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Premium copayments and the trade-off between wages and employer-provided health insurance

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ABSTRACT

This paper estimates the trade-off between salary and health insurance costs using data on Illinois school teachers between 1991 and 2008 that allow us to address several common empirical challenges in this literature. Teachers paid about 17 percent of the cost of individual health insurance and about 46 percent of the cost of their family members' plans through premium contributions, but we find no evidence that teachers' salaries respond to changes in insurance costs. Consistent with a higher willingness to pay for insurance, we find that premium contributions are higher in districts that employ a higher-tenured workforce. We find no evidence that school districts respond to higher health insurance costs by reducing the number of teachers.

1. Introduction

One of the most pressing issues that continues to confront policy-makers, employers and individuals is that the growth in health care costs have exceeded the growth of per capita incomes, wages, and the price of other goods for several decades. In 1960 annual per capita health spending was $809 (in 2009 dollars) and by 2009 it had increased to $7375, for an average annual growth rate of 4.6 percent (Chernew and Newhouse, 2011). Over this same period, inflation-adjusted per capita income increased by 1.8 percent.[1] This large and persistent growth in health care spending was an important issue in the debate over the Affordable Care Act and is a top concern for employers and workers because the vast majority of the under-65 population who have health insurance coverage receive their coverage as part of an employee compensation package. The growth in health care costs is also central to the long-term prospects for the federal and state government budgets through its effects on the cost of publically-provided insurance and on the costs to provide health insurance to public-sector workers. This paper investigates the incidence of rising health insurance premiums using a unique data set from over 600 public school districts in Illinois that tracks wages, health insurance premiums, and employee premium copayments for public school teachers from 1990–91 through the 2007–2008 school years.

While employer-provided health insurance premiums and total employment costs have been rising steadily over the last half-century, employees' monetary compensation has remained relatively flat. Economists traditionally interpret the disparity in these trends as partially reflecting an implicit (and sometimes explicit) trade-off that employees make between salary, other forms of compensation, and job attributes more generally. As health insurance costs increase, employees are increasingly willing to accept slower wage growth to maintain their health benefits. A long line of empirical research, however, has failed to find clear evidence that health insurance costs are borne by employees, which calls into question the long-standing views most economists hold about the incidence of rising health insurance costs and, more generally,

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[1] Per capita personal income in 1960 was $14,651 (in 2009 dollars) and in 2009 was $35,115. Data on personal income is from the Bureau of Economic Analysis National Income and Product Accounts. Data on the Consumer Price Index is from the Bureau of Labor Statistics.

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whether the labor market operates as a sorting mechanism based on employer and employee preferences for employer-provided health benefits.[2]

This paper estimates the trade-off between salary and health insurance costs using a unique data source on salary and benefits provided to public school teachers in over 600 schools districts in Illinois between 1991 and 2008. Public school teachers are an interesting and important group to study: there is a widely-held belief that public-sector employees receive higher compensation than what they would earn in the private-sector and much of the disparity is driven by differences in employee benefits. Recent attempts in Wisconsin and Ohio to restrict collective bargaining by public-sector employees were predicated, in part, on the desire to reduce compensation costs in general and employee benefit costs in particular. A similar debate is going on Illinois, where there are policy proposals to alter collective bargaining rules on a number of dimensions and also reduce the value of pensions for public-sector workers. These debates generally ignore the possibility that salaries and benefits are jointly determined, so attempts to reduce benefit costs will generally put upward pressure on salaries to maintain the same quality workforce.

Illinois public school teachers are also interesting to study because we have an almost ideal dataset to examine the trade-off between salary and benefits and can address some of the empirical limitations that have plagued past work. The salary survey that we use includes information on the premiums for individual and family health insurance plans and the fraction of the premium that is paid by the teacher through regular salary deductions. For the sake the brevity, we refer to these teacher contributions to health insurance premiums as "premium copayments". These premium copayments are important and have not been well-studied in the literature. According to nationally-representative survey data compiled by the Kaiser Family Foundation, 84 percent of workers covered by employer-provided insurance paid a premium copayment for their individual insurance in 2011, up from 76 percent in 2002.[3] These premium copayments accounted for 18 percent of the premium for individual coverage in 2011 and 28 percent of the premium for family coverage.[4] Our data on Illinois school district compensation contracts thus allows us to directly measure the correlation between changes in total insurance premiums, salaries, and premium copayments.

Economic theory offers a clear prediction about the relationship between wages, health insurance costs, and total compensation. When both employees and firms are willing to substitute insurance (and other benefits) for some of their salary, exogenous changes in the cost of benefits will be offset by changes in salary, leaving total compensation unaffected. This is true both in a competitive spot labor market, where the labor market serves as a sorting devise to match workers and firms who share a preferred mix of salary and benefits, as well as in a union-management or union-government negotiation, which is the case we study. In union-management contract negotiations, management is concerned about the total compensation an employee receives and how the mix of wages and benefits affects workforce quality; unions will negotiate a compensation level and mix that a majority of members will support.

A long line of research, however, has been largely unsuccessful in estimating a meaningful trade-off between health insurance and wages.

Data problems, as opposed to poor theory, have been the primary reason offered to explain why it has been difficult to empirically measure wage offsets from rising health insurance costs. One frequently cited reason for the lack of empirical support is that typical data sources have poor measures of individual productivity. An OLS regression often finds a positive association between wages and health insurance, which simply reflects the fact that higher skilled workers tend to receive both high wages and more benefits. It is exceedingly difficult to adequately control for individual productivity and remove this omitted variables bias. A second reason is that data on employee premium copayments are not part of many datasets used to study the wage-health insurance trade-off. Thus, to the extent that adjustments occur though premium copayments, the relationship between gross compensation and the level of health insurance benefits will understate the overall relationship between wages and insurance premiums.

Our analysis indicates that total health insurance costs rose for Illinois teachers at the same rate as they did nationally. Rising premium costs were partially offset by rising teacher premium copayments; teachers paid about 17 cents in higher premium copayments for each dollar increase in the cost of individual health insurance and about a 46 cent premium copayment increase for each dollar increase in the cost of family coverage. Offsets through premium copayments are larger in districts that have longer-tenured (thus older) teachers: a one-year rightward shift in the teacher tenure distribution increases the teacher premium copayment by an additional 3 cents for each dollar increase in premiums. Premium copayments do not, however, cover the full cost of health insurance, leaving ample room for additional offsets on other margins or for some of the incidence to fall on districts. We find no evidence that changes in teachers' salaries within a district over time are related to changes in insurance premiums. We also find no evidence that rising health insurance premiums reduce districts' demand for teachers or that districts substitute less-experienced teachers when health costs rise. Our results are strikingly similar to those of Anand (2011), who uses the National Compensation Survey to study this trade-off using nationally representative data. Our results are also consistent with Clemens and Cutler (2014), who find a small but statistically insignificant salary offset in response to predicted changes in the cost of health insurance among school districts nationally. This congruence of results gives us confidence that we have, in fact, found an empirical pattern that is real and is not unique to the particular employment setting that we study.

We draw two conclusions from these results. First, take-home compensation adjusts to rising premium costs, though all of the adjustment comes through premium copayments and not through negotiated salary levels. Our results suggest that school districts bear some of the incidence of rising health insurance premiums, especially for individual insurance. But we cannot rule out that measurement error in premiums leads us to understate the share borne by teachers. Second, the premium offset is significantly larger in districts with an older workforce is consistent with older workers placing a higher value on the health benefits associated with higher premiums.

2. The relationships between health insurance premiums, wages and employee premium contributions

The starting point for understanding how wages and premiums respond to changes in health insurance premiums begins with the model used to explain differences in wages and health insurance premiums across employers at a point in time. Goldstein and Pauly

[2] See Currie and Madrian (1999) and our discussion in Section 2.

[3] Kaiser Family Foundation and Health Research and Educational Trust (2011). These data refer to private-sector and public-sector employees, excluding employees of the federal government.

[4] The National Compensation Survey conducted by the BLS for 2011 found that among all civilian employees with employer provided health benefits, employees paid for 21 percent of the cost of individual coverage and 33 percent of the cost of family coverage through premium copayments that were deducted from a worker's pay check. See BLS series NBU11500000000000031175 and NBU11500000000000031177 at http://www.bls.gov/ncs/.

(1976) were the first to develop a formal model of this relationship. They assume workers are perfectly exchangeable in the production process, face the same expected health care costs and differ only in their level of risk aversion. Workers have preferences for take-home salary, s_{it}, and health benefits, h_{it}, and maximize utility $U_{it} = U(s_{it}, h_{it}(\text{risk aversion}))$, where take-home salary is the difference between the employee's nominal salary, w_{it}, and the employees' health insurance premium copayment or contribution, c_{it}; and the utility of health insurance is solely a function of worker risk aversion. Total labor cost per worker is identical across firms and is equal to the marginal revenue product of a worker, and is also equal to cash compensation plus the cost of health insurance. The budget constraint produces a set of equilibrium salary levels and health insurance premium combinations that trace out a hedonic wage function $s_{it} = S(h_{it})$, a level of take-home salary for each observed level of health insurance. This equilibrium implies a marginal condition that $-U_h/U_s = S'(h_{it})$: the employees' marginal rate of substitution between health insurance and salary, which depends on risk aversion, is equal to the marginal change in salary that results from a marginal change in health insurance, i.e. the "price" of health insurance in terms of reduced salary. Differences in worker risk aversion mean that firms offer different combinations of cash compensation and health insurance benefits to match the distribution of worker preferences and each worker is matched to a firm that offers the compensation package that maximizes her utility. This sorting of workers across firms means an employer need offer only one health insurance plan because all workers in the firm have identical risk preferences.

The Goldstein and Pauly model produces the well-known negative trade-off between wages and fringe benefits. There is a distribution of wage-health insurance offerings solely because of different worker preferences. The trade-off does not require differences across employers in either the costs of offering health insurance or in any benefits health insurance might provide to an employer in attracting or retaining more productive workers. The negative relationship between cash compensation and health insurance premiums continues to hold when the model's assumptions are relaxed and heterogeneity is allowed in worker productivity, expected health care expenditures, and the costs and benefits to employers from offering health insurance. The trade-off also holds when we move from a competitive spot labor market to a unionized setting and when we relax the assumption that firms (or school districts, in our case) are profit maximizers. We return to these latter issues below.

