

Jurisdictional Competition, Market Power, and the Compensation of Public Employees*

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January 9, 2021

Abstract

Jurisdictional competition can encourage government efficiency but may also lead to collective action problems (e.g., bidding wars) that increase taxpayer costs. The net effect is particularly consequential for the cost of public employee compensation, which accounts for more than half of local government spending. Using two decades of U.S. teacher salary data and changes in local teacher labor markets over time, I show that jurisdictional competition is associated with lower teacher salaries. One mechanism consistent with the evidence is that competitive markets help detect and deter inefficiency through “yardstick competition.” The findings suggest that the public may be better off under a decentralized regime compared to a system that allows for greater coordination and collusion among jurisdictions. The results have implications in other policy debates that involve government agencies using centralized buying power to achieve cost savings.

Keywords: jurisdictional competition, Tiebout choice, government efficiency, monopsony, public employee compensation

Word Count: 7,117

*An earlier version of this manuscript was circulated under the titled “Who Benefits from Jurisdictional Competition?” and greatly benefited from feedback from Sarah Anzia, Amy Bridges, Beth Garrett, Roger Gordon, Terry Jones, Thad Kousser, Stéphane Lavertu, Isaac Martin, Mat McCubbins, Julia Payson, and Zac Peskowitz and participants in the 2020 Local Political Economy Conference.

Just as market competition produces an economic system responsive to consumer needs, interjurisdictional competition can produce a government system responsive to voter desires.

—U.S. Advisory Commission on Intergovernmental Relations (1991)

You have 50 states competing to buy the same item. We all wind up bidding up each other and competing against each other, where you now literally will have a company call you up and say, “Well, California just outbid you.” It’s like being on eBay with 50 other states, bidding on a ventilator.

—New York Governor Andrew Cuomo (2020)

Political economy models often conceptualize governments as quasi-firms that supply public goods and services in exchange for taxes. If public agencies effectively hold monopolies, budget-maximizing bureaucrats may provide inefficient levels of service at exorbitant costs (e.g., Niskanen 1971). Such concerns provide one motivation for political decentralization. When jurisdictions must compete, constituents can vote with their feet (Tiebout 1956) — not just through the ballot box — to achieve better policy responsiveness. The mere threat of exit can also constrain tax rates and promote government efficiency (Peterson 1981).

Such accounts, while enlightening, abstract away from how public agencies actually procure the goods and services they provide. In many cases, government officials act merely as middlemen and negotiate contracts on their constituents’ behalf through private markets. As the struggles of many U.S. states and the federal government to obtain personal protective equipment during the COVID-19 crisis clearly demonstrated, jurisdictional competition could complicate this process and lead to bidding wars that increase cost and reduce the welfare of voters, the opposite of what many theoretical models would predict.¹

This study examines how competition among governments impacts the labor market for

¹Competition among local governments to generate sales tax revenue from big-box retailers (Lewis 2001), attract major league sports teams (Rosentraub 1997), and win big conventions (Sanders 2014) often produces similar welfare losses for voters.

public employees. Although scholars have long recognized that jurisdictional fragmentation can create collective action problems and generate policy externalities (e.g., Berry 2008, Hansen, Miller and Weber 2020, III, Konisky and Woods 2017), the research is largely silent on how these processes play out in the context of government employment. Many public services are highly labor intensive — with employee wages and benefits accounting for a majority of local government expenditures² — making the dynamics of public-sector compensation especially consequential for government efficiency. A number of public-sector occupations, such as teacher or police officer, also require formal licensure or highly specialized (and costly) training, limiting the pool of new hires and potentially creating incentives for public agencies to recruit workers from neighboring jurisdictions.³

