respond will be other forms of compensation – wages, or perhaps pension benefits (Summers, 1989; Gruber, 1994; Kolstad and Kowalski, 2012). If valuation is less than dollar-for-dollar, the cost above the value is functionally equivalent to a tax, and will have effects on other factor returns and output.

In the incomplete-valuation framework, past work has shown public sector unions to be adept at steering resources towards their preferred expenditures (Hoxby, 1996; Feiveson, 2012), as well as deflecting budget cuts (Clemens, 2013). Union contracts may be particularly inflexible along the wage margin. Employment may also exhibit rigidities, as layoffs of teachers, police, and fire fighters can be politically unpopular.

The generosity of non-cash benefits can vary significantly in terms of its flexibility. Initial bankruptcy proceedings for the city of the Detroit illustrate the potential difficulties associated with reducing the generosity of pensions. The generosity of health benefits tends to be more flexible. In recent decades, private firms have significantly reduced the comprehensiveness of their plan offerings while simultaneously increasing the share of premiums paid directly by workers (Kaiser Family Foundation and Health Research and Education Trust, various years). Below we provide evidence that state governments have taken similar steps, doing so most aggressively at times when other margins of budgetary adjustment were most constrained.

The flexibility of the last three terms of equation (3) depends on the nature of budgeting and legislative processes. Adjustment of non-labor inputs depends on how they are financed. School districts, for example, may not be able to adjust expenditures covered by earmarked funds from the state (e.g., through capital or building funds).

Deficit financing faces relatively explicit, though potentially evadable, institutional constraints. Balanced budget requirements force most state governments to enact budgets that foresee no need to issue short-term, general obligation debt. Many states are explicitly prevented from carrying such debt into subsequent years when unexpected needs arise (ACIR, 1987). These legal constraints are of sufficient practical importance that they have been found to significantly alter the manner in which states respond to fiscal shocks (Poterba, 1994; Clemens and Miran, 2012) as well as bond market reactions towards states in distress (Lowry, 2001; Poterba and Reuben, 2001). At the same time, such rules appear evadable by, for example, accumulating pension obligations as an alternative to paying workers through current wages and salaries (Novy-Marx and Rauh, 2011; Rauh, 2010).

Finally, constraints on revenue-raising can be both political and institutional. California's Proposition 13, for example, significantly constrains property taxation. Tax increases, and those associated with property in particular, have proven to be quite politically unpopular (Cabral and Hoxby, 2012). The below analysis of school districts suggests that the relevance of revenue constraints can vary significantly with the available financing opportunities. Revenue-strapped school districts appear to have significant flexibility in enhancing the transfers they receive from higher levels of government. Exploiting such opportunities may allow lower levels of government to expand their resources at little cost to the taxpayers within their jurisdiction. Ultimately, the incidence of rising benefit costs is an empirical question.

II. State Government Policies

We start by considering the incidence of rising benefit costs for state governments. Like most large employers, all state governments offer health insurance to their workers. We consider how these rising costs have affected the structure of health benefits that state governments offer.

Our ideal analysis would examine the full incidence of rising health insurance costs, as described in the previous section. However, this full analysis is complicated by the fact that spending on state employees is only a small share of health spending by state governments. About 8 percent of state health spending is for state employees. Three-quarters is for Medicaid and the Children's Health Insurance Program, and the remainder is for various other public health programs such as behavioral health institutions and immunizations (Cauchi, 2009). Since many of these other costs are increasing in magnitude at the same rate as employee health insurance costs – they involve the local health system, which increases or decreases in cost at a relatively uniform rate for all payers – it is impossible to consider the incidence of just a subset of the state employee total. We thus set ourselves a more limited goal, examining how much of increasing state employee costs have been passed back to workers in terms of higher cost sharing for medical care and a greater share of the premium paid. Analysis of the broader incidence question will be done with the school district data in the next section.

The Structure of State Government Health Benefits

The benefits that states offer to employees differ widely, as do their premiums and cost sharing provisions. We focus primarily on active employees. According to the Segal Company

(2013), the average state offered 6 health insurance plans to its employees in 2012. Forty-eight states offered at least one Preferred Provider Organization (PPO) or Point of Service (POS) plan; 30 states offered a Health Maintenance Organization (HMO) or other exclusive provider organization plan; and 28 states offered a high deductible or consumer directed plan. Only six states offered an indemnity plan. This choice menu is somewhat wider than what large private employers offer. According to the Kaiser Family Foundation and Health Research and Education Trust annual survey (2012; hereafter referred to as KFF-HRET), one-quarter of firms with 5,000 or more employees offer only one insurance plan, half offer two plans, and only one-quarter offer three or more.

States have three primary decisions that influence their costs for health care. The first is what services to cover – the categories of spending that are paid for or not, and how much employees have to pay for care. Traditional policies were very generous, but states have increasingly reduced the generosity of their plans. The introduction of high deductible health plans is one element of this. In 2002, no states reported offering a high deductible policy. By 2012, 28 states did (55 percent of the total). The trend towards offering high deductible plans matches large employers nationwide. In the 2012 KFF-HRET annual survey, 48 percent of firms with over 5,000 employees offered a high deductible health plan.

Cost sharing has increased in traditional plans as well. In 2002, the median deductible for in-network care in a PPO covering a single individual was about $200.[3] In 2012, it was $375. Among large employers nationally, the comparable values were about $275 in 2002 and $560 in 2012 (KFF-HRET, 2012).

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[3] Thirty-nine percent of plans reported a deductible of $0-$99 and 11 percent reported a deductible of $100-$199. Seventeen percent reported a deductible of $200-$299. Given the high density around $200, about $200 for the deductible is a reasonable inference.

The second dimension is how much to reimburse the providers of care. Many states run at least some of their plans themselves. Faced with budget difficulties, states may respond by reducing the amount they reimburse doctors, hospitals, and other care providers. In principle, providers can respond by choosing not to accept patients insured by state government plans, but the size of the state government pool, combined with the value of avoiding conflict with state government, may argue for accepting these price reductions.

The third dimension of generosity is how much the state contributes for health insurance relative to the employee. The premium amount required of employees can differ by plan type (e.g., traditional vs. high deductible policy), contract type (single vs. family), and employee behavior (smoker vs. non-smoker; participation in a wellness program or not). Many states make a fixed contribution to health benefits, regardless of the plan chosen, following the Enthoven (1993) 'managed competition' model.[4] In this system, employees pay all of the marginal cost for plans above the least generous. Other states have different rules, for example requiring employees to contribute a share of their salary to health care (Pennsylvania), or requiring a constant share of the premium (Massachusetts). Many states offer wellness discounts to employees or have tobacco usage surcharges, though the qualifications and rewards for each vary. In 2012, the average state required employees to contribute 24 percent of the premium for a family plan; among large firms nationally, the share was 27 percent.

State Responses to Rising Costs

States may change the benefits they offer, the amount they pay for care, and the employee costs for insurance as the costs of medical care increase. In the limit, a state may hold

[4] In such systems, high deductible policies are generally excluded, as their premiums are much lower and states often make contributions to the companion benefit account as well as to the premium.

its contributions to health care constant by incentivizing enrollment in high deductible policies, increasing the employee share of the costs, or reducing payment rates to providers. For example, legislation passed in Alabama in 2011 and 2012 froze the state's contribution to health costs at $765 per month; the group health benefit plan for state employees (SEHIP) was required to adjust to this fixed amount. In other states, contractual limitations make such adjustments more difficult.

To examine policies that states take to reduce employee costs or shift those costs to employees, we look at two dimensions of plans. The first is the overall premium for a typical plan, which summarizes all of the payment and access policies embedded in the plan. Second, we look at the employee's share of the cost for a typical policy.

Data on plan costs and state/employee contributions are from the National Conference of State Legislators (NCSL).[5] NCSL has collected data on the cost of a "standard benefit package" health plan that families can choose in the 50 states (exclusive of DC). The data are from 2001-2006, 2009, and 2011-2012. The specific plan that NCSL references has changed somewhat over time but tends to reflect a plan available statewide. Through 2009, the standard plan was the lowest cost full service HMO. In 2011 and 2012, NCSL reported two plan premiums: a PPO (if offered), and the lowest cost family plan – often a high deductible plan. In part, the shift from HMO default to PPO default reflects a general trend of large employers to move out of HMO arrangements and into a mix of PPOs and higher cost sharing plans (KFF-HRET, 2012). We suspect that the low cost plan understates the state government's contribution to health care, since many of these plans are high deductible plans and some states contribute to the associated savings account as well as the premium. For this reason, we primarily consider the results using the PPO plan in 2011 and 2012, but we also analyze trends using the lowest cost plan.

[5] We are extremely grateful to Dick Cauchi of NCSL for providing the data to us.

NCSL reports the total premium, the state contribution to the premium, and the required employee contribution. Where the latter differs across employees (because of differences by age, income, or health behaviors), the reported total is generally the cost for a middle income worker who does not meet criteria for wellness credits.

Data are missing for various states in different years. We account for this as follows. We take as fixed the weighted average plan cost in 2001 (49 states represented),[6] 2006 (50 states represented), and 2012 (45 states represented),[7] where the weights are state government employment in 2011 (Census, 2011). We then impute average spending in other years using states that are present in adjacent years.[8]

We compare the costs of state employee health plans to two averages. The first is the average cost of employer-provided health plans from the KFF-HRET annual surveys. We term this the 'all employer' sample. These survey data may differ from the state government data for several reasons, including differences in take-up and risk mix of enrollees. To adjust for these as possible, we consider a second comparison: the premium cost for large (200 or more employee) firms. Within these firms, we look at the average cost of an HMO up to 2010 and two series thereafter: a PPO in 2011 and 2012, to match the state employee data, and a continuation of the HMO. We term this the 'comparable employer' sample. While the comparison between the comparable employer sample and state employee premiums is relatively close, there may still be differences between state governments and large private employers, for example in the

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[6] There are data for all 50 states, but the data for Utah appear to be in error. We omit this observation.