The trade-off between wages and health insurance is empirically estimated using a hedonic wage regression that expresses an individuals' take-home cash compensation, s_{it}, as a function of the cost of employer-provided health insurance (and possibly other job attributes) (Brown, 1980; Rosen, 1986). Take home salary is equal to the wage rate, w_{it}, less the employees' contribution to their health insurance premium, c_{it}, or:

$$s_{it} = w_{it} - c_{it} = \alpha + \beta h_{it} + \gamma X_{it} + \varepsilon_{it}, \tag{1}$$

where α is a constant term, X_{it} are individual characteristics that are potentially correlated with health insurance that affect worker productivity, and ε_{it} is an unobserved error term. The parameter β captures the trade-off between health insurance and take-home salary. If $\beta = -1$ then a dollar increase in health insurance costs translates directly into a dollar less of take-home pay and premium increases are fully offset by a decline in cash compensation. Since health insurance is not taxed as income, a dollar-for-dollar tradeoff implies that teachers capture all of the favorable tax treatment of health benefits. If, in response to a dollar increase in premiums, a districts reduces cash compensation by a dollar, total labor costs to the employer remains unchanged but an employee's after-tax income declines by only (1-Marginal Tax Rate). Alternatively, the employer captures all of the tax benefit if the parties agree to reduce pre-tax take-home pay by 1/(1-Marginal Tax Rate) when premiums increase by a dollar. As we describe in footnote 16 below, we estimate the combined federal and state marginal tax rate in our context to be about 25 percent.

The trade-off between take-home salary and health insurance is also affected by the fraction of employees who take-up insurance and whether the wage offset occurs through reduced salaries or premium contributions. If all of the adjustment comes through salaries and salaries cannot be adjusted differentially for teachers who take-up insurance and those who do not (which seems reasonable in this context since salaries are determined by a simple function of education and experience, as we describe below), then a dollar increase in health insurance premiums should lead to a decrease in salary of (take-up rate) × (1-marginal tax rate). By contrast, premium contributions are only paid by those who take-up insurance. So if all of the adjustment were to come through premium contributions, then a dollar increase in health insurance premiums should lead to an increase in premium contributions of (1-marginal tax rate) among those who take up insurance.

A sizeable literature exists on the trade-off between wages and health insurance premiums. Despite the size of the literature, a consensus on the size of the trade-off does not exist: Currie and Madrian's (1999) literature survey indicates that many studies find no statistically significant relationship between wages and health insurance costs, or find a positive relationship between the two. [5] Other studies find evidence of a negative relationship. Anand (2011) and Clemens and Cutler (2014) are the most closely related studies to ours. Anand uses the National Compensation Survey, which is a nationally-representative panel of firms, and jobs within these firms, and contains information on wages, the incidence and costs of various benefits, and employee contributions toward the costs of health insurance and some other benefits.[6] As we do below, she estimates the within-firm correlation between total health insurance premiums, wages, and employee contributions and finds that all of the adjustments occur through employee contributions toward premiums. In particular, she finds that a dollar increase in total health insurance premiums is associated with a 52-cent increase in employees' premium contribution. She finds no salary offsets or effects on other employee benefits. Clemens and Cutler (2014) study the relationship between aggregate fringe benefit spending and salaries between 1998 and 2007 across about 16,000 school districts nationwide. They instrument the change in fringe benefit spending with a measure of the predicted growth in health expenditures. Their results indicate that a dollar increase in benefits is associated with about a fifteen cent decline in salaries, though the estimate is quite imprecise and not statistically distinguishable from zero or from a much larger wage offset.[7]

A number of other studies find some evidence of salary offsets: Eberts and Stone (1985) study public school teachers in New York and find that each dollar increase in health insurance costs between 1972 and 1976 was offset by about an 83 cent decrease in salary. Olson (2002) finds a negative effect of employer coverage on wages for married women working full-time using husband's own employer coverage, husband's union status, and husband's firm size as instruments. Baicker and Chandra (2006) find evidence of a fully

[5] In addition to Currie and Madrian's (1999) review, also see the discussions in Levy and Feldman (2001), Simon (2001), Lehrer and Pereira (2007), and Royalty (2008).

[6] For more on trends in benefits and other forms of compensation measured in the National Compensation Surveys, see Pierce (2010).

[7] The publically available school district financial data that Clemens and Cutler (2014) use, and which we use below, does not separately identify spending on health insurance from spending on other benefits. It also does not contain information on premium contributions.

compensated offset for those covered by employer-provided health insurance using medical malpractice settlement size as an instrument for health insurance costs. Kolstad and Kowalski (2012) study the 2006 Massachusetts health insurance mandates and conclude that wages adjusted to fully offset the cost of employer-provided health insurance. Notably, Kolstad and Kowalski, like many existing studies, estimate a compensating difference between jobs with and without health insurance. By contrast, we focus on how compensation adjusts to year-to-year changes in the cost of health insurance among people who are insured.

Other studies have found a relationship between wages and individual characteristics that correlate with the demand for health care. Gruber (1994) found that working women of child-bearing age with health insurance saw their wages decline when their state required insurance policies issued by insurance companies were required to offer maternity benefits. Sheiner (1999) found a flatter age-earnings profile for workers in markets with high medical care prices. Pauly and Herring (1999) found that predicted medical expenditures have a negative impact on the wages of older workers. Bhattacharya and Bundorf (2009) found a significant wage differential between obese and thinner women for those covered by health insurance, but no differential for those without insurance. While we have highlighted a few papers that find evidence consistent with the hypothesized wage-benefit trade-off, many studies fail to find any relationship and there is not yet an empirical basis for a consensus on the magnitude of any wage offset.

The most common explanation offered for the lack of empirical support for the theory is the presence of unobserved worker productivity that is positively correlated with the cross-sectional variation wages and either health insurance premiums or health insurance coverage.[8] Indeed, our analysis of nationally-representative, cross-sectional data from the American Community Survey reveals a positive relationship between wages and being covered by employer-provided health insurance. As we show below, there is also a positive cross-sectional correlation in our data on Illinois teachers between the salaries paid to teachers who have identical levels of education and teaching experience and health insurance premiums. This suggests it is likely to be very difficult for researchers to be confident they are comparing the wages and premiums for workers who face an identical budget constraint, that defined by their marginal revenue product.

The lack of data on the employee's premium copayment, c_{it}, may also explain why past empirical research has often failed to negative relationship between wages and insurance. The Kaiser Family Foundation surveys show that from 1999 to 2011 the mean nominal premium for family coverage among private sector employers increased from $5791 to $15,073 and the mean premium copay has remained virtually unchanged at 27 percent of the mean premium, suggesting that premium copayments have been an important mechanism for shifting some of the premium cost increases to workers through lower take-home pay.[9] Our Illinois teacher data show the teachers' premium copayment on a family policy has remained relatively unchanged from 1990–91 to 2007–08 at 34 percent of the total premium.[10] Examining solely the relationship between salaries and health insurance costs, without incorporating premium copayments, will miss a major mechanism through which take-home pay adjusts to higher premium costs.

The prediction of a dollar-for-dollar trade-off (ignoring the role of taxes) between take-home pay and the cost of health insurance is based on a particular set of assumptions. In the Goldstein-Pauly model, employers provide health insurance and employees are willing to pay for these benefits in the form of lower wages because the cost of health insurance is less than, or equal to, the value employees place on the protection the plan provides from unanticipated health shocks to a worker or her dependents. However, health insurance premium differences across firms at a point in time, or within firms over time, will reflect many factors, such as increased health costs due to technological advancements, the size and health status of the employee pool, and the characteristics of the health plan (i.e. deductibles, etc.). Some of these factors, such as the degree of cost sharing, may be easily apparent to employees; others may not. Importantly, not all of the factors affecting premiums may be valued by employees at their cost to the employer.

Following Summers (1989), the take-home wage and employment adjustments to premium increases depend on how the premium increases compare to the change in the value employees place on the policy. For example, a decrease in a health insurance plan's annual deductible will reduce enrollee's out-of-pocket costs and therefore increase the valuation employees place on the plan. Thus, we would expect to find that an increase in premiums that derive from a reduction in the deductible to be offset by a reduction in take-home salary. Indeed, Royalty (2008) finds that workers are willing to give up more than a dollar in wages to get an additional dollar's worth of observable plan generosity (such as a lower deductible).

The preceding discussion is based on a competitive labor market where wages and benefits are set in the absence of a union. All public primary and secondary school teachers in Illinois are represented by a local union, as we describe below. As previous studies have noted, the bargaining goals of the union will not reflect those of a union member who is on the margin of working for the firm, but will more likely reflect the preferences of the median union member.[11] In the context of health benefits, the evidence suggests unions will place more value on health benefits compared to the typically younger marginal worker in a non-union firm because the median union member is likely to be an older worker with a greater demand for health care.[12] Importantly, however, union and district compensation negotiations will set the union's marginal rate of substitution between wages and benefits equal to the districts marginal willingness to trade-off benefits for wages. A unionized setting does not itself imply that the trade-off between wages and insurance vanishes. A strong union will bargain to increase total compensation, but will also be willing to trade-off health insurance for salary.

The existence of a trade-off between wages and benefits also does not rest of the assumption of a profit-maximizing employer. Rather, it rests more on the school district's budget constraint and the fact that a dollar of salary and a dollar of health insurance have equal effects on the district's budget. As long as these cost to the district are the same, minimizing compensation costs will lead to a dollar-for-dollar trade-off between spending on salary and spending on health insurance (ignoring taxes).

Districts' willingness to trade-off salary and benefits could be less than a dollar-for-dollar if, for example, the district is better able to secure revenue from taxpayers to fund health insurance than to fund teachers' salaries. Glaeser and Ponzetto (2014) provide a theoretical foundation for this possibility. They posit that the true cost of pension benefits to public-sector workers are potentially "shrouded" from the view of local taxpayers. This will lead

[8] See Smith and Ehrenberg (1983) for an early discussion of the econometric and data problems in estimating the wage-fringe benefit relationship in the context of wages and pensions.

[9] See Kaiser (2011).

[10] A regression of the teacher premium copayment as a fraction of the total cost of a family policy on a linear time trend shows a very small increase over time of 0.0015 points per year. This estimate is statistically different from zero (p-value = .045).

[11] See Goldstein and Pauly (1976); Freeman and Medoff (1984); and Farber (1986).

[12] See Freeman and Medoff (1984).

public-sector workers' compensation to be tilted toward having too little in wages and too much in pensions and public-sector workers will value the marginal dollar in pension benefits at less than a dollar. Whether this is empirically important for health benefits is debatable since the cost of health benefits are arguably much more transparent than the costs of a defined-benefit pension plan.