Evidence from the private sector illustrates how local labor market competition can influence bargaining between firms and workers over compensation. When a small number of employers accounts for an overwhelming share of jobs in a region or industry, research shows that firms can use their market power to negotiate down wages for workers. For example, Azar, Merinescu and Steinbaum (Forthcoming) analyze online job postings and show that advertised wages are considerably lower in concentrated labor markets where a few employers dominate hiring. Benmelech, Bergman and Kim (Forthcoming) similarly find that increasing labor market concentration results in lower average wages in the manufacturing sector. Indeed, President Obama’s Council of Economic advisors warned that growing “monopsony”⁴ in labor markets has contributed to rising income inequality by “shifting the balance of bargaining power towards employers” (Council of Economic Advisers Issue Brief

²In 2017, salaries and wages alone accounted for nearly \$700 billion of the \$1.5 trillion spent on direct operations by local governments, according to the Census of Governments. This figure excludes the costs of health insurance and pension benefits.

³Hiring an already trained police officer from a neighboring jurisdiction provides considerable cost savings compared to recruiting a new cadet given the high cost of police academies, for example. The Police Foundation estimates training takes up to 18 months and could cost up to \$100,000 per cadet.

⁴While “monopolies” are characterized by imperfect competition in the supply of goods and services, “monopsonies” refer to market concentration on the buyer side.

2016).

Anecdotal examples suggests that governments may also be responsive to labor market competition. Consulting firms such as Koff & Associates specialize in conducting comparative salary studies in the public sector that are often used in collective bargaining. And Anzia and Moe (2015) find that cities paying below-average salaries to public safety personnel respond to competitive pressures by awarding larger raises than their neighbors.

In this study, I examine how the degree of competition government agencies face for recruiting and retaining their employees affects their compensation practices. My empirical analysis focuses on public school teachers, who are thought to be particularly vulnerable to employer market power. Because women make up a disproportionate share of the educator workforce and are often the second wage earners in their households, economists have long argued that teacher labor markets are highly localized because most teachers cannot easily relocate to areas with better compensation (Landon and Baird 1971, Murnane and Steele 2007). In regions with few outside options, school districts can theoretically leverage their market power to drive down teacher wages and increase efficiency, reducing the tax burden for constituents or redirecting savings to other services valued by parents and voters. In competitive markets, by contrast, individual school systems may be constrained by their neighbors — paying less could mean losing their best teachers to other nearby schools.

Using two decades of U.S. teacher compensation data and a panel design that leverages changes in labor market conditions within counties over time, I find no evidence that school districts take advantage of market power to achieve cost savings for taxpayers when the opportunity arises, however. Instead, I show that average teacher salaries actually *increase* substantially when local labor markets become more concentrated. This effect is non-linear, with the largest wage gains found in the most concentrated labor markets, the opposite of what economic theory would predict and what has been found in the private sector. To rule

out alternative explanations, including the possibility that more productive, higher-paying districts gain enrollment over time, I replicate the analysis at the school district level. Examining within-district changes nets out compositional shifts within labor markets over time that could bias the aggregate-level estimates. Strikingly, I show that individual school districts update teacher wages in response to changes in the local labor market — but not in response to changes in their own market share. In probing other potential mechanisms, I also find little evidence that the effects are substantially larger in contexts where we might expect employees to have more political clout — in states with strong collective bargaining laws or in school districts that utilize low-turnout, off-cycle elections to elect their boards.

The results reinforce the conclusion that managers and administrators in the public sector face fundamentally different incentives that affect the bargaining over employee compensation. Whereas private firms are strongly motivated to reduce cost to increase profits, government officials respond mainly to reelection pressures that can require balancing the interests of voters and taxpayers with demands from other politically influential interest groups, including public employees (see Moe 2006). My findings suggest that the relative balance of these considerations can be affected by local competitive conditions. One way that reduced jurisdictional competition can lead to higher salaries is by undermining constituents' ability to identify and punish government inefficiency. If voters look to *relative* performance and compare nearby jurisdictions to detect wasteful spending, a strategy known as “yardstick competition” in the literature (Besley and Case 1995, Gottlieb 2015), making such comparisons becomes more difficult as the number of comparable peer jurisdictions decreases. The non-linear effects are consistent with weaker “yardstick competition” representing one mechanism by which increased labor market concentration may translate to higher wages for public employees.