[7] Five states are not reported in the data, but we found data for one of them (Illinois). Data for Vermont appeared to be in error, so we omit this observation. Our 45 states in 2012 account for 91 percent of state government employment.

[8] Specifically, averages for 2002 come from the growth in premiums in matched states between 2001 and 2002. Premiums for all states are reported in 2003. Averages for 2004 are based on premium increases for states present in 2003 and 2004. Premiums are available for all states in 2005. Averages for 2009 use the growth in premiums across matched states between 2006 and 2009. Averages for 2011 use the growth in premiums across matched states between 2011 and 2012.

demographic mix of employees and the selection of plans within these groups. We are unable to make adjustments for this.

The average family premium for state employees was $17,400 in 2012. This is 11 percent above the average plan in the KFF-HRET survey for that year ($15,745) and 6 percent above PPO policies in large firms ($16,371). There is enormous variation in the premium across states. The lowest premium is Idaho ($9,267), and the highest is Wisconsin ($34,387). The premium for Wisconsin is sufficiently high that it must reflect significant selection into the plan;[9] significant selection will show up in some firms represented in the national data as well. On average, state government employees paid 24 percent of the premium cost in 2012. This is a bit below the national average of 27 percent for all employers and 26 percent for PPOs offered by comparable employers.

Real family premiums for our three samples are shown in figure 1. The figure shows three groups of premiums: state employees, comparable private employers and plans, and all private plans. For the state employees, we show two series after 2009: one using the 2011 and 2012 premiums for the PPO plan and a second using the premium for the lowest cost plan. Similarly, for the comparable plans, we show the 2011 and 2012 data for the PPO and for a continuation of the HMO.

From 2001-06, the growth of state employee plan premiums mirrored that for all employers and for comparable employers. Real growth in premiums was 8.5 percent annually for state government, compared to 8.7 percent for comparable employers and 7.4 percent for all firms. Between 2007 and 2009, cost growth was much more moderate in the state government plan. In that interval, real costs increased by only 1 percent annually, compared to 5 percent for

[9] Further evidence: the lowest cost family insurance plan is less than half as expensive.

the comparable plans. We do not know exactly when the slowdown occurred; data were not gathered in 2007 and 2008.

The cost of state government plans using the PPO option increased markedly from 2009-11 – by 27 percent overall. This could be a result of selection; the cost increase for the lowest cost plan was only 0.3 percent annually – though this plan is on average less generous than HMOs were in 2009. The comparable employer plan increased in cost by 4.5 percent over these two years. Premium growth between 2011 and 2012 in state government plans was again modest (1.9 percent), as was growth among comparable employer plans (0.3 percent).

Overall, the results suggest a significant reduction in the growth of state employee premium costs compared to comparable employer costs between 2006-12. Omitting the change from 2009-11, the growth in premium costs was 1.2 percent annually for state government plans and 3.8 percent annually for comparable private plans.

Our results do not say how much of this slower growth is because the generosity of state plans decreased over this time period relative to a reduction in prices paid for services. To answer this question, we need data on the actuarial value of the insurance policy – the share of expected costs that will be paid by the insurer relative to the enrollee. Actuarial values are not available for the state government plans, however.

Trends in the share of premium costs borne by workers are shown in figure 2. The structure of figure 2 is similar to that of figure 1. In 2001, state governments paid for a somewhat greater share of premiums than did private employers; the employee share of the premium was 24 percent in state government versus 29 percent for comparable plans from large employers and 25 percent of employer plans overall. From 2001 to 2006, the share of premiums that employees had to contribute declined in state governments and the comparable plans, coincident with the economic expansion. Using the trend for the PPO plan, required premium contributions in state government plans increased from 2006 to 2012. Using the lowest cost plan, they continued to decline. Put another way, cost sharing was low for the increasingly minimal high deductible plan, but became heftier for more generous plans. Employers offering the comparable policies held cost sharing relatively constant post 2006, with the exception of a blip in 2010.

The evidence presented here tentatively suggests that state governments raised premium requirements relatively more for more generous plans than did private employers. This was on top of a slowdown in premium growth. The implication is significant savings to state governments relative to trends in the private sector.

Cross-State Evidence

Looking at averages ignores the large variability of changes across states. Using the PPO plan as the benchmark, the contribution required of employees to enroll in health insurance rose by as much as 25 percent between 2006 and 2012 (New York) and declined by as much as 11 percent (Alaska). Understanding these differential changes, and those associated with differential premium growth, can help identify the variables associated with the incidence of employee health costs.

To understand incidence in a period of tight constraints, we consider the change in premium costs and the change in the share of those costs born by employees between 2006 and 2012. Our regressions are of the form:

$$\Delta Costs_{j,2006-2012} = X_j\beta \quad + \varepsilon_{j,2006-2012}. \tag{4}$$

We estimate equation (4) using the 45 states with data in 2006 and 2012, plus 3 states with data in 2011 (adjusting the growth rate for one fewer year).

We consider several factors that may explain the change in health insurance costs (X_j). The first factor is the extent of the recession. We proxy for this with the growth rate of real, per capita income from 2006 to 2012. The average growth rate is 0.5 percent annually, with a standard deviation of 1.1 percent. The second factor, also related to the recession, is the per capita amount of stimulus money spent in each state. These data were reported by the Wall Street Journal (2009). The average in our sample is $712 per capita, with a standard deviation of $200. Our third measure reflects the political orientation of the state. We include a dummy variable for the 23 states that voted for the Republican candidate in at least three of the last four Presidential elections. Our fourth variable is the share of public sector workers in the state that are unionized. The coefficient on this variable could be either positive or negative, as discussed above. Unionization of public sector workers averages 35 percent, with a large standard deviation (20 percent).[10] The final variable is the unfunded pension liability of the state. States with greater unfunded liabilities may be less able to borrow in the recession, and thus more likely to cut benefits. We use data compiled by Josh Rauh (2010) on unfunded liabilities net of assets, scaled by state revenues.

Table 1 shows the relationship between changes in employee health costs and these variables. The dependent variable in the first column is the change in real premiums from 2006 to 2012, and the dependent variable in the second column is the change in the share of premiums employees have to pay.

[10] Note that the share of workers covered by collective bargaining agreements may be greater than the share in a union.

Our variables have little explanatory power for the change in employee premiums. None of the coefficients are statistically significant, and the R^2 for the regression is only 3 percent. In contrast, we find several variables that influence the share of the premium paid by employees. Stimulus money appeared to keep employee cost sharing lower. A $700 increase in per capita stimulus dollars (about the average) leads to a reduction in the required employee contribution of 0.1 percent. This is not overwhelmingly large, but it is statistically significant. Red states increased employee contributions to health insurance more than blue or purple states. The coefficient is 0.04, which is again not particularly large.

The most surprising finding in these regressions is that states with a greater prevalence of public sector unions have larger increases in employee cost requirements. The coefficient is about 0.3, which is large relative to the political orientation and stimulus coefficients. There are several possible explanations for this finding. One explanation is that states with more unionized workers tended to have lower employee requirements to begin with; thus, there was greater room for premium contributions to increase. Figure 3 shows that this was the case in 2006. States with very low unionization rates had high contributions for health insurance (Mississippi and North Carolina are the two highest points in the upper left of the figure). In contrast, only one state with a unionization percentage that was above average had employee costs as high as 30 percent (Hawaii). A second explanation is that this relationship reflects omitted variables. It may be that unionized states differ in other dimensions that make higher contributions to health insurance a more viable option, for example the political strength of medical care providers. Future work might explore some of these explanations. In these data, however, unionized workers had greater increases in costs.

III. Benefit Growth and School District Finances

In this section we assess the effect of benefit growth on the finances of school districts and their education outcomes. In comparison with state governments, school districts provide a relatively data rich environment for assessing the economic incidence of benefit cost growth. In addition to providing a large sample of relatively localized government units, school districts provide a setting in which employee compensation accounts for the bulk of total cost. Nearly 70 percent of school district costs are for employee compensation. Benefit costs may thus more plausibly exert an appreciable impact on the finances of school districts than on other government entities.

Data on School District Finances

We assemble a panel of data on school district finances using files made available through the National Center for Education Statistics (NCES). The data are collected as part of the Common Core of Data (CCD), specifically through the annual editions of School District Finance Survey F-33.

We are interested in the trend growth in spending more than year-to-year variation. Year-to-year variation in spending can be absorbed by temporary changes in other inputs (for example, deferring maintenance of buildings), while longer-term trends cannot. Thus, we analyze data from 1998 and 2007, years roughly a decade apart. Among non-elderly individuals, real per capita national health expenditures grew by 5.8 percent annually in this time period, or $2,250 in (2007) dollar terms. We note, however, that these data do not encompass the Great Recession. Thus, the incidence here may differ from that for state governments noted above.

The NCES reports data on a universe of roughly 16,000 school districts. Our analysis sample excludes districts that did not report a complete accounting of the relevant financial variables in both 1998 and 2007, as well as those whose data exhibited statistical irregularities.[11] Our final analysis sample contains 6,429 districts, with total 2007 enrollment of 27 million students.[12] The districts in our sample account for 56 percent of the total school enrollment reported in the NCES.

Table 2 presents summary statistics describing the primary fiscal characteristics of the school districts used in our analysis. The table, like our entire analysis, expresses all costs and revenues in constant 2007 dollars on a per pupil basis. Spending variables of interest include total spending, benefit costs, salary costs, total compensation (the sum of salaries and benefits) costs, and all other non-compensation costs. In constant 2007 dollars, average school district spending rose from just under $7,000 to just over $11,000 per pupil from 1998 to 2007. While total costs thus rose by just over 50 percent, benefit costs rose by 80 percent, from approximately $1,000 per pupil to nearly $1,900 per pupil.