3. Estimating the value of health insurance using data on Illinois public school teachers

We use data from Illinois public school teacher contacts to overcome many of the empirical obstacles detailed above. The Illinois State Board of Education has conducted a census of school districts since the early 1990s that collects information on salaries paid to teachers at different points of the salary schedule, the cost of an individual and family health insurance policies (if these policies are offered to teachers), and teacher premium copayments for each of these policies. We use data from primary and secondary school districts in the state that participated in the survey from academic years 1991–1992 through 2008–2009. There are over 800 districts in the state, though the exact number varies from year to year as some districts consolidated and others were created. Virtually all public school teachers are represented by an affiliate of the Illinois Federation of Teachers (IFT) or the Illinois Education Association (IEA). An IEA affiliate represented teachers in 76 percent of the districts and an IFT affiliate represented teachers in 23 percent of districts and the remaining districts had an unaffiliated local union over our study period. Each school district negotiates a contract (usually a multi-year agreement) with their local union under state legislation that gives teachers the right to strike after proper notification is given to the district of their intent to strike.

In virtually all primary and secondary school districts in Illinois, a teacher's nine-month salary is exactly determined by where their education level and years of teaching experience place them on a two-dimensional salary grid.[13] The salary survey data includes information for seven points on this grid: the minimum salary for a teacher with a BA, the maximum salary for a teacher with a BA, the MA minimum, the MA maximum, a teacher who has an MA and 10 years of experience, the minimum salary for a teacher who has an MA and 30–32 credits, and a the maximum salary for a teacher who has an MA plus 30–32 credits-maximum. The "minimum" salary points specify the compensation for a teacher beginning their teaching career and the salary "maximum" describes pay for someone whose experience equals the salary schedule maximum. The number of years of experience required to reach the salary maximum (conditional on education) varies across districts. In some districts the parties have negotiated "longevity pay" which provides an additional yearly salary increment for teachers whose years of service place them at the maximum step (years) on the salary grid for their years of education. This longevity pay increment is smaller than the pay increment provided by advancing a step on the salary grid. For teachers with a BA (MA) degree the average percentage salary increase for a year of service was 2.70 (2.66) percent for years up to the grid maximum and in districts with longevity pay the average yearly increment was 1.68 (0.82) percent for each year of service beyond the maximum years on the salary grid.[14] We convert all monetary variables, such as salaries and health insurance costs, to July 2009 dollars using the national CPI for all items.

These data have several strengths that allow us to address the difficulties described above. By estimating a model of the salary paid to teachers with a specific level of credentials (i.e. a master's degree and ten years of teaching experience), we implicitly control for these two measures of worker productivity. In a typical survey (such as the Current Population Survey), productivity is measured imperfectly at best, experience is often measured imprecisely or not at all, and years of education fails to capture the specific kind of training that affects pay. Our research setting is unique because pay is determined solely by two factors, education and experience, and we have data on these two factors. Our data describes the pay for a college graduate certified to teach in Illinois who has a particular configuration of credentials. That is, we estimate the wage tradeoff for a particular job, not for a particular person. This distinction is important because it allows us to abstract from unmeasureable differences in tastes and productivity across people. Of course there is substantial variation across districts in the salary schedules and these differences may capture other important differences in teacher quality that are not captured by education and experience. Our models will attempt to address this by using district fixed-effect models. Moreover, since the analysis is based on data from a single occupation, the wage data do not include unmeasured selection effects related to occupational choice that could be correlated with health insurance premiums or salary.

School districts in Illinois either self-insure or buy insurance through a third-party.[15] Our data give us access to precise information on insurance costs that are not typically available in other nationally-representative data sources. For each district in each year, the survey includes information on the total premiums for health/hospitalization insurance, prescription drug insurance, disability insurance, life insurance, vision insurance, and dental insurance. Districts report the cost for a single individual (i.e. the teacher) and the extra cost to cover a teacher's spouse and/or dependents. Unfortunately, the survey does not include information about the number of plans offered. We do not know any details about the plan itself, such as what services are covered, cost sharing, etc.[16] Districts report the fraction of the cost of each type of insurance that is paid by the district; we refer to the balance paid by the teacher as the teacher premium copayment or premium contribution. Finally, we analyze the combination of health/hospitalization coverage and prescription drug coverage together. Many districts report a single cost for both of these forms of coverage and so it is not possible to analyze them separately.

We do not have administrative data on insurance take-up. Instead, we estimated take-up using the 1990–2014 March Supplement to the Current Population Survey, which asks respondents about their source of health insurance coverage and whether the coverage is in their name. To create a sample of public school teachers in Illinois, we selected respondents who live in Illinois, who reported their industry during the prior year was primary or secondary education, whose occupation during the prior year was some type of teacher, and whose class of worker was state

[13] One should think of each point on the experience-education salary grid as potentially independent from the others and negotiable. So a district could, for example, give larger raises to teachers who have more experience or who have an MA degree. For this reason, we treat each experience-education cell for which we have data as a separate dependent variable in our analysis below.

[14] Typically the number of yearly "steps" on the salary grid was greater for teachers with an MA degree. The average number of years it took a teacher with a BA to reach the salary grid maximum was 15.5 years for districts offering longevity pay to BA certified teachers. In contrast, the average number of years it took MA certified teachers to reach the maximum step was 19 years in districts offering longevity pay to teachers with an MA.

[15] The state government provides a pension program for all teachers, but health insurance is provided locally. Some districts participate in a health insurance trust, which we describe below.

[16] The National Compensation Survey used by Anand (2011) suffers from many of these same problems. While neither data source is perfect, two analyses are complementary to one another and it is quite reassuring that our findings are so similar to one another. The NCS data is nationally representative, but because we examine salary schedules for a teacher with a specific set of credentials, our data arguably does a better job of controlling for unmeasured worker characteristics.

or local government. We are left with a sample of about 50–100 observations per year, and 1750 total observations across all years. In this sample, 94.7 percent report that they were covered by employment-based health insurance (which could be in their name or a spouse's name). This fraction is nearly identical in 1990–2001 and 2001–2014. 82.9 percent have the insurance in their own name. (84.6 percent in the 1990–2000; 81.8 percent in 2001–2014.) Finally, 47 percent of the teachers' insurance policies are a family plan. Thus, take-up among teachers appears to be high – on the order of 83 percent – and fairly constant over time.[17]

If districts offer more than one plan, the survey instructions ask them to report the cost of the most expensive plan. This is a potentially important limitation since an increase in the premium for the most expensive plan may induce teachers to switch to less expensive plans that are not part of our data source. We obtained the current teacher contract from 623 districts in Illinois (about 70 percent of all districts). About a quarter of the contracts clearly indicate that the district offers more than one plan. In Section 7 below we use these contracts and data on the Egyptian Area Schools Employee Benefit Trust (a collection of 173 districts in Illinois that collectively buy insurance together) to assess whether our conclusions from the salary survey could be influenced by the fact that we only have data on a single plan in each district. We argue that this data limitation does not influence our results or conclusions.

We also only include districts that reported that they offer insurance in all periods in which they participated in the survey. In any given year, about 10–15 percent of districts that participate in the survey do not report a cost associated with their health insurance policy. This could mean that the district does not offer health insurance at all. However, in most such cases, the particular year with missing data is both preceded by, and followed by, years in which they report that they offer health insurance. This leads us to suspect that the missing data reflect a lack of reporting rather than a lack of health insurance. So we opt to focus on a sample of districts that report offering insurance in each year that they participate in the survey. As a practical matter, our estimates are not sensitive to including these observations in the analysis or to running models where the salaries are regressed on an indicator that the district reported a cost of insurance.[18]

Table 1 and Fig. 1 provide descriptive information on salaries at our sample schools. Fig. 1 shows inflation-adjusted average salaries for five points in the salary schedule over time. Table 1 shows the mean and standard deviation of salaries in 1991, 2000, and 2008. To be clear, these data do not represent the average salaries over teachers with each particular configuration of credentials; rather, they represent the average salaries over districts with each district receiving equal weight. The table and figure indicate that there was very little real growth in salaries over this 18-year period. In 1991, the average salary for a teacher with a BA and no teaching experience was $29,429 (in 2009 dollars); in 2008 the starting salary was $30,906. This change corresponds to an annual growth rate of 0.3 percent per year. The average maximum salary that a teacher with a BA could earn was $43,702 in 1991, or 48.5 percent more than the starting salary for a teacher with a BA. The average starting salary for a teacher with an MA in 1991 was $32,453, or 10.3 percent higher than the salary for a similarly new teacher who only has a BA.

Table 1
Descriptive statistics for salaries, insurance premiums, and copayments.

	1991	2000	2008
BA minimum salary	$29,429	$30,794	$30,906
	(4084)	(4078)	(4289)
BA maximum salary	43,702	45,755	45,867
	(7887)	(7693)	(8002)
MA minimum salary	32,453	34,119	34,226
	(4863)	(4921)	(5104)
MA maximum salary	53,428	57,768	58,043
	(12,240)	(12,377)	(12,352)
MA plus 10 year of experience	42,530	44,326	44,023
	(8195)	(8351)	(8532)
Premium for individual health insurance	2969	3900	5622
	(874)	(930)	(1445)
Premium for family health insurance	5101	6602	10,972
	(2041)	(2386)	(4128)
Copayment for individual insurance	9.3%	8.7%	10.9%
(as a percentage of the total premium)	(17.7)	(15.4)	(16.4)
Copayment for family health insurance	60.8	59.2	59.8
(as a percentage of the total premium)	(39.1)	(37.6)	(34.7)
Number of districts	597	494	655

Notes: All figures are in 2009 dollars. Copayment is the average fraction of the total premium that is paid by teachers for individual or family insurance, including zeros for teachers that have no copayment. Standard deviations in parentheses.

Fig. 2 shows the unweighted average premium for individual health insurance and prescription drug coverage and the average additional premium to cover family members between 1991 and 2008 (these premiums are expressed in 2009 dollars). The averages for 1991, 2000, and 2008 are also reported in Table 1. Individual premiums rose by 89 percent from $2969 in 1991 to $5622 in 2008, or 3.8 percent per year. Family premiums rose at a 4.6 percent annual rate, from $5101 to $10,972.

Insurance premiums for teachers in Illinois were slightly more expensive, but grew at a slightly slower rate, than the national average. The Kaiser/HRET survey began in 1999 and collects information on the characteristics of employer-provided health insurance plans

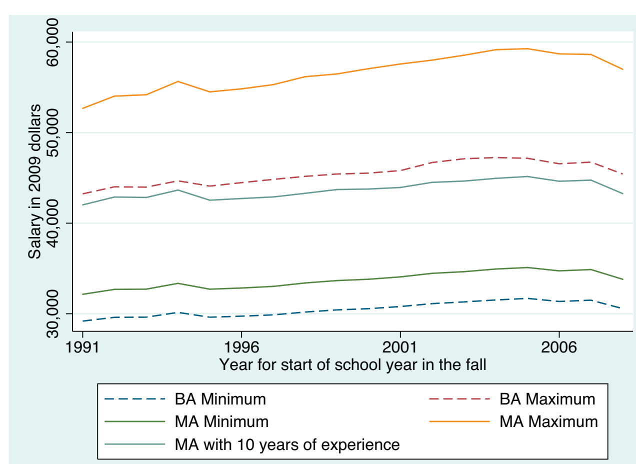

Fig. 1. Real average salaries by degree and experience, 1991–2008.