Although government fragmentation can create collective action problems, the findings

suggest that voters may nevertheless be better off under a decentralized regime than under a system that allows for greater coordination and collusion among jurisdictions. The results are specific to employee compensation policy in the context of public education but may also have implications in other policy debates — such as over health care reform — where greater coordinated government buying power is often assumed to result in significant efficiencies and cost savings.

Background

Compared to most other developed nations, the American education system is defined by an unusual degree of decentralization. More than 13,000 school districts oversee elementary and secondary public education in the U.S., with considerable discretion over curriculum, disciplinary policies, and funding. At last count, these districts spent more than \$600 billion per year on operations alone and employed over 3.3 million teachers, with staff salaries and benefits accounting for 80 percent of total operating expenditures.⁵ Given the sums at stake, negotiating the terms of compensation with school employees is one of the core functions of elected school boards.

However, voters face a number of challenges in holding school boards accountable. First, many voters are misinformed about how much school teachers actually earn. For example, when asked to make their best guess about the typical salary of public school teachers in their state, respondents in the 2017 *Education Next* poll underestimated actual salaries by nearly \$18,000 on average, or more than 30 percent. Second, it is not obvious what teachers *should* get paid in the absence of rents. The labor-affiliated Economic Policy Institute regularly publishes analyses showing that teachers earn considerably less than

⁵These figures are from the National Center for Education Statistics, accessed at <https://nces.ed.gov/fastfacts/display.asp?id=66>.

other college graduates with similar levels of experience and education.⁶ Such comparisons may be misleading, however, because teachers typically receive their post-secondary degrees in lower-paying majors that tend to attract lower ability students as measured by average ACT/SAT and GRE scores (e.g., Arcidiacono 2004). By contrast, several studies utilizing administrative unemployment insurance records find that former teachers who have left the profession typically experienced a modest pay cut when they entered the private sector (Podgursky, Monroe and Watson 2004, Scafidi, Sjoquist and Stinebrickner 2006).⁷

Benchmarking a school district's compensation practices against its local peers is one way constituents can overcome the informational asymmetry in this context (Besley and Case 1995, Gottlieb 2015), in the same way that voters and parents can compare test scores among neighboring school systems to make inferences about relative educational quality (e.g., Gibbons, Machin and Silva 2013). Reback (2017) provides the most direct evidence that districts look to their peers when making decisions over fiscal policies. Comparing neighboring school systems located on different sides of state borders and leveraging exogenous changes in state education funding formulae, he finds that districts increase their own expenditures when their neighbors begin to spend more. The effect is largest for instructional expenditures and is especially pronounced in districts that rely on direct democracy to set tax rates, suggesting that voters themselves engage in relative benchmarking.⁸

Of course, all (or even most) voters need not pay attention to relative wages to enjoy the efficiency benefits of competition. School board members may rely on relative compensation data when evaluating the reasonableness of pay increase demands. Alternatively, Hoxby (1999) develops a model in which information about relative efficiency of school districts is

⁶See, e.g., <https://www.epi.org/publication/the-teacher-weekly-wage-penalty-hit-21-4-percent-in-2018-a-record-high-trends-in-the-teacher-wage-and-compensation-penalties-through-2018/>.

⁷Of course, teachers who leave may be unrepresentative of the broader educator workforce. There is also considerable heterogeneity in the labor market outcomes of former teachers (Chingos and West 2012).

⁸Reback (2017) shows that higher salaries account for only a fraction of overall increase in instructional expenditures, however.

capitalized into property values and competition leads to productivity gains, even in cases where few residents actually move across district lines. In each of these scenarios, education markets influence the extent to which “yardstick competition” provides useful information, however. In areas with just one or two districts, the amount of comparative information available is obviously limited. The same is also true in districts facing more competition but where school systems vary substantially in their size — for example, a market with one large district surrounded by several smaller minnows — as dissimilar districts may not provide useful or informative counterfactuals.⁹