Figure 4 shows the resulting rise in benefits as a share of total school district spending. After exhibiting stability during the mid-1990s, a period characterized by relatively slow growth in health care spending and a robust economic expansion, benefit costs rose from 14 to 17 percent of total costs over the subsequent decade. Over the same period, these costs rose from 20 to 25 percent of worker compensation. As discussed in greater detail below, benefits are reported by NCES as an aggregate that includes both health benefits and pension costs.

[11] Relevant irregularities include cases in which total spending per pupil grew by more than 300 percent or declined by more than 50 percent, or when benefits were reported as exceeding 50 percent of a group of workers' total compensation. Our results change little when we adjust the thresholds associated with these sample inclusion criteria. Returning the excluded districts to the sample tends primarily to reduce the precision of our estimates.
[12] While lost districts are disproportionately small, large districts are also prone to incomplete or inconsistent reporting. New York City School District and its 1 million students are lost, for example, due to missing 2007 data on major financial aggregates.

We also present data describing the primary sources of school district revenue. Just over half of school district spending is financed by transfers of revenue from the state and federal governments, as was over half of the growth that occurred between 1998 and 2007. Roughly 70 percent of school districts' own-source revenues came through property taxation.

Approach to Estimating the Incidence of Benefit Growth

To provide a descriptive look at the data, we begin by characterizing the relationship between changes in benefit costs and changes in the spending and revenue aggregates reported in Table 2. We estimate equations of the form:

$$\Delta Outcome_{j,1998-2007} = \beta_0 + \beta_1 \Delta Benefits_{j,1998-2007} + \varepsilon_{j,1998-2007}. \tag{5}$$

The explanatory variable of interest is $\Delta Benefits_{j,1998-2007}$, the change in district *j*'s real benefit costs per pupil from 1998 to 2007. The mean of this variable, indicated in table 1, is about $850. The dependent variable, $\Delta Outcome_{j,1998-2007}$, initially describes the change in district *j*'s total spending per pupil from 1998 to 2007, while $\varepsilon_{j,1998-2007}$ is an idiosyncratic error term. In estimating standard errors, we allow for state-level correlation.

Table 4 shows the descriptive relationship between changes in benefit costs and changes in school district spending and revenue. For each additional dollar of spending on benefits, school districts increased spending, on average, by a total of $1.50. This includes the dollar of benefits itself and an additional $0.43 in the form of wages and salaries; the remaining $0.07 is non-compensation spending.

The wage coefficient should not, of course, be interpreted as a causal estimate of the effect of benefit growth on wages and total compensation. This estimate of β_1 is almost certainly biased upward, since districts are likely to increase spending on benefits when they increase the generosity of compensation more generally, perhaps as a result of strong local economic performance. Additionally, the estimate is associated with growth in an aggregate that lumps pensions together with the health benefits that are this paper's primary focus.

Still, it is interesting to note that the observed increases in spending are, on average, financed almost exclusively by revenues flowing to the school district from the state and federal governments. Relative to a revenue increase of $1.63 per dollar of benefit spending, non-local revenue increases by $1.43 per dollar of benefits.[13]

We implement two strategies to produce unbiased estimates of the incidence of employees' health benefits for school districts. For both approaches we use baseline benefit generosity and local growth in health expenditures to construct a simulated-benefit-growth instrument. In our first approach, we estimate the effect of instrumented benefits on district-level budgetary aggregates; this analysis mirrors the descriptive analysis reported in Table 3. Our second approach isolates variation in simulated benefit growth *across* groups of workers (e.g., bus drivers, maintenance staff, food service workers, and administration) *within* each district. This second approach, described in greater detail below, is intended to address any lingering identification concerns associated with omitted correlates of local health spending growth.

Our initial, district-level, approach is described by the following two stage estimation framework:

1st Stage: $\Delta \widehat{Benefits}_{j,1998-2007} = \gamma_0 + \gamma_1 Simulated\ Benefit\ Growth_j \qquad (6)$

2nd Stage: $\Delta Outcome_{j,1998-2007} = \delta_0 + \delta_1 \Delta \widehat{Benefits}_{j,1998-2007} + \varepsilon_{j,1998-2007} \qquad (7)$

[13] We should note, however, that conceptually distinguishing between intergovernmental and own-source revenues can be difficult in this setting. In some states, revenues that are effectively own-source first pass through state government hands before being returned to districts.

The variable $Simulated\ Benefit\ Growth_j$ is the product of two components: district j's baseline level of per-pupil benefit spending ($Benefits_{j,1998}$) and the average growth, in real per capita terms, of non-Medicare health spending in the state.[14] $Simulated\ Benefit\ Growth_j$ is thus the growth that would be predicted were the cost of benefits to grow at the same rate as the growth of health spending on the statewide non-elderly population. On average across the sample, non-elderly health spending grew from $3,400 per capita to $5,600 per capita from 1998 to 2007 (in 2007 dollars), or by roughly 65 percent. $Simulated\ Benefit\ Growth_j$ averages roughly $400 per student across districts, as shown in Table 2. The difference between simulated benefit growth and average benefit growth suggests that the pension portion of the benefit aggregate grew at an even fast rate than health benefits over this time period.

We use equation (7) to study a variety of outcomes. Our first outcomes involve spending: how much, in total, does spending change with increases in simulated benefit costs? When we turn to wages, the important question is how close δ_1 is to 0 and -1. A coefficient of 0 would indicate no shifting of health costs to wages, while a coefficient of -1 would indicate full shifting. We also look at other outcomes such as revenue and student achievement.

For δ_1 in equation (7) to produce consistent estimates of the impact of benefit growth on spending, a standard exclusion restriction must hold, namely that simulated spending growth is uncorrelated with the error term. This condition may not hold. For example, growth in statewide health expenditures could be driven in part by income growth, which might also drive up the wages paid to school district employees and spending on other parts of schools. Although

[14] The latter variable is constructed as [*Non Medicare Health Per Cap*$_{s(j),2007}$/ *Non Medicare Health Per Cap*$_{s(j),1998}$ – 1]. Data on non-Medicare health spending is from the National Health Expenditure Accounts maintained by the Center for Medicare and Medicaid Services.

we find that controlling directly for income growth has little impact on our results, we take further efforts to alleviate concerns of this sort.

In addition to providing data on the wage bill and cost of benefits for teachers, the school district finance data include the cost of benefits and wages for an additional 7 categories of school district employees: bus drivers, maintenance staff, food service workers, pupil support staff (e.g., guidance counselors), instructional support staff (e.g., teachers' aids), school level administrators, and district level administrators. Table 3 shows that teachers themselves, at \$5,000 per pupil in 2007, account for around two thirds of school districts' total compensation costs. Remaining compensation costs are relatively evenly distributed across the remaining worker categories, the largest being school administration, at nearly \$500 per pupil, and the smallest being district administration, at \$100 per pupil. Figure 5 illustrates that the growth in benefits as a share of total compensation was broadly similar across groups.[15]

There is substantial variation both across and within districts in the baseline benefit costs associated with these groups of workers. Using the resulting variation in group-level simulated benefit growth, $Simulated\ Benefit\ Growth_{g,j}$, we can estimate the relationship between benefit growth and wages on a within-district basis:

$$\Delta Outcome_{g,j,1998-2007} = \gamma_j + \gamma_g + \beta_1 Simulated\ Benefit\ Growth_{g,j} + \varepsilon_{g,j,1998-2007} \quad (8)$$

Crucially, we are able to control for the components of wage growth that are common both across groups within each district, γ_j, and across districts within each group, γ_g. Any growth in benefits associated with broader increases in incomes or changes in preferences for school district spending will thus be accounted for by the district fixed effect.

[15] While the figure shows groups aggregated into "white" and "blue" collar groups, the pattern is quite similar across the individual groups.

Incidence Results

Table 5 reports estimates of equations (6) and (7). The first stage is reported in column 1. Each dollar in simulated benefit growth is associated, on average, with $1.30 in additional spending on benefits. The point estimate is within a standard deviation of 1 and is strongly statistically differentiable from 0. The first stage yields an F-statistic of 14.7, implying that $Simulated\ Benefit\ Growth_j$ is a reasonably strong instrument for growth in benefit costs. We illustrate the fit of this first stage relationship in Panel A of Figure 6.

The remaining columns of Table 5 report estimates of equation (7). Each dollar of benefit growth is associated with a roughly $1 increase in total spending (i.e., it neither crowds out nor is supplemented by other spending). Wages fall on average by an estimated $0.15. This estimated wage incidence is statistically indistinguishable from 0 but is statistically differentiable from -1. The estimate thus suggests that the compensation of school district employees deviates from the benchmark case of competitive labor markets in which employees fully value health benefits. This contrasts with the results of Gruber (1994), raising interesting questions about why.[16]

The revenues associated with this additional spending follow the same pattern observed in Table 4. Increases in benefit costs appear to be financed by increased flows of funds from the state and federal government as opposed to increases in local revenues. The same pattern of results holds when we control for growth in income per capita, as shown in Table 6. While income growth is a strong predictor of growth in school districts' wage and salary costs, the inclusion of this control has essentially no effect on the coefficients of primary interest. Increases in benefit costs continue to appear to be financed by inflows of revenue from outside the locality.

[16] Possibilities include differences between public and private sector workers and difference in the periods studied.

We next investigate the sources of the revenue inflows associated with simulated benefit growth. Tables 7 and 8 present the results. Table 7 shows that these revenues are not associated with Federal Title I grants, Federal Nutritional Assistance, or other direct federal transfers to school districts. While the revenues thus pass directly to the school districts from state governments, it should be kept in mind that the federal government transfers significant resources to state governments for precisely this purpose.