[17] We also used this sample to calculate marginal tax rates using the NBER's Taxsim program. Over our sample period, the teachers had an average federal marginal tax rate of 22.1 percent and an average state tax rate of 3.2 percent, for a combined average rate of 25.3 percent. (Illinois public school teachers do not participate in the Social Security system and instead are covered by a state defined benefit pension.).

[18] Each year, districts report the month and year that their current labor contract expires. In the regressions in Section 4, we estimate models based only on the first year of each contract. As such, we drop observations that do not have a valid year of expiration of the contract.

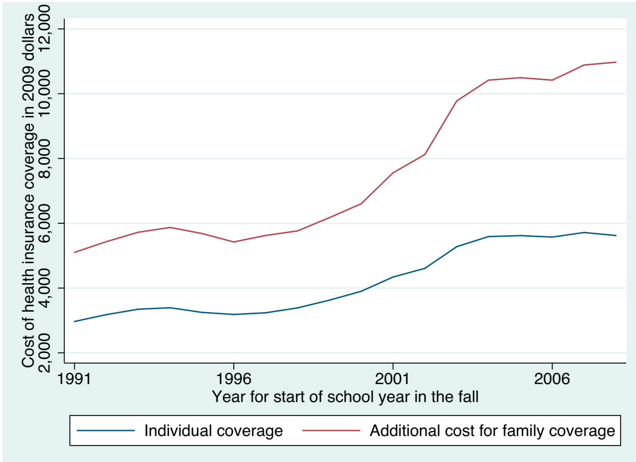

Fig. 2. Average health insurance premiums, 1991 to 2008. *Note*: data refer to the cost of health insurance and drug coverage.

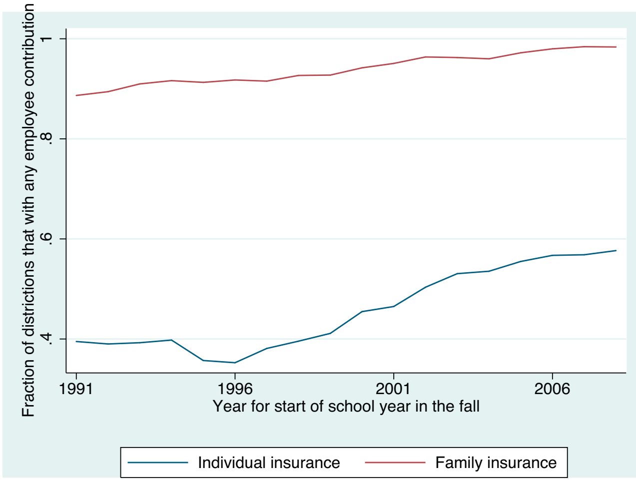

Fig. 3. Fraction of districts that require an employee premium-copayment for individual or family insurance, 1991–2008.

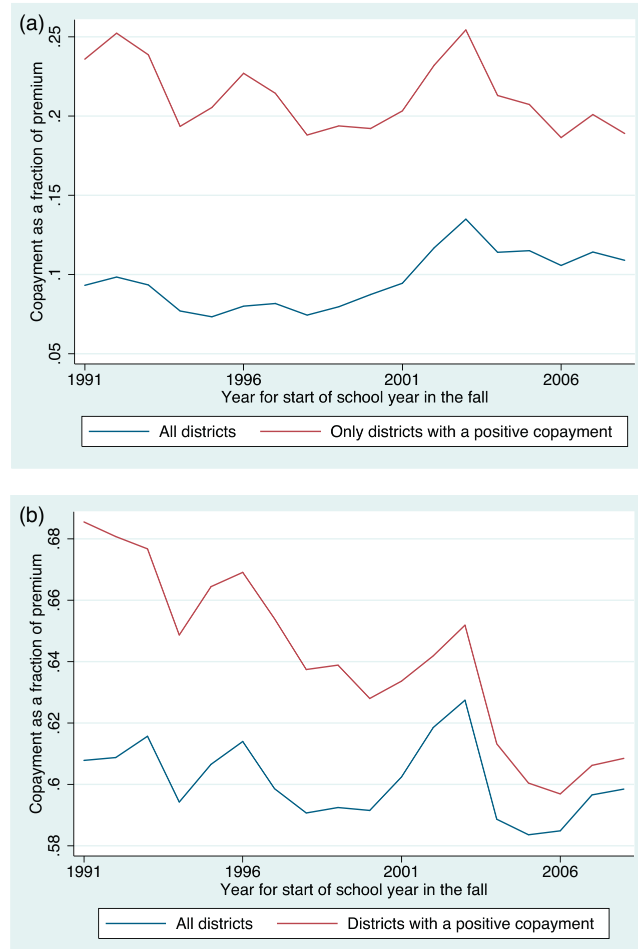

Fig. 4. (a) Copayments for individual insurance as a fraction of total premium, 1991–2008. (b) Copayments for family insurance as a fraction of total premium, 1991–2008.

in the private sector and state and local governments (Kaiser, 2011). The average premium for individual insurance in 2000 was $3090, about 20 percent less than the average cost of individual insurance for Illinois teachers that year. The premium in 2008 was $4708, about 16 percent less than cost in Illinois. The average annual growth rate of individual insurance premiums in the Kaiser data between 2000 and 2008 was 5.4 percent per year.

Districts increasingly relied on premium copayments to cover a portion of individual and family health insurance costs. Fig. 3 shows the fraction of districts that had any premium copayment and Fig. 4a shows the unconditional average copayment for individual insurance and the copayment conditional on having a positive copayment. Table 1 shows the unconditional average copayment as a fraction of the average premium in 1991, 2000, and 2008. 39.5 percent of districts had a copayment for individual insurance in 1991 and the average copayment among districts that had one was $672, or 23.6 percent of the average premium in these districts. The unconditional average copayment (including zeros for districts without any copayment) was $266, which represents 9.3 percent of the average premium that year. By 2008 57.6 percent of districts had a copayment for individual insurance and the average copayment among those that had one was $1042, or 18.9 percent of the average premium in these districts. The unconditional average copayment was $601, or 10.9 percent of the average premium that year. So more districts adopted copayments for individual insurance over time, but the fraction of premiums covered by teacher copayments increased by only 1.6 percentage points. Another way to view the role of premium copayments is to note that the real average premium rose by $2653 between 1991 and 2008; $335 dollars of this, or 12.6 percent, was paid by teachers directly through increased premium copayments. Districts real expenditures on individual health insurance increased by an average of $2318 per teacher.

Premium copayments are more important for family insurance. Fig. 4b shows the unconditional average copayment for family insurance and the copayment conditional on having a positive copayment. 81.7 percent of districts had a copayment for individual insurance in 1991 and the average copayment among districts that had one was $3371, or 68.6 percent of the average premium in these districts. The unconditional average copayment (including zeros for districts without any copayment) was $2758, which represents 60.9 percent of the average premium that year. By 2008 90.7 percent of districts had a copayment for individual insurance and the average copayment among those that had one was $6429, or 60.8 percent of the average premium in these districts. The unconditional average copayment was $5834, or 59.8 percent of the average premium that year. As with individual insurance, school districts adopted copayments for family insurance over time and, indeed, by 2008 nine out of 10 districts had a copayment. The fraction of premiums covered by teacher copayments remained essentially the same over time. Between 1991 and 2008 real average premiums for family

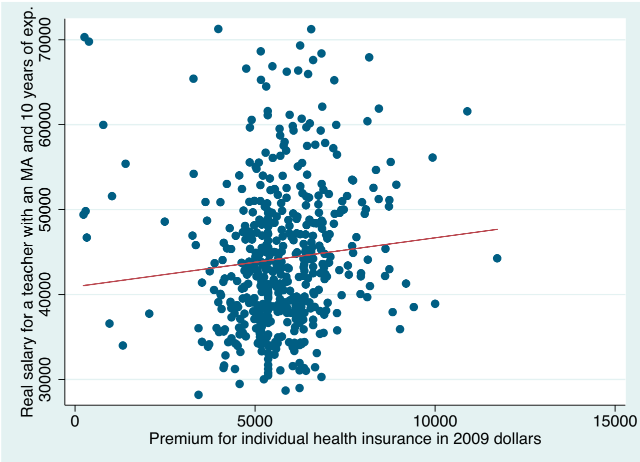

Fig. 5. The cross-sectional relationship between individual health insurance premiums and salary, 2008.

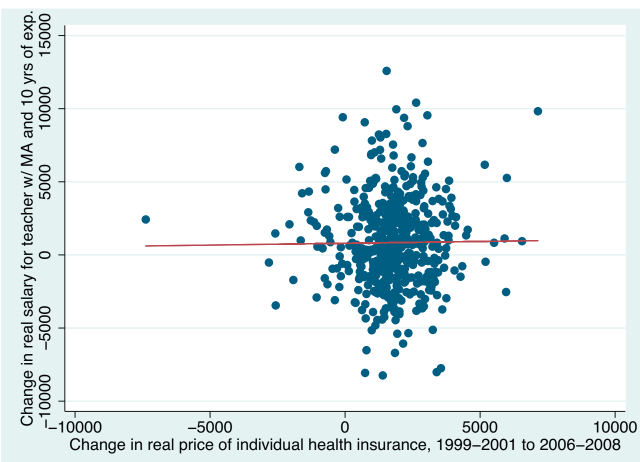

Fig. 6. Changes in individual health insurance premiums and salary, 1999 to 2008.

insurance rose by $5419; $3076 dollars of this, or 56.8 percent, was paid by teachers directly through increased premium copayments. Districts real expenditures on family health insurance increased by $2343 per enrolled family, on average, which is almost exactly the increase that districts paid for individual insurance during this period.

Fig. 5 shows the cross-sectional relationship in 2008 between premiums for individual health insurance and the salary for a teacher with a master's degree and 10 years of teaching experience. The slope of a bivariate regression line through the data is 0.58 with a standard error of 0.27, which indicates that a $100 increase in premiums is associated with $58 higher salary. We interpret this positive cross-sectional relationship as a reflection of other, potentially unobservable factors that lead some districts to offer both high wages and more expensive health insurance. For example, districts in richer neighborhoods are likely to offer relatively higher compensation to attract and retain high-quality teachers.