Of course, the potential informational benefits of competition may be offset by the more direct impacts on the labor market. As I summarize in the introduction, evidence from the private sector suggests that more competitive labor markets may benefit employees by increasing their bargaining power in negotiations over compensation. In the public sector, competition could similarly encourage jurisdictions to “bid up” wages to attract or retain workers. This may be particularly true in education due to long-run, ongoing shortages of qualified teachers — especially in STEM subjects and special education.¹⁰ For example, Jackson (2012) finds that the opening of nearby charter schools in North Carolina prompts traditional districts to increase teacher compensation in an effort to retain high-quality teachers. Just as a single-payer health care system can theoretically reduce costs by allowing the government to negotiate more favorable rates with providers, a concentrated teacher labor market could empower school districts to negotiate more favorable compensation terms with teachers, knowing that they have few outside options.

Motivated by the standard “monopsony” model of employee compensation from economics, there is a relatively large older literature that explores the impacts of labor market

⁹In the logic of the Hoxby (1999) model, these districts are likely to serve different “types” of families and students.

¹⁰Because teacher pay scales typically do not differentiate compensation based on individual teaching assignments, districts must compete by raising wages for all teachers, not just those in hard-to-staff fields.

concentration on teacher salaries (e.g., Medcalfe and Thornton 2006, Merrifield 1999). These studies have a number of methodological limitations, however. Nearly all tend to focus on a small number of school districts in a single state and are largely limited to cross-sectional variation in wages at a single snapshot in time, making them particularly vulnerable to omitted variable bias. Perhaps as a result of these limitations, the existing studies have produced mixed findings, some showing that concentration reduces wages, others that it increases wages, and yet others that find null effects. Only Taylor (2010) examines panel data on teacher salaries, focusing on a subset of 670 school districts in Texas. The study finds a positive average effect of market concentration on wages, which masks significant heterogeneity: At high baseline levels of competition, increased concentration appears to reduce wages, while in already concentrated markets, further consolidation drives up wages.

I make several important contributions to this literature. I utilize national data over a 20-year period, covering many more labor markets, and leverage a research design that can more credibly isolate causal effects. In addition, I can directly examine specific mechanisms, showing that the compensation practices of individual school districts actually respond to changes in market competition.

Data

To analyze the relationship between labor market concentration and teacher compensation, I rely on detailed records from the National Center for Education Statistics' Common Core of Data. The panel covers the period between 1996 and 2016 and includes information on school enrollment, staffing, and finances from the full universe of U.S. public school districts.¹¹

¹¹The data excludes private schools but does include public charters.

Measuring Labor Market Concentration

Following much of the empirical literature, I measure market competition using a Herfindahl-Hirschman Index (HHI) of teacher employment concentration. Specifically, I begin by calculating each school district's share of total teacher employment measured in full-time equivalent (FTE) units in each county-year, $s_{d,c,t}$, with subscript d indexing districts. I then square each district's employment share and add up these squared shares within each county (c)¹² for each year (t) to construct the HHI:

$$\text{HHI}_{c,t} = \sum_{d=1}^D s_{d,c,t}^2$$

Theoretically, the index can range from 0 (representing a very large number of very small districts) to 1 (all teachers in a county working for a single district), with higher values corresponding to more concentrated labor markets.

For historical reasons, school district boundaries are required to be conterminous with county lines in some Southern states,¹³ with a single district educating all students in a county.¹⁴ By construction, the HHI is equal to one in these counties. I remove these Southern states from the sample and focus on regions where multiple districts typically serve students in the same county and where I can leverage meaningful variation over time.

During the 20-year period I examine, the median HHI in my sample was 0.34 with a standard deviation of 0.19. For perspective, this is roughly half the level of concentration Benmelech, Bergman and Kim (Forthcoming) document among industries in the private sector during the same time period. In other words, the labor market for the average teacher

¹²As a robustness check, I will also discuss results that use commute zones as the unit of analysis as well.

¹³In some cases, county governments themselves run the school system.