Table 8 presents the breakdown of revenues passed directly to the school districts by state governments. In total, each dollar in instrumented benefit growth is associated with \$1.54 in such transfers. The primary sources of these revenues are quite illuminating. Nearly half of this money (a total of \$0.76) comes from two categories of revenue that previous research suggests are subject to manipulation by the school districts (Cullen, 2003).[17] These include revenues linked to students classified as special needs, remedial, and bilingual (\$0.46),[18] and revenues associated with "Other Programs" tied to state transfers (\$0.30). An additional, but imprecisely estimated, \$0.45 is associated with state general formula assistance. Finally, a precisely estimated \$0.28 comes from moderately sized categories with uninformative descriptions (e.g., "Unspecified").

We next turn to the group-level analysis described in equation (8). We relate simulated spending growth for each worker group to spending on benefits, total compensation, and salaries. Table 9 reports the results. Columns 1 and 2 show the first stage results without and with the inclusion of district fixed effects. We do this to examine the potential importance of omitted,

[17] Cullen finds that the disability-claiming rates of Texas school districts responded significantly to changes in the value of the state aid associated with serving such students. Cullen and Reback (2006) find evidence of moderate manipulation of "the composition of students in the test-taking pool" for tests associated with publicized school accolades. Anecdotally, a broad range of school district activities linked to state transfers and assessment are subject to manipulation.

[18] The school district finance data only report the financial flows associated with categorical aid. We thus do not directly observe the counts of students reported in these groups.

district-level factors. A similar coefficient across the two columns would indicate that district level changes are not particularly important in the results. In both columns, the coefficient on Simulated Benefit Growth is again indistinguishable from 1. Precision in both instances is significantly improved from that observed in Tables 4 and 5, with the associated first stage F-statistics in excess of 30.

Columns 3 through 6 report estimates of the effect of simulated benefit growth on total compensation and cash income. The results are quantitatively similar and statistically indistinguishable from those reported in the district-level analysis. An additional dollar of simulated benefit growth is associated with just under one dollar in total compensation, and with a \$0.19 reduction in cash income. The coefficients associated with reductions in cash income are, in both cases, distinguishable from 1. Once again, the estimates provide evidence that the compensation of school district employees deviates from the benchmark case of competitive labor markets in which employees fully value health benefits.

We take the additional step of splitting the sample of worker groups into those traditionally classified as "blue collar" and "white collar." Our estimates of δ_1 could be biased if cross-district variation in baseline benefit levels for a given class of workers is correlated with subsequent, cross district variation in changes in that class of workers' economic prospects. If relevant, such forces would almost certainly play out in terms of cross-district differentials in the trajectories of the compensation for administrators and instructional staff relative to bus drivers, food service workers, and maintenance staff. Table 10 thus reports results separately for "blue collar" and "white collar" worker groups. The results are broadly similar to the pooled results reported in Table 9.

Table 11 provides suggestive evidence that the relationship between simulated benefit growth and increases in school district costs is driven primarily by states with relatively strong teachers' unions. The union variable is adapted from a 5 category characterization of union strength by Winkler et al (2012). It runs from 0 to 1, with 1 indicating the strongest unions. The estimates in column 1 suggest that where teachers' unions are weak, benefit cost growth tended to be shifted back onto workers. Total compensation growth is, similarly, only positively associated with simulated benefit growth where strong unions prevail. Neither of these union-interaction results is estimated with a substantial precision.

Building on the analyses in Tables 8 and 11, Table 12 shows that strong-union states drive the linkage between benefit growth and the acquisition of funds from higher levels of government. Most notably, the linkage between benefit growth and aid associated with students classified as requiring special or remedial education is driven entirely by states with relatively strong teachers' unions. This is also true to an economically, although not statistically, significant degree of transfers through state general formula assistance.

To understand the quantitative implication of these results, we use the estimates of wage impacts. Our baseline estimates, both across districts and across the worker groups within each district, suggest that salaries declined by around 20 cents for each additional dollar in benefit costs. Our simulated growth in benefit costs, which mapped roughly dollar for dollar into growth in actual benefits, averages \$410 across the districts in our sample. We therefore estimate that total district costs rose, on average, by roughly \$330 per student due to the rising cost of health benefits. This accounts for 10 percent of the total increase in per student spending over the course of the sample period. The variation in this number is also large. Moving from the 5th percentile to the 95th percentile, the rise in compensation costs associated with the rise in health benefits ranges from \$60 to \$600 dollars per student.

Effect on School Quality

We next turn to available proxies for school outputs and inputs. NCES reports data on dropout rates of 9th-12th graders in a manner directly comparable between the first and last years of our sample. Dropout data are more sparsely available than finance data, however, resulting in a substantial reduction in the size of the analysis sample (from 6,429 districts to 3,388). The reduction of sample size significantly reduces the power of our first stage, as illustrated in column 1 of Table 13. To sidestep the problem of understated two-stage-least-squares standard errors, we thus estimate the effect of benefit cost growth on the dropout rate in reduced form.

We estimate that benefit cost growth is associated with increases in school districts' dropout rates. A \$200 increase in simulated benefit growth (just over one standard deviation) is associated with a 0.6 percentage point increase in the dropout rate.[19] This corresponds to one-sixth of a standard deviation in the dropout rate at baseline.

Finally, we investigate the effect of benefit growth on the margins of total compensation per teacher and the number of teachers. Teachers are the only worker group for whom the CCD reports employment; fortunately, they are probably the most important. We estimate a version of equation (6) using spending per teacher and the number of teachers as the dependent variables.

The results of this exercise are reported in Table 14. The relationships between simulated benefit growth and both compensation per teacher and the number of teachers are positive, but

[19] Note that the coefficient in the table is reported in percent x 100 so that several significant digits are visible. The point estimates implies that an additional dollar in simulated benefit growth is associated with a 0.003 percentage point increase in the dropout rate, hence an additional \$200 in simulated benefit growth is associated with a 0.6 percentage point increase.

statistically indistinguishable from 0. While the precision of this exercise is low, the point estimates suggest that benefit-induced increases in compensation costs were driven by changes in total compensation per teacher. These increases appear to have been neither mitigated nor augmented by changes in employment. In the standard incidence framework (Summers, 1989), one expects increases in total compensation per worker to be associated with decreases in employment as firms adjust to equate cost with labor's marginal revenue product. These results thus provide a final, suggestive bit of evidence regarding differences between benefit incidence in the public and private sectors.

IV. Conclusion

In this paper, we assessed who bore the burden of recent increases in the cost of health benefits for state government and school district employees. In both settings, the institutions associated with labor supply and demand, as well as price determination (here the setting of tax rates), deviate significantly from those in the competitive-market benchmark. Our results suggest that these differences in institutions result in differences in how benefit costs are distributed. We estimate that the compensation of school district employees tended to rise by 85 cents for each dollar increase in benefit costs; reductions in wages and salaries offset roughly 15 cents of the increase.

Labor market, budgetary, and legislative institutions play important roles in determining how increases in public employee costs are distributed. We find that when economic conditions are poor, distressing budgets as during the financial crisis, benefit costs are more readily shifted back to employees. Further, we find that public worker organizations play a central, mediating role; in the school district context, the linkage between cost growth and compensation growth was driven largely by areas with strong teachers' unions. Looking forward, the outcomes of future bargaining over benefits will be particularly important for the finances of service-intensive governments like school districts, where employee compensation accounts for the bulk of total cost.

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Figures and Tables

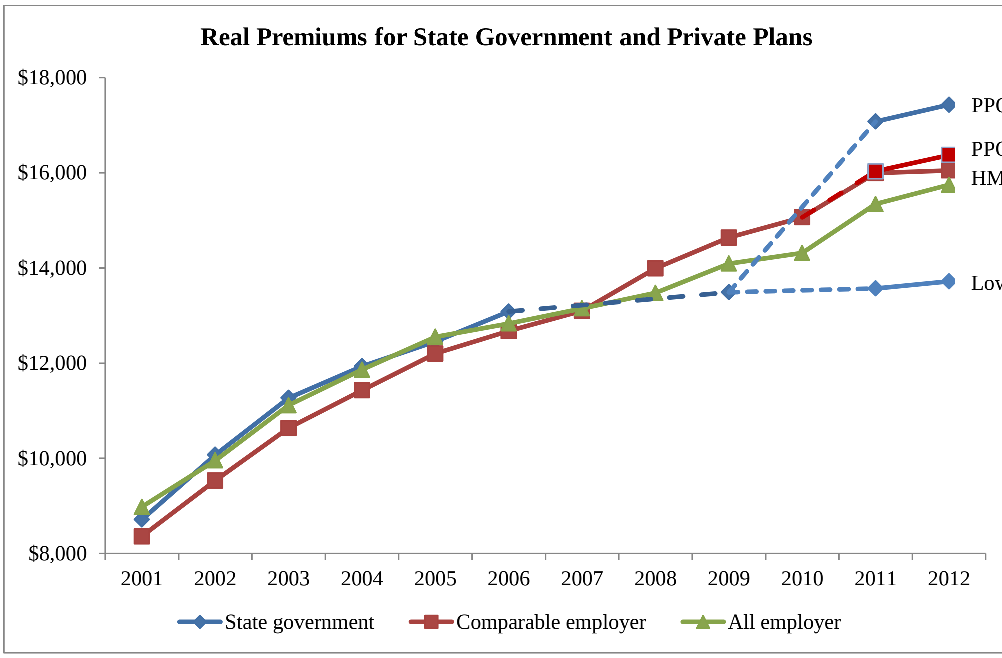

Figure 1: **Real Premiums for State Government and Private Plans:** Dashed lines indicate missing data. In 2011, the NCSL moved from reporting the premium of the lowest cost HMO to two alternatives: the premium of a standard benefit PPO and the premium of the lowest cost plan. The upper line shows premiums using the PPO plan cost; the lower line shows the premium for the lowest cost plan. The increase in premium costs between 2009 and 2011 for the PPO option likely reflects this change. For the comparable employers, the two lines after 2009 show the continuation of premiums for an HMO and a switch to a PPO.