The advantage of panel data is that we can correlate changes in the cost of insurance in a particular district over time with changes in the premium copayments and salaries in the district and purge any time-invariant district characteristics. Fig. 6 shows the relationship between changes in the real cost of individual health insurance between 1999–2001 and 2006–2008, on the one hand, and the change in the real salary paid to a teacher with an MA and ten years of teaching experience.[19] The scatter plot reveals that there is quite a bit of variation in the real change in health insurance costs during this period, with many experiencing little or no growth and others experiencing upwards of a $5000 increase in insurance costs. The slope of the bivariate regression line is 0.03 with a standard error of 0.10. That is, changes in health insurance costs are virtually uncorrelated with changes in salary; a $100 increase in premiums is associated with a $3 increase in wages, though the estimate is not statistically different from zero. Importantly, virtually all of the positive correlation in the cross-section disappears once we look at within-district changes. That pattern remains once we move to the regression framework in Section 4. Fig. 7 is a scatter plot of changes in the real cost of individual health insurance between 1999–2001 and 2006–2008, on the one hand, and changes in the premium copayment for this insurance. The slope of the bivariate regression line is 0.21 with a standard error of 0.02, indicating that a $100 increase in premiums is associated with a $21 increase in teachers' premium copayment. We find the same pattern of results in the regressions below, but these figures are important because while the regressions pick up shorter-term adjustments, the figures show that even longer-run changes in premiums within districts are uncorrelated with changes in salaries.

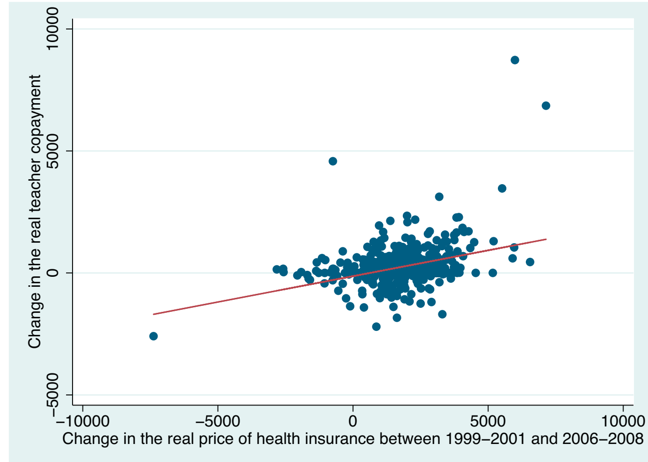

Fig. 7. Changes in individual health insurance premiums and premium copayments, 1999 to 2008.

4. Regression estimates of the relationship between premiums, salary, and copayments

This section presents regression estimates of the relationship between health insurance premiums, salaries, and premium copayments. The basic wage regression is

$$w_{it} = \alpha + \beta h_{it} + \gamma X_{it} + \lambda_t + \nu_i + e_{it} \quad (2)$$

where w_{it} is a point on the salary schedule (such as the starting salary for teacher with a BA) of district i in year t. h_{it} is the total annual health insurance premium for either the teacher or for family members. X_{it} represents time-varying covariates and includes the log of average daily attendance in the district, the log of real assessed value of local property per student in the district, and the log of real federal and state aid to the district per student. The non-compensation data are collected separately by the Illinois State Board of Education. Our preferred specification includes both district (ν_i) and year fixed effects (λ_t). To highlight that the

[19] Averaging over three years should reduce the attenuating effect of measurement error in premiums.

cross-sectional correlation between salaries and health insurance is quite different from the correlation within districts over time, we also present models that omit the district fixed effects.[20] Finally, e_{it} represents the unobservable error term. We also present similar models of the copayment, c_{it}, for individual or family insurance as a function of health insurance premiums.

As we noted above, we estimate these models only using observations associated with the first year of each district contract. Most contracts last between one and three years. Our review of current teacher contracts indicates that many specify wages for each year of the contract as well as the dollar contribution that the district makes toward health insurance premiums. If wages are fixed (or change in a pre-determined manner) during the course of a contract, while the cost of health insurance is adjusted annually, then including observations from each year in the regression will tend to underestimate the responsiveness of wages to health insurance costs. Including these observations would also heighten biases associated with misspecification of any lag structure between changes in health insurance and changes in wages. As a practical matter, our estimates are virtually unchanged if we include all years of each contract.

Identifying variation in health insurance premiums comes from differential changes in premiums within districts over time. As shown in Figs. 6 and 7, premiums rose (or fell) more in some districts than in others. This variation in premiums could come from a number of sources: districts could alter the details of their insurance plans by, for example, changing their physician network, the degree of cost sharing, switching between and HMO and a PPO. Within-district changes in premiums could also result from different health experiences of teachers and their families, as premiums rise disproportionately more in districts that experience more adverse health events.

The fact that we cannot observe health plan features limits the degree of detail we can provide about how firms respond to rising health insurance costs, but it in no way biases our estimates or impairs our ability to estimate a trade-off between health insurance and compensation. Plan design features and teachers' expected medical claims will be capitalized into the cost of insurance. Suppose that teachers in a district experience adverse health events that threaten to raise future health insurance premiums by $1000 per year. The district could respond in a number of ways: for example, they could fully offset this cost by reducing salaries by $1000 per year. Or they could raise the teachers' contribution to premiums by $1000 per year. Alternatively, the district could raise the deductible teachers' face so that premiums only rise by $500. If there is a full wage offset, one would expect to see wages fall (or premium copayments rise) by $500. So while we have no information on the counterfactual $1000 increase in premiums or changes in the deductible, we are able to measure the net effect of how take-home pay responds to changes in premiums. Unobserved changes in plan design simply reduce the scope of premium and compensation changes, but would not change the relationship between premiums and compensation.

Variation in premiums within a district could also be driven by market-wide changes in the cost of health care. The major factor thought to explain the persistently high level of growth in medical spending in the U.S. over the last fifty years is technological innovations (Chernew and Newhouse, 2011). Since our models include fixed effects for each calendar year, we control for the state-wide increase in medical care costs and associated premium increases. Nevertheless, the premium variation we use to identify the impact of health insurance premiums on salaries and teacher copays could come from the uneven impact of new technologies on the local cost of health care if there is variation across health markets in the adoption rates of new medical technologies. Numerous studies (e.g. Phelps, 2000; Skinner, 2011) suggest that this may be important because the adoption rates of new medical technologies vary across markets for reasons not easily explained by prices, income or characteristics of the patient population, even when the technology is low cost and clearly clinically effective.[21] Differences in adoption rates of new technology across markets will generate different changes in health insurance premium costs across employers. Variation over time within markets could also reflect differential changes in physician practice styles or the wages of medical service providers, among other things.

We use hospital referral regions to assess the degree to which market-specific health costs are drive variation in premiums. The Center for Medicare and Medicaid Services (CMS) identifies the different geographic markets served by acute care hospitals in the U.S. We match each school district (by zipcode) to one of the 19 different hospital referral regions in Illinois. We then regressed the individual and family health insurance premiums (h_{it} in the above model) on the covariates, district fixed effects, and year fixed effects. The residuals from this regression are the variation used to identify the relationship between premiums and salary. We regress these residuals on a full set of hospital referral region-by-year fixed effects. The R-squared from this regression is 0.073, indicating that only about seven percent of the identifying variation in premiums is driven by local-market factors. Thus, our results most likely reflect the trade-off between district-specific changes in health costs and compensation. We return to this briefly at the end of this section.

Table 2 presents results of OLS regressions of the minimum and maximum salaries for teachers with a B.A. (in Panels A and B) and an M.A. (in Panels C and D) on annual premium for individual health insurance. Results in the first model in Panel A, which does not include district fixed effects, indicates that a dollar increase in the premium for individual health insurance is associated with a 0.19 dollar increase in the salary for a teacher who has a B.A. degree

Table 2
Regression estimates of the effect of individual health insurance premiums on four points in the salary schedule.

	BA minimum		BA Maximum	
Premium for individual insurance	0.190**	−0.007	0.389**	0.027
	(0.0809)	(0.030)	(0.186)	(0.079)
Observations	3604	3604	3604	3604
Districts	686	686	686	686
District fixed effects?	No	Yes	No	Yes
	MA minimum		**MA Maximum**	
Premium for individual insurance	0.260***	−0.018	0.616***	−0.073
	(0.098)	(0.034)	(0.225)	(0.089)
Observations	3604	3604	3604	3604
Districts	686	686	686	686
District fixed effects?	No	Yes	No	Yes

Notes: Sample only includes districts that offered insurance in all contracts. All models contain control variables described in the text. Robust standard errors in parentheses are clustered by school district.
*** $p < 0.01$.
** $p < 0.05$.
* $p < 0.1$.

[20] We cluster the standard errors at the school district level in models that do not contain district fixed effects.

[21] For example, in 1985 the medical evidence clearly showed that taking beta blockers after an individual has had a heart attack is both very cost effective and it substantially improves health outcomes. However, by 2000–2001 state level data show that only 2/3 of the patients that should take beta blockers were taking beta blockers in the median state (Skinner and Douglas, 2007).

Table 3
Regression estimates of the effect of family health insurance premiums on four points in the salary schedule.

	BA minimum		BA Maximum	
Premium for family insurance	0.046 (0.033)	0.024** (0.011)	−0.018 (0.065)	0.062** (0.031)
Observations	3002	3002	3002	3002
Districts	567	567	567	567
District fixed effects?	No	Yes	No	Yes
	MA minimum		**MA Maximum**	
Premium for family insurance	0.078* (0.044)	0.026** (0.013)	0.055 (0.079)	0.014 (0.035)
Observations	3002	3002	3002	3002
Districts	567	567	567	567
District fixed effects?	No	Yes	No	Yes

Notes: Sample only includes districts that offered insurance in all contracts. All models contain control variables described in the text. Robust standard errors in parentheses are clustered by school district.
*** $p < 0.01$.
** $p < 0.05$.
* $p < 0.1$

but no teaching experience. The second model includes district fixed effects and indicates that within-district changes in the cost of health insurance are virtually uncorrelated with salaries. The point estimate indicates that a dollar increase in the premium is associated with a 0.007 dollar decrease in the starting salary for a teacher with a B.A. The standard error on this estimate is 0.03, which effectively rules out any economically meaningful wage offset.

The remaining panels of Table 2 confirm that within-district changes in health insurance premiums are uncorrelated with changes in teachers' salaries. The point estimates indicate that a dollar increase in the real premium for individual health insurance is associated with a 0.03 dollar increase in the maximum salary paid to a teacher with a BA degree, though this estimate is not different from zero. The point estimates for models of the minimum and maximum salary paid to a teacher with an MA indicate that these fall by 0.018 and 0.073 dollars for a dollar increase in health costs. Again, these estimates are not statistically different from zero.