¹⁴This system has changed somewhat due to a number of high-profile Southern district secession efforts in more recent years. However, in these cases, the resulting changes in labor market concentration are less plausibly exogenous.

is considerably more competitive — with more employment options — than is the case for many workers in the private sector. Although the annual median remained unchanged over time — varying only between 0.33 and 0.35 — we do observe considerable over-time changes within individual counties. The standard deviation for the change in HHI between 1996 and 2016 is 0.12. I leverage these within-county changes in the empirical analysis.

Teacher Compensation

NCES surveys of school districts include questions about their aggregate expenditures across detailed categories. To calculate the average salary in a given county, I add up the total spending on instructional salaries for districts within the same county and divide by the total number of FTE teachers employed by districts in that county. These figures are adjusted for inflation and presented in real 2012 dollars. My main analysis focuses on average county-level salaries, but when examining mechanisms, I present analyses using district-level data as well. Average district salaries are calculated similarly — dividing total reported spending on instructional salaries by total number of teacher FTEs. NCES data also include spending on non-salary fringe benefits such as health insurance and pensions and I add these costs to the wages to examine average total compensation in some specifications.

While the NCES data provide nationwide geographic coverage, they are sensitive to misreporting by districts, particularly for very small jurisdictions (Brunner, Hyman and Ju 2020). To address this concern, I exclude a small number of observations with clearly implausible values.¹⁵

¹⁵Specifically, I drop counties (districts) that report an average salary of \$0 as well as observations that report an average salary of more than \$120,000 in the county (district) analyses.

Empirical Strategy

To investigate the relationship between market concentration and teacher salaries, I estimate a variant of the standard difference-in-differences model:

$$\log(\text{Salary})_{c,t} = \beta \text{HHI}_{c,t} + \gamma \mathbf{X}_{c,t} + \alpha_c + \delta_t + \epsilon_{c,t}$$

where $\log(\text{Salary})_{c,t}$ is the natural log of the average teacher salary in a county-year, $\text{HHI}_{c,t}$ is the index of market concentration, matrix $\mathbf{X}_{c,t}$ includes time-varying controls, and α_c and δ_t capture county and fiscal year fixed effects, respectively. The control variables include the share of public school students who are white, percent of students who qualify for free or reduced-priced lunch (capturing socioeconomic status) and the natural log of the total teacher FTEs employed in a county. I also cluster the standard errors by county to account for autocorrelation. With salary measured in logs, the coefficient β can be interpreted as the percent change in mean wages associated with full unit change in market competition. Dividing the coefficient by ten thus corresponds to the rough effect of a one within-county standard deviation change in market concentration observed in the data.

Because the county fixed effects absorb all unmeasured time-invariant characteristics, the model leverages changes in market concentration and average salaries over time to identify the effects. Nevertheless, there remain potential challenges to interpreting the estimates causally. One possibility is that students sort across districts within counties in a way that could confound the relationship. For example, if higher-paying districts are able to hire better teachers and provide a superior education, they might gain student enrollments from nearby districts. Over time, higher-paying districts would come to account for a larger share of teacher employed in a county¹⁶ and thus cause both the county-average wages

¹⁶Because student-teacher ratios vary only modestly, there is a very strong correlation between a district's share of student enrollment and its share of teacher employment.

and market concentration to increase in tandem. Alternatively, districts paying unusually high salaries maybe particularly inefficient or effective, consequently losing enrollments to nearby jurisdictions over time. This would also affect both the average county-level salaries and measured competition. In each of these hypothetical scenarios, we would observe an association between changes in market concentration and average wages measured at the county level even if there are no actual changes in district-level salaries. This could occur because a district’s share of teacher employment ($s_{d,c,t}$) is used to calculate the market concentration while also determining how much weight a district receives in the computation of the average county salary.