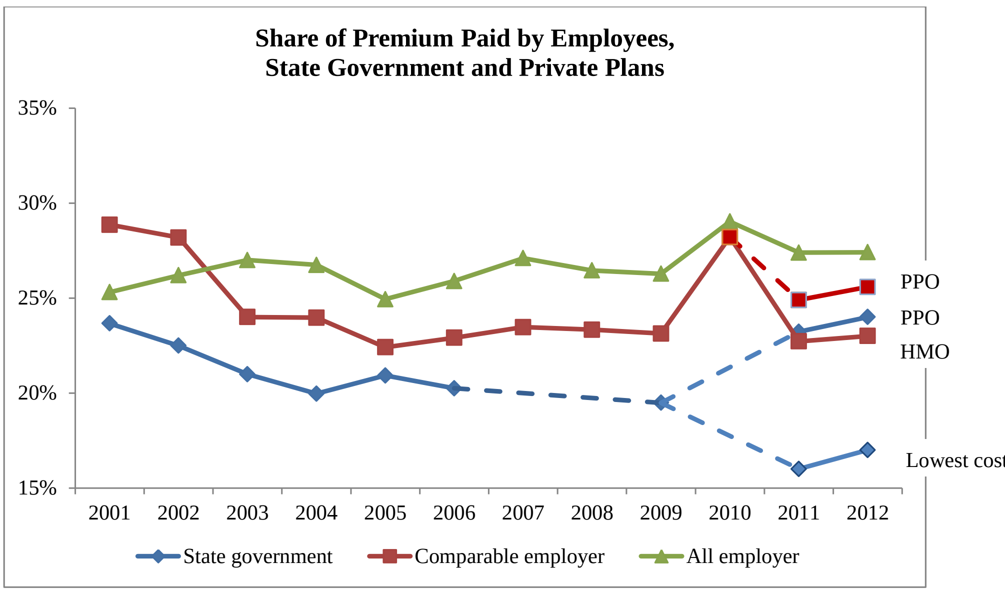

Figure 2: **Share of Premium Paid by Employees, State Government and Private Plans:** Dashed lines indicate missing data. In 2011, the NCSL moved from reporting the premium of the lowest cost HMO to two alternatives: the premium of a standard benefit PPO and the premium of the lowest cost plan. The upper line shows the employee share of costs using the PPO plan cost; the lower line shows the employee share of costs for the lowest cost plan. The increase in the employee share of costs for the PPO option between 2009 and 2011 likely reflects this change. For the comparable employers, the two lines after 2009 show the continuation of premiums for an HMO and a switch to a PPO.

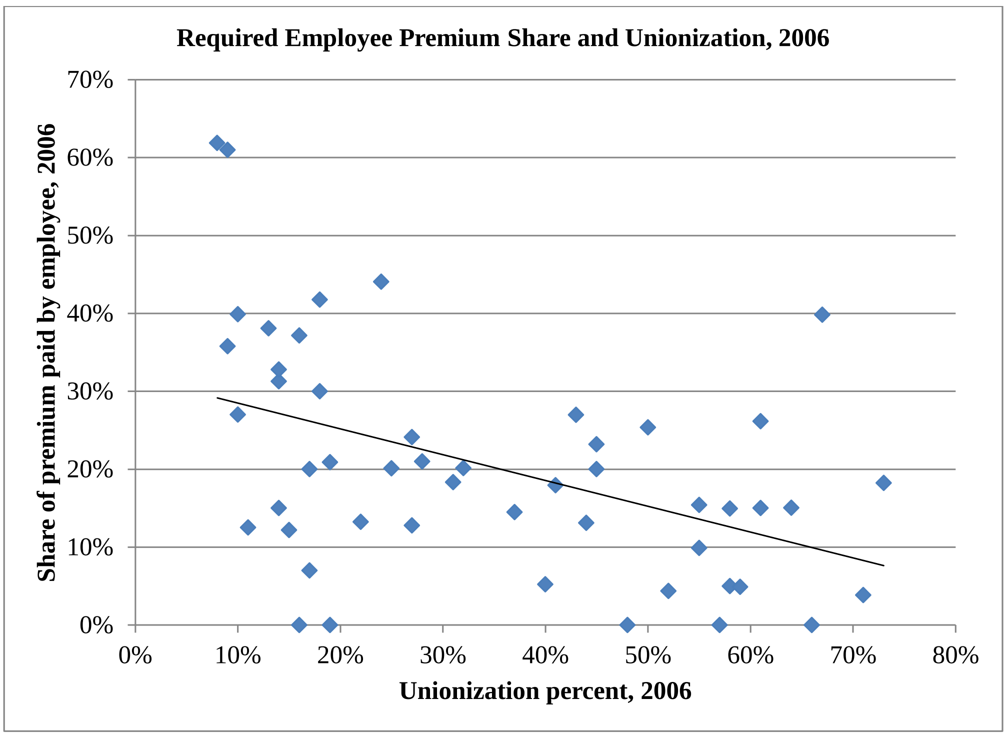

Figure 3: **Required Employee Premium Share and Unionization, 2006:** The unionization percentage is for state and local government employees. The share of the premium paid by the employee is for the plan reported by the National Conference of State Legislatures.

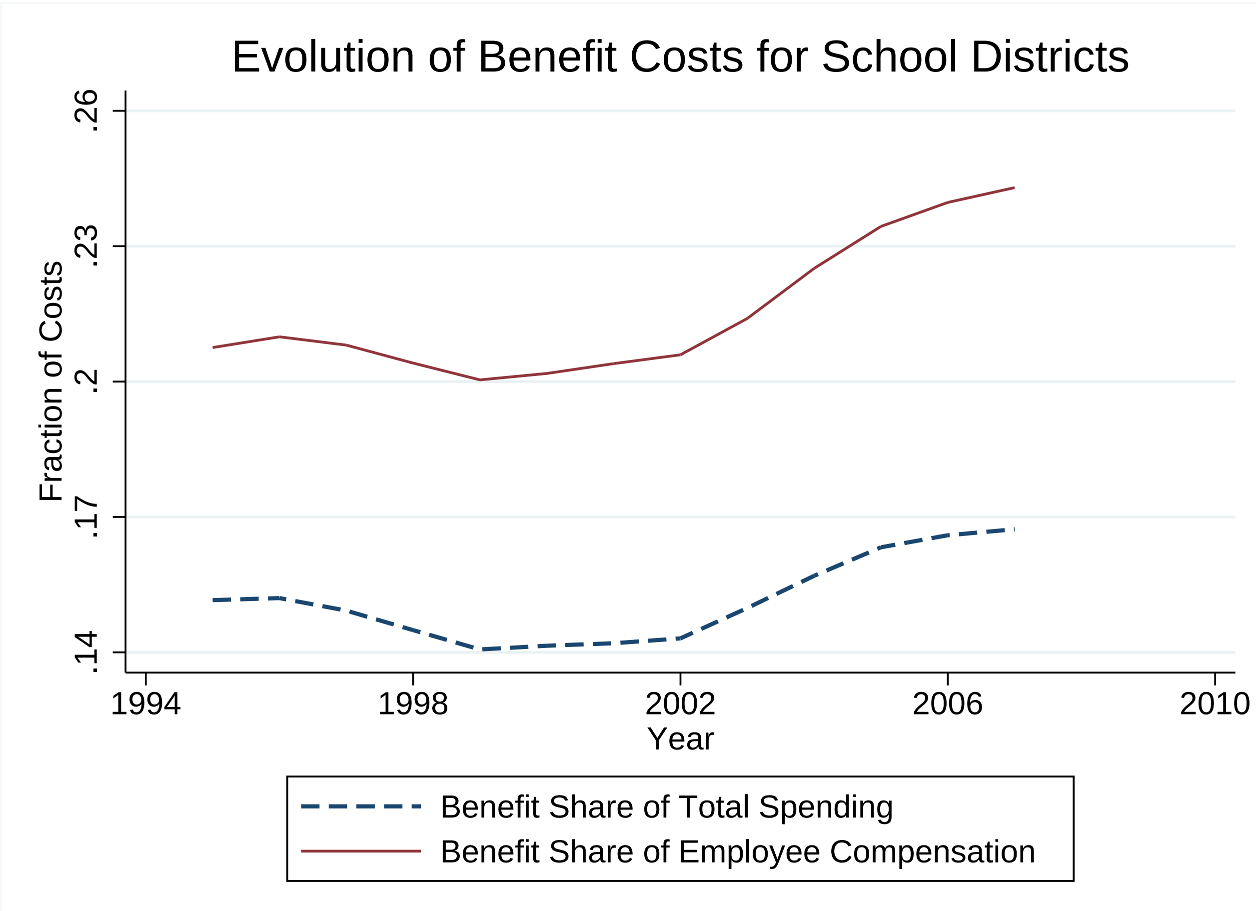

Figure 4: **Evolution Of Benefit Costs:** The series in the figure were constructed by the authors using data collected by the National Center for Education Statistics. The data are associated with the Common Core of Data, collected through the annual editions of School District Finance Survey F-33. The Benefit Share of Total Spending is equal to the total employee benefit aggregate divided by the total spending aggregate. The Benefit Share of Employee Compensation is equal to the total employee benefit aggregate divided by the sum of the benefit aggregate and the aggregate of total employee wages and salaries.