Estimates in Table 3 indicate that changes in the premium for family members' insurance are not meaningfully correlated with changes in teachers' salaries. The first estimate in Panel A, which does not include district fixed effects, indicates that a dollar increase in the premium for family insurance is associated with a 5 cent increase in the salary for a teacher who has a B.A. and no teaching experience. The standard error on this estimate is 0.03 (or 3 cents) and so the estimate is not statistically different from zero. Nevertheless, it is interesting to note that, unlike the models of the cost of individual insurance which showed quite strong cross-sectional correlations between health insurance costs and wages, these models show very little cross-sectional correlation. Our preferred estimates are those that include district fixed effects and these too show very small, if any, correlation between changes in the cost of family health insurance and salaries. For example, the second column of Panel A indicates shows that a dollar increase in the cost of a family health insurance plan is associated with 0.02 dollar increase in the salary of teachers who have a B.A. and no teaching experience. The standard error of this estimate is 0.01, and so the coefficient is statistically different from zero, but is nevertheless close enough to zero to not be meaningfully different. The other panels also show small, positive associations between changes in the cost of family health insurance plans and teachers' salaries. Our interpretation of these positive estimates is that they may reflect a small upward bias as districts that offer more expensive family plans also pay higher wages. However, there is no reason to believe that this bias is large enough to mask large wage offsets.

Teachers pay a meaningful portion of their health insurance costs through premium copayments, as documented in Table 4. The left two columns show results from models of the copayment for individual insurance on the premium for individual insurance, without and with district fixed effects. The estimates from models with and without fixed effects are broadly similar to one another. With fixed effects, the estimates indicate that a dollar increase in the premium for individual health insurance is associated with a 0.17 dollar increase in teachers' premium copayment. The standard error on this estimate is 0.01. The third and fourth columns present estimates of the effect of premiums for family health insurance on the copayment for family insurance. The model with fixed effects indicates that a dollar increase in the premium for family health insurance is associated with a 0.46 dollar increase in the premium copayment. The standard error on this estimate is 0.01.

The last two columns of Table 4 present models where the dependent variable is the sum of the copayments for individual and family coverage (recall that, in this survey, "family coverage" refers to the additional costs to cover a teacher's spouse and/or dependents). The penultimate column includes the premiums for individual and family coverage separately in the regression and the results are largely the same as those in columns 2 and 4. The final column models the combined copayment as a function of the combined premium and the results indicate that a dollar increase in the combined premium is associated with a 0.41 dollar increase in the copayment. This indicates most of the variation in the combined premium and copayments stems from variation in the family premium and copayment.

Our conclusions from Tables 2 and 3 is that changes over time within a district in the cost of individual and family health insurance plans are largely uncorrelated with changes in teachers' salaries.[22] However, teachers do pay something for their health insurance: Table 4 shows that teachers pay about 17 percent of the cost of individual insurance and about 46 percent of the cost of family members' insurance through premium copayments. These estimates may understate teachers' contribution toward the cost of health insurance if there is measurement error in our premium data.

The lack of correlation between wage and premium changes is not driven by wages being fixed within a multi-year contract because our estimates are based on changes from one contract to the next. Fig. 6 showed a similar lack of correlation between changes in wages and premiums between 1999 and 2008, which gives us further confidence that our results are not driven by shorter-term wage stickiness or the presence of measurement error in the premium data. These conclusions are robust to a host of alternative regression specifications and other choices in how we utilize the data.[23] In Section 7 below we present evidence that our conclusions are likely not influenced by the fact that salary survey only contains information on a single health insurance plan in

[22] We have also estimated regression models of teachers' salaries on the difference between the health insurance premium and the teacher's premium contribution (i.e. the part of the premium for which teachers do not directly pay), the covariates, and fixed effects. These models also indicate no relationship between changes in wages and changes in health insurance premiums.

[23] The Teacher Service Records that we discuss in Section 5 also contain information on the salaries of the school district superintendent, elementary school principals, junior high school principals, and high school principals and we ran models of their salaries as a function of teachers' health insurance premiums. Interestingly, here we did find evidence of a negative association between insurance and wages. For example, pooling all of these administrators together, we find that a dollar increase in teachers' individual health insurance is associated with a 0.345 dollar decline in salary (with a standard error of 0.178). The administrators are not part of the teachers' labor union and we suspect that this may help explain why there is a wage offset for them. Alternatively, it could be that administrators do not pay premium copayments. In any case, we do not have the data to further address these findings.

Table 4
Regression estimates of the effect of health insurance premiums on premium copayments.

	Copayment for individual insurance		Copayment for family insurance		Combined copayment	
Premium for individual insurance	0.157*** (0.026)	0.170*** (0.013)			0.199*** (0.051)	
Premium for family insurance			0.400*** (0.031)	0.458*** (0.014)	0.463*** (0.017)	
Combined premium						0.412*** (0.013)
Observations	3624	3624	3019	3019	3019	3019
Districts		686		567		567
District fixed effects?	No	Yes	No	Yes	Yes	Yes

Notes: Sample only includes districts that offered individual and/or family insurance in all contracts. All models contain control variables described in the text. In models without fixed effects, robust standard errors in parentheses are clustered by school district.
*** $p < 0.01$.
** $p < 0.05$.
* $p < 0.1$.

districts that offer multiple plans. Our results are also not driven by a nominal wage floor. We created versions of Fig. 6 using nominal wages and health insurance premiums and examined changes between 1991–1993 and 1999–2001 and also between 1999–2001 and 2006–2008. Nearly all districts experienced nominal wage increases during these seven and eight year periods. Thus, even if there were a binding nominal wage floor in a particular year, there does not appear to be a binding nominal wage floor over longer periods of time.

As we discussed above, variation in insurance premiums within a district could come from market-level factors (such as uneven technological diffusion) and from changes in district-specific features (such as health plan design or the health experience of teachers in the district). We also ran models that included a full set of hospital referral region (HRR) by year fixed effects and found virtually identical results to those presented in Tables 2–4. In these models, identification comes from contrasts between the changes over time among school districts in the same hospital referral region. Since the HRR-by-year effects only explain seven percent of the variation in premiums, it is not surprising that including these effects has little impact on the results. We also ran instrumental variables models where we use the HRR-by-year fixed effects as instruments for health insurance premiums. These models only use variation in premiums that are common to the whole local market. Most of these models also showed little relationship between premiums and wages, but the standard errors were large enough so that we cannot draw firm conclusions.[24]

5. The impact of the teacher experience distribution on wage and premium copayment offsets

As noted earlier, several studies have found the wage offset from health insurance benefits are larger for some demographic groups that have higher than average expected health care expenditures. These findings could reflect sorting across employers where groups with higher health care needs work for employers with more generous health insurance and are willing to accept lower cash compensation because of the higher value they place on the better coverage relative to other groups. These effects could also reflect within-firm wage differentials between workers based on their expected utilization of health care services. Our data are uniquely suited for estimating how both salary and premium copayments adjust within districts over time because we have information on the distribution of teachers' experience within each school district for the final seven years of our study period. We use individual teacher-level data from the Illinois Board of Education's Teacher Service Records (TSR). These are administrative data reported by districts to the state Board of Education and contain one record per teacher, administrator, and staff member in the school. The data contain information on the highest degree held; years of experience in the district, state, and out of state; and the individual's job, among other things. This data is available beginning in 2002.

To assess the differential impact of premiums on districts that employ higher-tenured teachers, we first compute the 20th–80th percentiles of the distribution of tenure within each district in each year. We then augment Eq. (2) with the seven values for these deciles of the experience distribution and the seven decile values interacted with a health insurance premium measure. We estimated models of both wages and copayments, but only models of the copayments showed statistically significant effects and so we focus on those. Panel A of Appendix Table A1 shows results from two models: the dependent variable in the first column is the copayment for family insurance and the premium measure is the premium for family insurance. The dependent variable in the second column is the sum of the copayments individual and family insurance and the premium measure is sum of premiums for individual and family insurance. The remaining rows show the coefficients on the main effects of the 20th–80th percentiles of each districts tenure distribution and the interactions between these and the premium measure. In both models, the main effects and interaction effects are jointly statistically different from zero.[25]

Table 5 translates the estimates in Appendix Table A1 by reporting $\partial(\text{Family Copay})/\partial(\text{Family Premium})$ evaluated at hypothetical teacher tenure distributions that correspond to a "less experienced", "average experienced", and "highly experienced" teacher workforce. These distributions of teacher experience are presented in Panel B of Appendix Table A1 and correspond to the 25th, 50th, and 75th percentiles of each point in the tenure distribution across districts. For example, the top row of Panel B indicates that the 25th, 50th and 75th percentiles of the 20th percentile of the within-firm distribution were equal to 3, 4 and 6 years. The first column indicates that our hypothetical district with a "less experienced"

[24] These estimates are available upon request.

[25] We also estimated simpler models with interactions between the premium and just the district's mean or median level of teaching experience. These interaction terms were statistically significant in all of the teacher copay models and the magnitudes of the estimated effects were larger for the model with mean tenure, but both estimates of the offset effects were smaller than the estimates using the seven points of the tenure distribution. This indicates the copay offset effect depends on the overall shape of the experience distribution.

Table 5
The estimated impact of the teacher tenure distribution on ∂Teacher Copay/∂Premium.

	∂Teacher Copay/∂Premium evaluated at:			1 year rightward shift in the experience distribution
	Low experience: $f_{.25}(.2)$, $f_{.25}(.3)$, $f_{.25}(.4)$ $f_{.25}(.5)$, $f_{.25}(.6)$ $f_{.25}(.7)$, $f_{.25}(.8)$	Average experience: $f_{.5}(.2)$, $f_{.5}(.3)$, $f_{.5}(.4)$ $f_{.5}(.5)$, $f_{.5}(.6)$ $f_{.5}(.7)$, $f_{.5}(.8)$	High experience: $f_{.75}(.2)$, $f_{.75}(.3)$, $f_{.75}(.4)$ $f_{.75}(.5)$, $f_{.75}(.6)$ $f_{.75}(.7)$, $f_{.75}(.8)$	
∂Family copay/∂family premium	0.4072 (0.0374)	0.4634 (0.0364)	0.5576 (0.0512)	0.0314 (0.0126)
∂(Individual + family copay)/∂(Individual + family Premium)	0.3433 (0.0372)	0.3972 (0.0377)	0.4973 (0.0536)	0.0334 (0.0133)

Note: Standard errors in parentheses. Calculations based on parameter estimates reported in Appendix Table A1.

workforce had a median value of teacher tenure of nine years. The "average experienced" district had a median value of 11 year and the "highly experienced" district had a median tenure of 14 years.