To account for such potential compositional changes, I also run the analysis at the school district level using the following specification:

$$\log(\text{Salary})_{d,c,t} = \beta\text{HHI}_{c,t} + \gamma\mathbf{X}_{d,c,t} + \alpha_d + \delta_t + \epsilon_{d,c,t}$$

with the dependent variable measured at the district level and district fixed effects replacing the county effects. The matrix \mathbf{X} includes the same time-varying controls but also measured at the school district level. This specification examines how the compensation practices of individual districts respond to changes in labor market competition in their home counties and is unaffected by changes in the relative market shares of high- and low-paying districts.

Table 1 reports summary statistics for all of the data used in the analysis. The top panel covers the the aggregate county-level sample, while the bottom panel is at the level of individual school districts.

Table 1: Summary Statistics

VARIABLES	(1) N	(2) mean	(3) sd	(4) min	(5) max
<i>Panel A: County-Level Sample</i>					
log(Salary)	38,296	10.93	0.196	9.834	11.69
log(Benefits)	38,296	9.669	0.460	8.351	11.76
log(Tot. Compensation)	38,296	11.19	0.236	10.07	12.23
HHI	38,296	0.367	0.186	0.0189	0.991
White (% of Enrollment)	38,296	75.97	23.38	0	100
Free/Reduced-Priced Lunch (% of Enrollment)	38,296	39.32	18.55	0	100
log(Teacher FTEs)	38,296	6.055	1.258	1.099	11.30
<i>Panel B: District-Level Sample</i>					
log(Salary)	240,021	10.96	0.284	3.594	11.70
HHI	240,021	0.250	0.169	0.0189	0.991
White (% of Enrollment)	240,021	74.90	28.01	0	100
Free/Reduced-Priced Lunch (% of Enrollment)	240,021	38.53	23.81	0	100
log(Teacher FTEs)	240,021	4.147	1.387	0	10.49
Market Share (%)	240,021	14.75	18.16	0.00249	99.53

Results

Table 2 presents the results from the market-level analysis. The first column focuses on average salary and finds a strong positive association between labor market concentration and pay. A standard deviation increase in concentration¹⁷ corresponds to a 3.2 percent increase in average teacher salaries. This effect is economically meaningful, equal to a roughly \$1,800 annual pay raise for each teacher. Importantly, it has the opposite sign of what one would predict on the basis of monopsony research from the private sector.

The remaining columns present comparable results for non-wage benefits and total compensation, which combines benefits and salaries. The relationship remains positive and highly significant for each component of the compensation package. The estimates imply that that a standard-deviation increase in market concentration translates into a \$2,100 increase in total compensation per teacher. To check the robustness of the results, I replicate these analyses using state-by-year (instead of year) fixed effects in the Supple-

¹⁷As noted above, I'm using the within-district standard deviation.

Table 2: Labor Market Concentration and Average Teacher Compensation

VARIABLES	(1) log(Salary)	(2) log(Benefits)	(3) log(Tot. Comp.)
HHI	0.269*** (0.0363)	0.199*** (0.0454)	0.238*** (0.0351)
Observations	38,296	38,296	38,296
R-squared	0.299	0.715	0.537
Number of Counties	1,870	1,870	1,870
Time-Varying Controls	X	X	X
County FE	X	X	X
Year FE	X	X	X

Robust standard errors clustered by county in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Control variables include percent of enrolled students who are white, percent free and reduced-priced lunch, and the log of total county teacher employment (FTEs).

mental Appendix (see Table A1). Although the point estimates are somewhat smaller, they remain positive and statistically significant.

To address the possibility that the aggregate relationships may be biased by compositional changes — with high-paying districts gaining or losing market share over time — Table 2 replicates the main results using school district-level data. The analysis examines changes in average salaries within districts over time. The first model replicates my main specification and again finds that greater labor market concentration is associated with higher average salaries, although the effect size is smaller. A one standard deviation increase in market concentration corresponds to a \$550 increase in average wages. In the second column, I further control for each school district’s market share — the fraction of a county’s total teachers that it employs. Strikingly, the effect of market share is a precisely estimated zero, while the effect of aggregate market concentration actually increases somewhat in size. In other words, teacher salaries respond to changes in the broader labor market for teachers, not individual districts’ hiring patterns and needs.