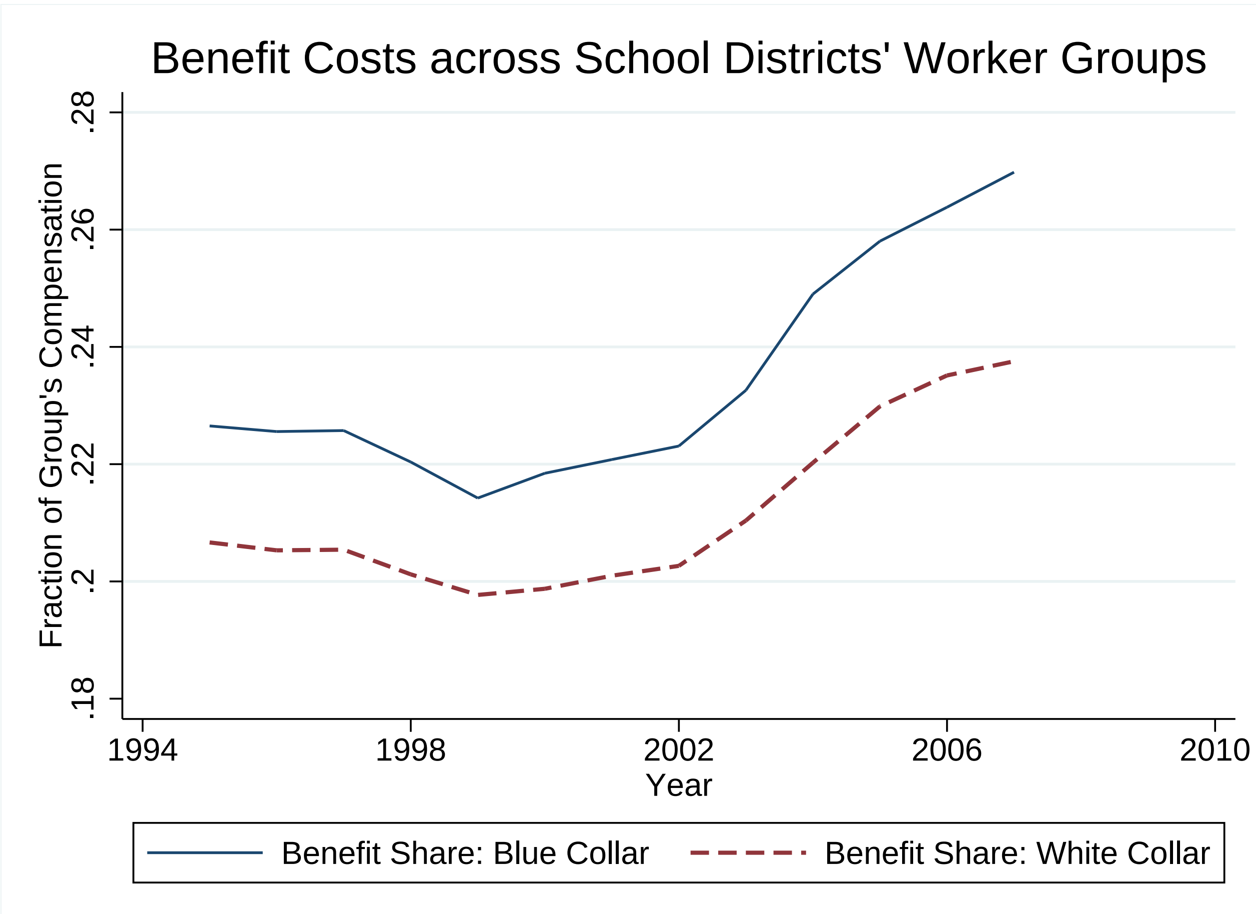

Figure 5: **Evolution Of Benefit Costs across Worker Groups:** The series in the figure were constructed by the authors using data collected by the National Center for Education Statistics. The data are associated with the Common Core of Data, collected through the annual editions of School District Finance Survey F-33. Both series involve sums of the group-specific employee benefit aggregate divided by the sums of the benefit aggregate and the aggregates of total employee wages and salaries. "Blue Collar" workers include transportation, food service, and maintenance staff. "White Collar" workers include teachers, instructional aids, student support staff, school administration, and district administration.

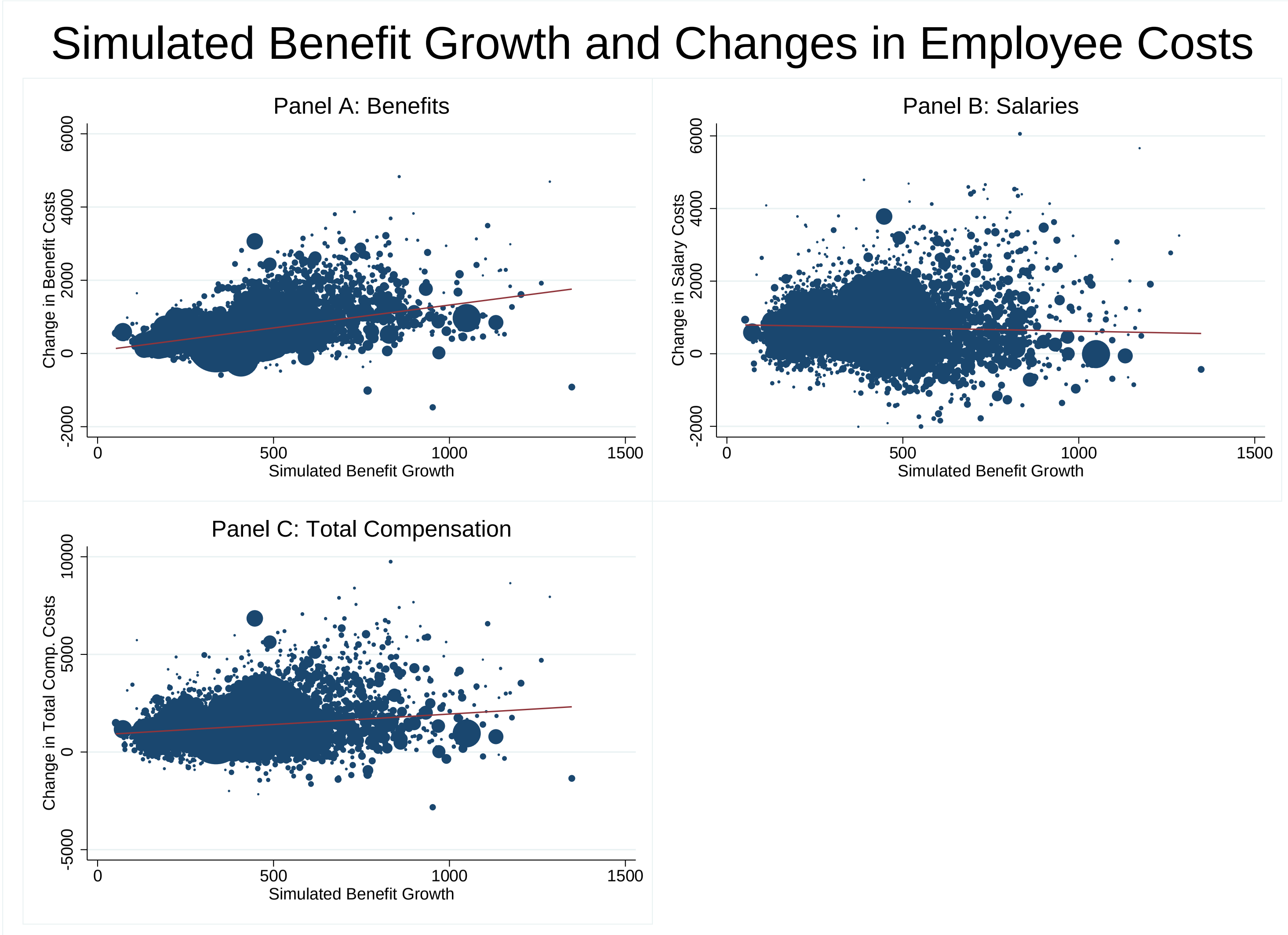

Figure 6: **Simulated Benefit Growth and Employee Costs:** The figure shows the relationship between simulated benefit growth and changes in employee costs from 1998 to 2007, as reported in the annual editions of School District Finance Survey F-33. Simulated benefit growth is constructed as the 1998 level of benefit spending per pupil (at the school district level) times the state level growth of per capita health expenditures among the non-elderly population. Total Compensation (Panel C) is the sum of Benefits (Panel A) and Wages and Salaries (Panel B). These series are expressed as changes in per pupil costs from 1998 to 2007.

Table 1: **Explaining Trends in Employee Costs, 2006-2012**

	(1) Change in Real Premiums	(2) Change in Employee Share of Costs
Income Growth	-0.239	0.362
	(0.475)	(0.897)
Stimulus Money (/100)	0.001	-0.013**
	(0.003)	(0.005)
Red State	0.011	0.042
	(0.035)	(0.027)
Public Sector Union Percent	0.011	0.283**
	(0.035)	(0.067)
Unfunded Liabilities	-0.004	-0.012
	(0.006)	(0.012)
N	48	48
R^2	.026	.375

Note: **, *, and + indicate statistical significance at the 0.01, 0.05, and 0.10 levels respectively. Standard errors are corrected for heteroskedasticity. The change in real premiums and change in employee share of costs are both for the period 2006-2012. The 2012 plan is a statewide PPO. Unfunded liabilities are the difference between pension liabilities and assets, divided by revenue in 2008, taken from Rauh (2010).