The first row of Table 5 shows ∂(Family Copay)/∂(Family Premium) is equal to $0.41 in the "less experienced" workforce, $0.46 for the average workforce and $0.56 for the "highly experienced" workforce. That is, districts with longer-tenured teachers tend to have larger premium copayments. The larger gap between the average and more experienced workforce compared to the gap between the less experienced and average workforce is because the difference in years of experience for most of the seven decile values is greater between the 75th and 50th percentiles than between the 25th and 50th percentile. The last column of numbers shows the estimated effect of aging any of the distributions by one year. A rightward shift of the experience distribution by one year increases the copay by three cents for every dollar increase in the family premium.

The second row of Table 5 show estimates of ∂(Individual + Family Copay)/∂(Individual + Family Premium); the change in the total copay for teacher and family coverage with respect to a change in the total cost of covering both the teacher and his/her dependents. Compared to the first row, which shows the marginal change in the copay relative to a change in the marginal cost of family coverage, these copayment offsets are about six percentage points smaller for each of the three tenure distributions. Finally, the estimated effect of a one year shift in the tenure distribution is only slightly larger ($0.031 versus $0.033). This suggests that virtually all of the effect of the teacher experience distribution on the total copay for self and dependent coverage is due to the impact of experience on the marginal change in the family copay response to a marginal change in the cost of the family coverage premium.[26]

These results are consistent with the results reported in Tables 2–4; all the adjustment in cash compensation to changes in health insurance premium costs come through changes in teacher premium copayments rather than adjustments to salary. The estimates indicate that the teachers in districts with a more experienced and older workforce place a greater value on the health benefits associated with higher family premiums relative to a district with a less experienced and younger workforce.

6. Understanding how health insurance costs influence school districts

Teachers' premium copayments account for about 17 percent of the cost of individual insurance and about 46 percent of the cost of family insurance. Based on our estimate, the tax exclusion can account for perhaps 25 percent of the cost. This implies that a potentially large share of the incidence of health insurance costs falls on the district. This section first explores alternative hypotheses that could explain how schools respond to increased health insurance costs. We conclude by estimating the effect of premiums on districts' total spending on fringe benefits.

When faced with higher compensation costs, do districts simply move up their labor demand schedule and hire fewer teachers? Estimates presented in Table 6 indicate that the answer is no. This table reports results of regressions of the log of the number of teachers in a district on the log of various compensation measures. These models all include district fixed effects and the log of average daily attendance in the district, the log of real assessed value of local property per student in the district, and the log of real federal and state aid to the district per student. These are essentially regressions of quantities on prices and are therefore potentially subject to the standard concerns about simultaneity. However, because we are dealing with union-negotiated contracts where teachers have negotiated a wage premium above market wages, if school boards are free to set employment levels, these estimates reflect movement along the labor demand curve.[27] The model in column 1 separately includes the log of the salary for a teacher with an M.A. and 10 years of teaching experience, the log of the premium for individual health insurance, and the log of teachers' premium copayment. None of the compensation variables are statistically associated with the log of the total number of teachers in the district. Columns 2 and 3 present results from alternative specifications. Column 2 includes the log of salary and the log of the difference between the health insurance premium and the teacher's copayment. Column 3 simply includes the log of the salary plus the individual health insurance premium less the teacher's copayment. Neither of these specifications reveal any statistically significant correlation between the number of teachers and measures of compensation.

The remaining columns of Table 6 report the relationship between compensation measures and the number of pre-kindergarten, kindergarten, elementary school, and secondary school teachers, and teachers in ungraded classrooms (such as music teachers). While some of these models do show a statistically

[26] We formally confirmed this conclusion by including the tenure interaction terms in the Individual copay = f(individual premium) model. The experience and experience by individual premium terms were jointly insignificant in this model.

[27] This ignores two potentially confounding factors. First, employment will not fall on the district's labor demand curve if the parties bargain for the more efficient contract that sets both salaries and employment levels rather than just compensation levels (Brown and Ashenfelter, 1986; MaCurdy and Pencavel, 1986) For a discussion of this literature see Pencavel (1991) and Booth (1995). Second, many of the school districts in the state are in lightly populated rural areas where districts may have some monopsony power. We leave these issues for later research and view our estimates as suggestive of a relationship between compensation costs and employment levels.

Table 6
Regression estimates of the effect of components of compensation on the number of teachers in a district.

Independent variables in logs	Log of the number of teachers in each district, by teacher type							
	Total teachers	Total teachers	Total teachers	Pre-kindergarten	Kindergarten	Elementary school	Secondary school	Ungraded
Salary for a teacher with an MA & 10 years of experience	0.0289 (0.0314)	0.0352 (0.0314)		0.253 (0.296)	0.248* (0.138)	0.0929* (0.0495)	-0.0809 (0.0792)	-0.156 (0.112)
Premium for individual insurance	-0.0024 (0.0057)							
Teacher's premium copayment for individual insurance	0.0029 (0.0029)							
Premium less teacher copayment		-0.0009 (0.0043)		-0.0611* (0.0323)	-0.0208 (0.0195)	-0.0063 (0.0070)	0.0215** (0.0104)	-0.0361** (0.0165)
Salary plus premium less copayment			0.0233 (0.0309)					
Observations	3,075	3,049	3,075	1,193	2,412	2,468	1,860	2,186
Districts	646	645	646	344	548	560	506	555
District fixed effects?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Sample only includes districts that offered insurance in all contracts. All models contain control variables described in the text. Robust standard errors in parentheses are clustered by school district.
*** $p < 0.01$.
** $p < 0.05$.
* $p < 0.1$.

significant relationship between the district's health insurance cost and the number of teachers, the effect sizes are uniformly small and of inconsistent signs: In two models the premium is negatively associated with the number of teachers; in one model the premium is positively associated with the number of teachers; and in two models the coefficient on the premium is not statistically different from zero. We have also run models of the log of the number of non-teacher employees, such as guidance counselors, administrators, and staff, on the teachers' compensation measures and similarly found no evidence of a relationship. We conclude that increased health insurance costs do not seem to lead to reductions in the number of school employees.[28]

Changes in health insurance costs may lead to changes in other margins of compensation. The salary survey contains information on a number of other terms of employment, including whether the district offers a severance pay, an early retirement program, whether teachers are reimbursed for their expenses related to obtaining additional college credit, whether teachers receive any paid leave for personal reasons, whether teachers receive paid sick leave, and whether teachers can accumulate sick time. The survey also contains total premiums for dental, life, vision, and supplementary disability insurance policies and the fraction of the premium that is paid by the school district. To assess whether health insurance premiums are correlated with these other margins of compensation, we ran regression models that are similar to our main specification (Eq. (2)) and modeled these outcomes as a function of the premium for individual health insurance, the three covariates that have appeared in all of our models, time fixed effects, and district fixed effects. (For the sake of brevity, we do not report these results but they are available upon request.) With one exception, all of these models indicate no statistically significant relationship between changes in health insurance premiums and changes in other margins of compensation. Indeed, all of the point estimates are close to zero. (The one exception is that a $1000 increase in health insurance premiums is associated with a 1.3 percentage point increase in the probability that a district offers severance pay relative to a base rate of 16.6 percent. While this is potentially intriguing, the results in Table 6 indicate that premiums are not associated with a decline in the number of teachers.)

Finally, we also ran models of teacher's contribution toward individual and family dental, disability, life, and vision insurance as a function of the premium for individual health insurance, the covariates, year, and district fixed effects. With one exception, all of these models indicate that health insurance premiums are uncorrelated with teachers' contributions toward other types of insurance.[29] The one exception is that a dollar increase in health insurance premiums is associated with a nine-tenths of a cent increase in teachers' contributions toward family dental insurance, with a standard error of five-tenths of a cent. Although statistically different from zero, this effect is economically very small. Overall, we see little evidence that changes in health insurance premiums lead to changes in other margins of compensation.

How do rising premiums affect districts' total spending on fringe benefits? We extracted data on total district fringe benefit costs for instructional employees from the detailed expenditure information filed with the Illinois State Board of Education by each district between 2001 and 2007. According to the *Illinois Program Accounting Manual for Local Education Agencies*, districts are to report total spending on fringe benefits (including health insurance) net of employee contributions toward the cost of these benefits.[30] The publicly available data does not separately identify spending on health benefits from spending on other benefits. We regressed the inflation-adjusted fringe benefit expenditures per full-time equivalent teacher on inflation-adjusted premiums and the set of controls used throughout this study. These results are presented in Table 7. Models that include district fixed effects indicate that dollar increase in the real premium for individual coverage raised fringe

[28] Districts could also respond to rising health insurance premiums by substituting younger teachers for older ones. We investigated this by regressing the percentiles of the distribution of teacher experience on health insurance premiums, also controlling for teacher salary, district fixed effects, and the three covariates included in previous models. We found no relationship between changes in premiums and changes in the distribution of teacher tenure. This is consistent with districts opting not to adjust their workforce in response rising health insurance costs. We also note, however, that these regression may confound any effect of premiums on the districts workforce with the effect of teachers' age on premiums.

[29] These results are available upon request.

[30] The current manual is available at http://www.isbe.net/sfms/pdf/ipam.pdf (accessed 16.07.15). Codes 200 through 230, which are described on page 76 and 77, are for fringe benefits.

Table 7
Regression estimates of the effect of health insurance premiums on fringe benefit costs per FTE, 2001–2007.

Premium for individual insurance	0.267***	0.154***			0.248***	0.158***
	(0.067)	(0.040)			(0.079)	(0.047)
Premium for family insurance			0.080***	0.028**	0.013	−0.003
			(0.026)	(0.015)	(0.030)	(0.018)
Observations	1774	1774	1774	1774	1774	1774
District fixed effects?	No	Yes	No	Yes	Yes	Yes

Notes: Sample only includes districts that offered individual and/or family insurance in all contracts. All models contain control variables described in the text. In models without fixed effects, robust standard errors in parentheses are clustered by school district.
*** $p < 0.01$.
** $p < 0.05$.
* $p < 0.1$.

benefit costs per employee by about 15 cents. A dollar increase in the premium for family coverage had no discernable effect on fringe benefit costs per employee. Note that the sum of our estimates of the incidence that falls on teachers and on districts is less than one. This could reflect a number of factors, including measurement error in premiums, shifting to less expensive health plans in response to rising premiums, or other offsets that we have not measured.[31]

7. Would having data on all district health insurance plans influence our conclusions?

The key limitation of the Illinois teacher salary data is that the survey instructs districts that offer more than one health insurance plan to report the premium for the most expensive plan. To the extent that districts offer multiple health insurance plans, and to the extent that the premiums do not move together across plans, then our estimates in Tables 2 and 3 likely understate the true correlation between premiums and salary. We use two additional sources of information to assess the empirical significance of this limitation in the data: First, we obtained the current teacher contract from 623 districts in Illinois. This represents 70.7 percent of the 879 districts in Illinois. We are able to match 542 of the 623 contracts to districts that are in our analysis sample. The 81 contracts that remain unmatched are mainly special education districts that were excluded by design in our original sample. Second, we study the trade-off between salary and health insurance among school districts that participated in a self-insured insurance pool.