A causal interpretation of these results requires assuming that counties (or districts)

Table 3: Local Labor Market Concentration and Average Teacher Salaries, Within-District Results

VARIABLES	(1) log(Salary)	(2) log(Salary)
HHI	0.0756*** (0.0205)	0.0915*** (0.0244)
District Market Share		-0.000532 (0.000381)
Observations	240,021	240,021
R-squared	0.160	0.160
Number of School Districts	15,150	15,150
Time-Varying Controls	X	X
District FE	X	X
Year FE	X	X

Robust standard errors clustered by school district in parentheses
 *** p<0.01, ** p<0.05, * p<0.1

Control variables include percent of enrolled students who are white, percent free and reduced-priced lunch, and the log of total county teacher employment (FTEs).

would have followed parallel trends over time were it not for the changes in the local labor market conditions. Because my treatment variable of interest is continuous, this assumption is difficult to test visually by simply plotting event study coefficients as one would typically do with a dichotomous treatment. Instead, I estimate models that includes both a lag and three leads of HHI. These results are presented in Table A2 in the Supplemental Appendix. In the case of both the county- and district-level models, the lag and two of three leads are not significant and close to zero. In each specification, however, one of the three leads is significant — $t + 1$ for the county model and $t + 2$ for districts. Both significant coefficient have the opposite sign, suggesting a negative association between average salaries and future increases in market concentration, and are substantially smaller than the contemporaneous effect. Thus, it is unlikely that preexisting trends are driving the estimates.

Several additional analyses further strengthen the causal interpretation of these re-

sults.¹⁸ First, in a placebo specification, changes in labor market concentration have no effect on school district student enrollment. Second, one may be concerned that the control variables I include may themselves be “post-treatment” outcomes. Indeed, higher levels of market competition are associated with significantly lower employment levels, which I include as a control in my preferred specification. Removing these controls does not change the substantive results — in fact, the point estimates on competition become considerably larger.¹⁹ Third, the effect is not driven by the splitting or consolidation of school districts over time. Change in the number of districts explains less than 5 percent of the within-county variation in teacher labor market competition over time and is not itself associated with changes in average teacher salaries.

As an additional robustness check, I also re-estimate the results using the commute zone as the geographic bound of each labor market.²⁰ These are reported in Table A3 in the Supplemental Appendix. While both measures appear to matter — with higher levels of concentration associated with significantly higher wages — the effect of county-level labor market concentration is considerably larger.

Mechanisms

The results presented thus far pose a puzzle: Why does concentration in the labor market for public school teachers result in higher salaries, when the opposite is true in the private sector? Put differently, why don’t school districts use their market power to negotiate a better bargain for their taxpayers?

One possibility is that incumbent school board members do not face strong electoral

¹⁸All of these results are available upon request from the author.

¹⁹In addition, I find no significant impact on total spending because the reduction in employment levels appears to offset the increase in per-employee compensation.

²⁰While the cross-sectional correlation between county- and commute zone-level labor market competition is modestly correlated ($r = 0.4$), the over-time change in these measures are almost completely uncorrelated ($r = 0.12$ for the correlation between the first differences).

incentives to prioritize efficiency or perhaps must trade off these considerations against competing demands from interest groups. For example, educators are themselves heavily overrepresented on school boards. Shi and Singleton (2019) examine school board elections in California — a unique state in that candidates can voluntarily list their occupations on the ballot — and find that nearly one in five elected school board members self-identifies as a teacher. Using variation due to random ordering of candidate names on the ballot, they find that electing more educators to the school board results in higher teacher salaries, suggesting that interest groups play an important role in determining compensation practices and that school board members are not simply responding to the preferences of the median voter.