Table 2: **Summary Statistics for School Finance Variables: 1998 and 2007**

	(1)	(2)
	1998	2007
Total Spending Per Pupil	6971.5	11132.0
	(1822.3)	(3029.5)
Compensation Costs Per Pupil	4924.9	7578.0
	(1215.7)	(2010.0)
Benefit Costs Per Pupil	1030.9	1901.4
	(339.3)	(767.0)
Salary Costs Per Pupil	3894.0	5676.6
	(967.5)	(1385.3)
Non-Comp. Spending Per Pupil	2046.6	3554.0
	(1083.8)	(1827.1)
Revenues Per Pupil	6916.0	11051.7
	(1640.0)	(2977.4)
Local Revenues Per Pupil	3020.6	4792.5
	(1905.5)	(2927.3)
Non Local Revenues Per Pupil	3895.4	6259.2
	(1338.7)	(2627.0)
Property Taxes Per Pupil	2329.2	3557.1
	(1779.7)	(2740.3)
Non-Medicare Health Spending Per Cap.	3386.0	5641.5
	(368.2)	(688.3)
Simulated Benefit Growth	.	412.1
	(.)	(168.6)
Observations	6429	6429

Note: The table reports summary statistics constructed by the authors using data collected by the National Center for Education Statistics. The data are associated with the Common Core of Data, collected through the annual editions of School District Finance Survey F-33. Compensation Costs are the sum of Benefit Costs and Salary Costs. Total Spending is the sum of Compensation Costs and Non-Compensation Costs. Revenues are the sum of Local and Non Local Revenues. Non-Medicare health spending per capita was calculated as statewide health care spending through all sources other than Medicare divided by the state population net of its Medicare beneficiaries. These series come from the National Health Expenditure Accounts. Simulated benefit growth is constructed as the 1998 level of benefit spending per pupil (at the school district level) times the state level growth of per capita health expenditures among the non-elderly population.

Table 3: **Summary Statistics for Worker-Group Compensation Variables: 1998 and 2007**

	(1)	(2)
Compensation Per Pupil	1998	2007
Teachers	3314.1	5027.8
	(859.8)	(1427.3)
Pupil Support Workers	258.1	419.8
	(127.1)	(223.6)
Instructional Support Workers	197.5	362.7
	(88.18)	(175.1)
District Admin Workers	64.52	102.6
	(55.24)	(88.18)
School Admin. Workers	328.8	497.8
	(85.07)	(128.4)
Maintenance Workers	306.3	464.9
	(125.7)	(189.6)
Transport Workers	149.0	236.3
	(99.32)	(165.5)
Food Service Workers	122.5	182.3
	(39.67)	(59.08)
Observations	6429	6429

Note: The table reports summary statistics constructed by the authors using data collected by the National Center for Education Statistics. The data are associated with the Common Core of Data, collected through the annual editions of School District Finance Survey F-33. Each of the worker groups are individually identified in the School District Finance series. Pupil Support includes guidance counselors and Instructional Support includes teacher's aids.

Table 4: **OLS Relationship between Changes in Per-Student Benefit Costs and Changes in School District Spending and Revenue Aggregates**

	(1) Spending	(2) Salaries	(3) Non Comp.	(4) Revenue	(5) Non Local	(6) Local	(7) Property
△ Benefit Costs	1.498**	0.428**	0.070	1.630**	1.427**	0.203	0.161
	(0.269)	(0.077)	(0.215)	(0.260)	(0.153)	(0.204)	(0.204)
N	6,429	6,429	6,429	6,429	6,429	6,429	6,429
Number of Clusters	45	45	45	45	45	45	45
Weighted	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Estimator	OLS	OLS	OLS	OLS	OLS	OLS	OLS
Specification	Changes	Changes	Changes	Changes	Changes	Changes	Changes
Period	98 to 07	98 to 07	98 to 07	98 to 07	98 to 07	98 to 07	98 to 07

Note: **, *, and + indicate statistical significance at the 0.01, 0.05, and 0.10 levels respectively. Standard errors are calculated allowing for correlation at the state level. The table reports estimates of β_1 in equation (5) from the main text. The outcome variables are described in greater detail in the note to Table 2. Observations describe changes from 1998 to 2007 at the school district level.

Table 5: **IV Relationship between Changes in Per-Student Benefit Costs and Changes in School District Spending and Revenue Aggregates**

	(1) Benefits	(2) Spending	(3) Salaries	(4) Non Comp.	(5) Revenue	(6) Non Local	(7) Local	(8) Property
△ Benefit Costs		1.296*	-0.153	0.449	1.366*	1.607**	-0.242	-0.080
		(0.626)	(0.332)	(0.473)	(0.674)	(0.467)	(0.459)	(0.498)
Sim. Ben. Growth	1.257**							
	(0.326)							
N	6,429	6,429	6,429	6,429	6,429	6,429	6,429	6,429
Number of Clusters	45	45	45	45	45	45	45	45
Weighted	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Estimator	OLS	IV	IV	IV	IV	IV	IV	IV
Instrument	NA	Sim CG	Sim CG	Sim CG	Sim CG	Sim CG	Sim CG	Sim CG
Specification	Changes	Changes	Changes	Changes	Changes	Changes	Changes	Changes
Period	98 to 07	98 to 07	98 to 07	98 to 07	98 to 07	98 to 07	98 to 07	98 to 07

Note: **, *, and + indicate statistical significance at the 0.01, 0.05, and 0.10 levels respectively. Standard errors are calculated allowing for correlation at the state level. The table reports estimates of γ_1 (column 1) in equation (6) and δ_1 (the remaining columns) in equation (7), both from the main text. The outcome variables are described in greater detail in the note to Table 2. "Sim. Ben. Growth" is equal to the base year (1998) value of benefit costs per pupil times the growth (in percent terms) of state level per capita health spending on the non-Medicare population. Observations describe changes from 1998 to 2007 at the school district level.

Table 6: **IV Relationship between Changes in Per-Student Benefit Costs and Changes in School District Spending and Revenue Aggregates**

	(1) Benefits	(2) Spending	(3) Salaries	(4) Non Comp.	(5) Revenue	(6) Non Local	(7) Local	(8) Property
$\triangle$ Benefit Costs		1.323*	-0.137	0.460	1.396*	1.631**	-0.236	-0.074
		(0.596)	(0.255)	(0.491)	(0.586)	(0.466)	(0.432)	(0.471)
Sim. Ben. Growth	1.263**							
	(0.296)							
Income Growth	0.031	0.190+	0.111**	0.078	0.210+	0.168+	0.042	0.036
	(0.037)	(0.104)	(0.036)	(0.078)	(0.109)	(0.092)	(0.057)	(0.054)
N	6,429	6,429	6,429	6,429	6,429	6,429	6,429	6,429
Number of Clusters	45	45	45	45	45	45	45	45
Weighted	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Estimator	OLS	IV	IV	IV	IV	IV	IV	IV
Instrument	NA	Sim CG	Sim CG	Sim CG	Sim CG	Sim CG	Sim CG	Sim CG
Specification	Changes	Changes	Changes	Changes	Changes	Changes	Changes	Changes
Period	98 to 07	98 to 07	98 to 07	98 to 07	98 to 07	98 to 07	98 to 07	98 to 07

Note: **, *, and + indicate statistical significance at the 0.01, 0.05, and 0.10 levels respectively. Standard errors are calculated allowing for correlation at the state level. The table reports estimates of γ_1 (column 1) in equation (6) and δ_1 (the remaining columns) in equation (7), both from the main text. The outcome variables are described in greater detail in the note to Table 2. "Sim. Ben. Growth" is equal to the base year (1998) value of benefit costs per pupil times the growth (in percent terms) of state level per capita health spending on the non-Medicare population. Observations describe changes from 1998 to 2007 at the school district level.

Table 7: **IV Relationship between Changes in Per-Student Benefit Costs and Changes in Sources of Non-Local Revenues**

	(1) Non Local	(2) Fed Title I	(3) Fed Nutrit.	(4) Other Fed	(5) State Rev
$\triangle$ Benefit Costs	1.607**	0.050	-0.008	0.024	1.541**
	(0.467)	(0.071)	(0.014)	(0.084)	(0.450)
N	6,429	6,429	6,429	6,429	6,429
Number of Clusters	45	45	45	45	45
Weighted	Yes	Yes	Yes	Yes	Yes
Estimator	IV	IV	IV	IV	IV
Instrument	Sim CG	Sim CG	Sim CG	Sim CG	Sim CG
Specification	Changes	Changes	Changes	Changes	Changes
Period	98 to 07	98 to 07	98 to 07	98 to 07	98 to 07

Note: **, *, and + indicate statistical significance at the 0.01, 0.05, and 0.10 levels respectively. Standard errors are calculated allowing for correlation at the state level. The table reports estimates of δ_1 in equation (7) from the main text. The outcome variables in columns 2 through 7 sum to total Non Local Revenue from column 1. Observations describe changes from 1998 to 2007 at the school district level.

Table 8: **IV Relationship between Changes in Per-Student Benefit Costs and a Further Breakdown of State Revenues**

	(1) State Tot	(2) Gen. Formula	(3) Capital	(4) Categorical	(5) Other Prog.	(6) Mystery	(7) Other Minor
$\triangle$ Benefit Costs	1.541**	0.451	0.035	0.459*	0.306+	0.282*	0.042
	(0.450)	(0.401)	(0.088)	(0.181)	(0.181)	(0.134)	(0.127)
N	6,429	6,429	6,429	6,429	6,429	6,429	6,429
Number of Clusters	45	45	45	45	45	45	45
Weighted	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Estimator	IV	IV	IV	IV	IV	IV	IV
Instrument	Sim CG	Sim CG	Sim CG	Sim CG	Sim CG	Sim CG	Sim CG
Specification	Changes	Changes	Changes	Changes	Changes	Changes	Changes
Period	98 to 07	98 to 07	98 to 07	98 to 07	98 to 07	98 to 07	98 to 07

Note: **, *, and + indicate statistical significance at the 0.01, 0.05, and 0.10 levels respectively. Standard errors are calculated allowing for correlation at the state level. The table reports estimates of δ_1 in equation (7) from the main text. The outcome variables in columns 2 through 7 sum to total State Other Revenue from column 1. Categorical refers to funding associated with special, remedial, bilingual and other students to whom funding is directly linked. Mystery includes moderately large revenue categories labeled as "Unspecified" and "State Revenue on Behalf - Not Employee Benefits." Other Prog. is an independent category of general, program-specific funding. Observations describe changes from 1998 to 2007 at the school district level.