Our examination of the contracts indicates that 154 of the 623 districts (24.7 percent) contain language that clearly indicates that the district currently offers multiple healthcare options. For example, the contract might specify separate premium contributions for an HMO and a PPO, or refer to “plans” (in the plural). The remaining 469 districts probably only offer one health plan, although the contract language does not always make this entirely clear. Sometimes the contract specifies terms of the health plan (such as the deductible and co-insurance rates) and it is clear that there is only one health plan. Other contracts state that the district will provide “a health insurance plan” (in the singular), and provide information on the district’s contribution to the premium. It is possible that some of these districts do, indeed, offer multiple options and have a fixed-dollar contribution or a fixed percentage contribution toward each plan, but nevertheless have vague language in the contract that simply refers to a “a health insurance plan”.

We re-ran the fixed-effects regression described by Eq. (2) of wages and premium copayments on health insurance premiums using the subsample of districts for which we have a current contract, and then excluding those districts that currently offer multiple health insurance plans. The point estimates from these models are virtually identical to those reported in Tables 2–4. That is, within-district changes in health insurance premiums are uncorrelated with changes in salaries and teachers pay about 17–26 percent of the individual health insurance premium, and about 46 percent of the family premium, directly through premium copayments.[32]

We gain additional insight into the robustness of our main results by focusing on the 173 districts in the southern half of the state that participate in the Egyptian Area Schools Employee Benefit Trust. This is a self-insured health insurance trust that pools contributions across member schools. These are largely districts in rural areas and small towns and thus less than five percent of students in the state attend these schools. The trust began in 1984 and offered teachers a single health insurance plan. Beginning in 2005, the Trust offered member districts three plans (called Platinum, Gold, and Silver); in 2008 a Bronze plan was offered. We have data on enrollment by district and plan in 2013 and most teachers were enrolled in either the Platinum or Gold plans (the most expensive plans).

We also have information on premiums for each plan in each year. The premiums for all districts in the Trust for a specific plan were identical; no experience rating or underwriting at the district level was undertaken to account for the claims history or teacher demographics in a district. Importantly, the relative costs of the Platinum, Gold, Silver, and Bronze plans have remained virtually identical since their introduction in 2005 (and 2008 for the Bronze plan). The premiums for the Gold, Silver, and Bronze plans are 90 percent, 78 percent, and 66 percent of the premium for the Platinum plan. To the extent that this similarity in premiums across tiers is common in other districts that offered multiple plans, it implies that our estimates from the whole state would not be different if we had access to premium information for all plans.

We estimated regression models of salaries and copayments that just use districts that participated in the Egyptian Trust during the period when the Trust offered a single health insurance plan. For this sample we know that premiums are determined by the claims experience of all 170+ districts and do not reflect idiosyncrasies of a particular district that may also be correlated with changes

[31] We also used data from the National Center for Education Statistics’ School Finance Survey to verify some of our results. This data contains aggregate school budget variables, such as total annual revenue and expenditures, by category, though it does not separate spending on health insurance from spending on other employee benefits. We found that total spending on employee benefits is positively associated with health insurance premiums and with total instructional spending in regression models that also control for the district-level covariates, year effects, and districts effects. Consistent with the regressions reported in the text, we found no association between premiums and spending on salaries for instructional staff.

[32] All of the estimates described in this section are available upon request.

in wages.[33] Although the standard errors on these estimates are somewhat large since the sample size is smaller, the point estimates in the wage regressions remain near zero and the effect of the premiums on teachers' contributions toward individual health insurance premiums are similar to those reported in Table 4. The only anomalous results are for the premium contributions for family insurance, which vary a lot across models.

Our conclusion from these analyses is that our conclusions from Tables 2–4 about the relationship between health insurance premiums, premium copayments, and salaries are not influenced by the fact that data in the Illinois teacher salary survey only contains information on the premium of the most expensive health plan. As a final check, we ran models similar to those in Tables 2–4 just using data from the 1990s, when we presume that districts were less likely to offer multiple plans. Again, we reach the same conclusion that changes in wages within a district are uncorrelated with changes in health insurance premiums.[34]

8. Discussion and conclusions

Health insurance premiums for Illinois public school teachers increased dramatically over the past twenty years, just as they did nationally. Our analysis indicates that teachers' take-home pay is reduced by approximately 17 percent of the cost of individual health insurance, and 46 percent of the cost to insure family members. These offsets occur entirely through premium contributions and are larger in districts with relatively higher-tenured teachers. Changes in premiums within a district over time are uncorrelated with changes in salaries. These patterns are remarkably similar to those of Anand (2011), who found a 52 percent offset through premium copayments and no effect on wages. Our results are also consistent with Clemens and Cutler (2014), who study changes in benefit costs across school districts nationwide and estimate a 15 percent salary offset that is not statistically distinguishable from zero.

Our analysis of district financial data indicates that a dollar increase in the premium for individual health insurance leads to about a 15 cent increase in districts' spending on fringe benefits. Since spending on other, non-health benefits do not change, we interpret this finding as corroborating the view that some of the incidence of changes in benefit costs is indeed born by districts. Importantly, though, changes in the premium for coverage for family members has no effect on districts' spending on fringe benefits. In combination with teachers' higher premium contribution for family insurance, it is likely that the incidence of changes in the premium for family members largely falls on teachers.

We offer two potential interpretations for why school districts appear to bear some of the incidence of changes in health insurance costs. First, the costs and valuation of public-sector benefits may somewhat "shrouded" from the view of taxpayers (Glaeser and Ponzetto, 2014). School districts may be more able to secure revenue from the state government or from local taxpayers to fund benefit increases than to fund salaries. An implication of Glaeser and Ponzetto's model of shrouded benefits is that public-sector benefits may be overly generous and marginal spending on benefits is valued at less than its cost. A lack of full valuation of marginal spending implies that teachers would not accept a full wage offset.

Several previous studies are consistent with this interpretation. Evidence presented by Royalty (2008) indicates that employees highly value observable measures of health plan generosity. The widely cited paper by Gruber (1994) can be interpreted to show employees only accept wage offsets when premiums increase when they value the medical care changes driving the premium increases. Gruber finds a complete wage offset for the cost of maternity care among married women of child-bearing age when states required that insurance policies cover maternity costs. This conclusion was based on a "difference-in-difference-in-difference" estimator comparing the difference in wage changes before and after the state mandates between married women 20–40 years old and men either over 40 or single men 20–40 years old There was a significant wage decline for females after the mandate was passed, but for the comparison group of men there was not a significant change in mean wages This suggests the control group of men placed no value on the health benefits provided by maternity coverage. However, since married women of childbearing age are not employed in gender segregated establishments, firms employing both men and women faced higher premium costs because of the maternity mandate but only married women 20–40 years old valued these benefits as indicated by their willingness to accept lower wages following the mandate. Finally, our estimates that show more experienced and older teacher workforces are willing to accept higher premium copayments when premiums increase compared to less experienced workforces is consistent with the previous research that shows wage offsets only for demographic groups that value the benefits changes driving the premium cost increases.

A second potential explanation for our results is that both employees and employers are concerned about the uncertain changes in future health insurance costs. If changes in the cost of health insurance are driven by factors that are difficult to forecast, then teachers and the district will want to share the risks associated with uncertain year-to-year premium increases. A full wage offset, as predicted by the traditional model of employee benefits, implies that employees bear all of the risk associated with uncertain health insurance costs. If local taxpayers are more able or willing to take on some of these risks, then we would expect to find less than full wage offset. Testing between these two explanations for less than a full wage offset for health insurance premiums will require better data on the characteristics of insurance policies and the factors generating changes in insurance premium costs.

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Appendix A.

See Table A1.

[33] We cannot include year fixed effects in these models since all districts in this sample face the same premium in a given year. Instead, we control for a linear time trend that that captures the fact that both health insurance premiums and wages are trending upwards (in real dollars) over time.

[34] We also ran models that looked at the relationship between changes in premiums for dental, vision, insurance and salary. Unfortunately, there is not sufficient within-district variation in dental insurance over time and thus the standard errors in these models were too large to learn anything substantive.

Table A1

	Panel A: Estimates of the Teacher Experience Distribution on Premium Copays		Panel B: Experience Values for Low, Average, and High Distributions (years):		
	Family Copay	Individual + Family Copay	$f_{.25}(.)$	$f_{.50}(.)$	$f_{.75}(.)$
Premium	0.150	0.0767			
	(0.141)	(0.143)			
20th Percentile of experience	169.2	237.3	3	4	6
	(238.7)	(358.1)			
30th Percentile of experience	−491.6*	−750.3*	5	6	8
	(252.9)	(389.4)			
40th Percentile of experience	−125.2	−153.6	7	9	11
	(264.6)	(410.3)			
50th Percentile of experience	337.2	422.1	9	11	14
	(240.0)	(374.6)			
60th Percentile of experience	−96.37	−155.4	12	15	18
	(206.3)	(322.0)			
70th Percentile of experience	−59.85	−5.110	15	19	23
	(166.2)	(262.9)			
80th Percentile of experience	−89.46	−158.1	20	24	27
	(121.1)	(181.3)			
20th percentile × Premium	−0.0217	−0.0174			
	(0.0203)	(0.0209)			
30th percentile × Premium	0.0584**	0.0551**			
	(0.0230)	(0.0239)			
40th percentile × Premium	0.00542	0.00376			
	(0.0248)	(0.0258)			
50th percentile × Premium	−0.0366*	−0.0304			
	(0.0213)	(0.0226)			
60th percentile × Premium	0.0214	0.0200			
	(0.0184)	(0.0196)			
70th percentile × Premium	0.00478	−0.0007			
	(0.0156)	(0.0166)			
80th percentile × Premium	−0.0003	0.00307			
	(0.0106)	(0.0109)			
P-value for joint significance of interaction terms	0.0092	0.0261			
P-value for joint significance of exper and exper × prem interaction terms	0.0216	0.0544			
Observations	1056	1056			
Number of Districts	460	460			
District fixed effects?	Yes	Yes			

Notes: The premium measure in the first column is the additional cost to cover teachers' family members. The premium measure in the second column is the sum of the individual premium and the family premium. Standard errors in parentheses.

*** $p < 0.01$.

** $p < 0.05$.

* $p < 0.1$.

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