Table 9: **Estimates of the Effect of Simulated Benefit Cost Growth on Total Compensation and Salaries across the Worker Groups within Districts**

	(1) Benefits	(2) Benefits	(3) Salaries	(4) Salaries	(5) Total Comp.	(6) Total Comp.
$\triangle$ Benefit Costs			-0.176	-0.186	0.824*	0.814*
			(0.378)	(0.390)	(0.378)	(0.390)
Simulated Benefit Growth	1.350**	1.354**				
	(0.183)	(0.190)				
N	51,432	51,432	51,432	51,432	51,432	51,432
Number of Clusters	45	45	45	45	45	45
Weighted	Yes	Yes	Yes	Yes	Yes	Yes
Estimator	OLS	OLS	IV	IV	IV	IV
Specification	Changes	Changes	Changes	Changes	Changes	Changes
Period	98 to 07	98 to 07	98 to 07	98 to 07	98 to 07	98 to 07
Observation Level	Group x Dist	Group x Dist	Group x Dist	Group x Dist	Group x Dist	Group x Dist
District Fixed Effects	No	Yes	No	Yes	No	Yes
Group Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes

Note: **, *, and + indicate statistical significance at the 0.01, 0.05, and 0.10 levels respectively. Standard errors are calculated allowing for correlation at the state level. Columns 1 and 2 report estimates of β_1 in equation (8) from the main text. District fixed effects are excluded in column 1 and included in column 2. Columns 3 and 4 report IV estimates of the relationship between benefit growth and salaries in which columns 1 and 2 serve as the underlying first stage. Columns 5 and 6 similarly report IV estimates of the relationship between benefit growth and total compensation. The outcome variables are described in greater detail in the note to Tables 2 and 3. "Simulated Benefit Growth" is equal to the base year (1998) value of benefit costs per pupil times the growth (in percent terms) of state level per capita health spending on the non-Medicare population. Observations describe changes from 1998 to 2007 at the level of worker groups within each district. The worker-group data are summarized in Table 3.

Table 10: **Estimates of the Effect of Simulated Benefit Cost Growth on Total Compensation and Salaries across the Worker Groups within Districts: Blue Collar Vs. White Collar Worker Groups**

	(1)	(2)	(3)	(4)	(5)	(6)
	Blue Collar Workers			White Collar Workers		
	Benefits	Salaries	Total Comp.	Benefits	White Salaries	Total Comp.
$\triangle$ Benefit Costs		0.183	1.183**		-0.202	0.798*
		(0.273)	(0.273)		(0.404)	(0.404)
Simulated Benefit Growth	1.137**			1.346**		
	(0.152)			(0.185)		
N	19,287	19,287	19,287	32,145	32,145	32,145
Number of Clusters	45	45	45	45	45	45
Weighted	Yes	Yes	Yes	Yes	Yes	Yes
Estimator	OLS	IV	IV	OLS	IV	IV
Specification	Changes	Changes	Changes	Changes	Changes	Changes
Period	98 to 07	98 to 07	98 to 07	98 to 07	98 to 07	98 to 07
Observation Level	Group x Dist	Group x Dist	Group x Dist	Group x Dist	Group x Dist	Group x Dist
District Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Group Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes

Note: **, *, and + indicate statistical significance at the 0.01, 0.05, and 0.10 levels respectively. Standard errors are calculated allowing for correlation at the state level. The specifications are equivalent to those reported in columns 2, 4, and 6 of the previous table, with the samples restricted to sub-groups of workers. The worker-groups categorized as "Blue" and "White" collar are listed in the note to Figure 5. Blue Collar includes transportation, food service, and maintenance staff, while White Collar includes all other workers. The outcome variables are described in greater detail in the notes to Tables 2 and 3. "Simulated Benefit Growth" is equal to the base year (1998) value of benefit costs per pupil times the growth (in percent terms) of state level per capita health spending on the non-Medicare population. Observations describe changes from 1998 to 2007 at the level of worker groups within each district. The worker-group data are summarized in Table X + 1.

Table 11: **Union Strength Interactions**

	(1) Benefits	(2) Salaries	(3) Tot Comp	(4) Non Comp	(5) Tot Spend	(6) Revenue	(7) Non Loc Rev
Simulated Benefit Growth	0.308	-0.606	-0.298	0.744	0.447	0.008	-0.491
	(0.453)	(0.536)	(0.649)	(1.435)	(1.672)	(1.670)	(1.051)
Sim. Ben. Gr. x Union	1.057+	0.461	1.518+	-0.201	1.318	1.904	2.800*
	(0.623)	(0.478)	(0.786)	(1.565)	(1.640)	(1.450)	(1.058)
N	6,429	6,429	6,429	6,429	6,429	6,429	6,429
Number of Clusters	45	45	45	45	45	45	45
Weighted	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Estimator	OLS	OLS	OLS	OLS	OLS	OLS	OLS
Specification	Changes	Changes	Changes	Changes	Changes	Changes	Changes
Period	98 to 07	98 to 07	98 to 07	98 to 07	98 to 07	98 to 07	98 to 07

Note: **, *, and + indicate statistical significance at the 0.01, 0.05, and 0.10 levels respectively. Standard errors are calculated allowing for correlation at the state level. Specifications take the form of equation (6) from the main text, augmented to include an interaction between Simulated Benefit Growth and an index of union strength. The index runs from 0 to 1 (in 5 evenly distributed categories) and was taken from a report published by the Thomas Fordham Institute (Winkler et al, 2012). Higher values of the index indicate relatively strong teachers' unions. The outcome variables are described in greater detail in the note to Table 2. Observations describe changes from 1998 to 2007 at the school district level.

Table 12: **Simulated Benefit Growth and State Revenues: The Mediating Role of Strong Teacher's Unions**

	(1) State Tot	(2) Gen. Formula	(3) Capital	(4) Categorical	(5) Other Prog.	(6) Mystery	(7) Other Minor
Simulated Benefit Growth	-0.984	-0.849	-0.203	-0.451	0.363	0.253	-0.300
	(0.911)	(0.898)	(0.190)	(0.352)	(0.699)	(0.187)	(0.244)
Sim. Ben. Gr. x Union	3.255**	1.579	0.276	1.146*	0.025	0.113	0.393
	(0.905)	(1.015)	(0.174)	(0.500)	(0.825)	(0.119)	(0.307)
N	6,429	6,429	6,429	6,429	6,429	6,429	6,429
Number of Clusters	45	45	45	45	45	45	45
Weighted	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Estimator	OLS	OLS	OLS	OLS	OLS	OLS	OLS
Specification	Changes	Changes	Changes	Changes	Changes	Changes	Changes
Period	98 to 07	98 to 07	98 to 07	98 to 07	98 to 07	98 to 07	98 to 07

Note: **, *, and + indicate statistical significance at the 0.01, 0.05, and 0.10 levels respectively. Standard errors are calculated allowing for correlation at the state level. Specifications take the form of equation (6) from the main text, augmented to include an interaction between Simulated Benefit Growth and an index of union strength. The outcome variables in columns 2 through 7 sum to total State Other Revenue from column 1. Categorical refers to funding associated with special, remedial, bilingual and other students to whom funding is directly linked. Mystery includes moderately large revenue categories labeled as "Nonspecified" and "State Revenue on Behalf - Not Employee Benefits." Other Prog. is an independent category of general program-specific funding. Observations describe changes from 1998 to 2007 at the school district level.

Table 13: **Benefit Growth, Spending, and Student Outcomes**

	(1) Benefits	(2) Salaries	(3) Spending	(4) Dropouts Percent x 100
Sim. Ben. Growth	1.276*	-0.151	2.240*	0.296*
	(0.471)	(0.421)	(0.910)	(0.144)
N	3,388	3,388	3,388	3,388
Number of Clusters	32	32	32	32
Weighted	Yes	Yes	Yes	Yes
Estimator	OLS	OLS	OLS	OLS
Specification	Changes	Changes	Changes	Changes
Period	98 to 07	98 to 07	98 to 07	98 to 07

Note: **, *, and + indicate statistical significance at the 0.01, 0.05, and 0.10 levels respectively. Standard errors are calculated allowing for correlation at the state level. Specifications take the form of equation (6) from the main text. Drop Out Percent x 100 is the district dropout rate of 9th through 12th graders as reported in the Common Core of Data's "Nonfiscal Data Files" for "Local Education Agency (School District) Universe Survey Dropout and Completion Data." In 1998, Drop Out Percent x 100 had a mean of 395 in the analysis sample. Observations describe changes from 1998 to 2007 at the school district level. The sample is smaller than that in previous tables due to the need to merge the dropout data with the school district finance data.

Table 14: **Benefit Growth, Compensation Per Teacher, and Teacher Employment**

	(1) Benefits	(2) Salaries	(3) Total Comp.	(4) Compensation Per Teacher	(5) Number of Teachers (per 10,000)
Simulated Benefit Growth	0.812**	-0.144	0.668	1.998	0.004
	(0.275)	(0.282)	(0.520)	(6.012)	(0.044)
N	6,215	6,215	6,215	6,215	6,215
Number of Clusters	42	42	42	42	42
Weighted	Yes	Yes	Yes	Yes	Yes
Estimator	OLS	OLS	OLS	OLS	OLS
Specification	Changes	Changes	Changes	Changes	Changes
Period	98 to 07	98 to 07	98 to 07	98 to 07	98 to 07

Note: **, *, and + indicate statistical significance at the 0.01, 0.05, and 0.10 levels respectively. Standard errors are calculated allowing for correlation at the state level. Specifications take the form of equation (6) from the main text. Number of Teachers is the per pupil number of full time equivalent instructional staff as reported in the Common Core of Data's "Nonfiscal Data Files" for "Public Elementary/Secondary School Universe Survey Data." Compensation Per Teacher is equal to Total Comp. divided by Number of Teachers . The sample is smaller than in earlier tables due to the need to merge the full time instructional employment data with the school district finance data.