Even when teachers do not directly serve on local boards, teachers' unions remain very active in school board elections, including canvassing and phone banking, raising money, and offering endorsements. Moe (2006) finds that school board candidates endorsed by the teachers' union are much more likely to win. Indeed, a union's endorsement is more electorally beneficial than the perks of incumbency, he shows. If incumbents' electoral fortunes are closely tied to pleasing teacher interests, they may face strong cross-pressures when negotiating compensation. Although these cross-pressures are likely to exist regardless of the labor market context, Hoxby (2000) argues that districts in more competitive markets have stronger incentives to prioritize efficiency.²¹

If higher salaries observed in concentrated markets are due to greater agency loss, we would expect this effect to be most pronounced in contexts where teacher unions exercise more political power and where school board members face the strongest interest group pressures. Although I cannot examine these directly, I do look at two important proxies

²¹Although her focus is on market competition measured in terms of school district choice and student enrollment, student enrollment concentration and teacher labor market concentration are highly correlated ($r = 0.95$) in my data. That is not surprising, as school districts that hire a larger share of teachers in a region typically do so because they enroll a larger share of students.

that scholars have argued predict teacher union political influence. First, following Brunner, Hyman and Ju (2020), I examine differences in public sector unionization. Specifically, I identify states that require school districts to bargain collectively, as measured in the NBER Public Sector Collective Bargaining Law Data Set. Second, there is compelling evidence that teachers account for a larger share of the electorate, and thus may have greater political influence, in low-turnout elections. A number of studies find that school districts that elect their boards during off-year or off-cycle elections pay teachers more compared to districts that utilize even-year, November elections (Anzia 2011; 2012, Berry and Gersen 2011). To capture these dynamics, I examine the interaction between labor market concentration and election timing, utilizing Anzia’s (2011) state-level coding.

The results of these analyses are presented in Table 4. The first column provides evidence that the effect of market concentration is somewhat larger in states with duty-to-bargain laws, although the interaction is not statistically significant. Importantly, however, this accounts for only a small part of the overall effect, with a large positive relationship even in states with weaker collective bargaining laws. The second column breaks down the results by election timing, with states using uniformly off-cycle elections representing the baseline category. Although the effect does appear to be smaller in states where timing of school board elections varies, it is actually largest in states with on-cycle timing, where teachers represent the smallest share of the electorate (see Kogan, Lavertu and Peskowitz 2018). While admittedly suggestive rather than definitive, this evidence does not suggest that the association between market concentration and compensation is due to interest groups exercising greater influence in less competitive markets.

In the last column of Table 4, I examine whether the impact of market concentration is moderated by the ability of districts to recruit new teachers from the private sector, taking advantage of the passage of the No Child Left Behind Act in 2001. Most relevant for the

present analysis, the law required that students be taught only by “highly qualified” teachers, defined as teachers who obtain state certification and demonstrate content knowledge in their area of instruction. The main impact of this provision was to discourage districts from hiring teachers without formal certification, using emergency certificates or temporary waivers, thus further restricting the available teacher pool and perhaps making the competitive structure of the labor market for existing teachers a more binding constraint. I do find evidence that the effect of labor market concentration on salaries became somewhat stronger after NCLB, although the substantive magnitude is small and arguably has the wrong sign.²²

Table 4: Testing Mechanisms: Collective Bargaining, Election Timing, and NCLB

VARIABLES	(1) log(Salary)	(2) log(Salary)	(3) log(Salary)
HHI	0.235*** (0.0655)	0.236*** (0.0464)	0.255*** (0.0371)
HHI * Duty to Bargain	0.0453 (0.0783)		
HHI * Mixed Timing		-0.113 (0.104)	
HHI * On-Cycle Timing		0.211*** (0.0733)	
HHI * Post-NCLB			0.0191** (0.00955)
Observations	38,296	38,296	38,296
R-squared	0.299	0.301	0.299
Number of Counties	1,870	1,870	1,870
Time-Varying Controls	X	X	X
County FE	X	X	X
Year FE	X	X	X

Robust standard errors clustered by county in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Control variables include percent of enrolled students who are white, percent free and reduced-priced lunch, and the log of total county teacher employment (FTEs).

²²We would expect the “highly qualified” requirement to increase district competition for existing teachers, which would suggest a larger pay premium post-NCLB in more competitive — not concentrated — markets.

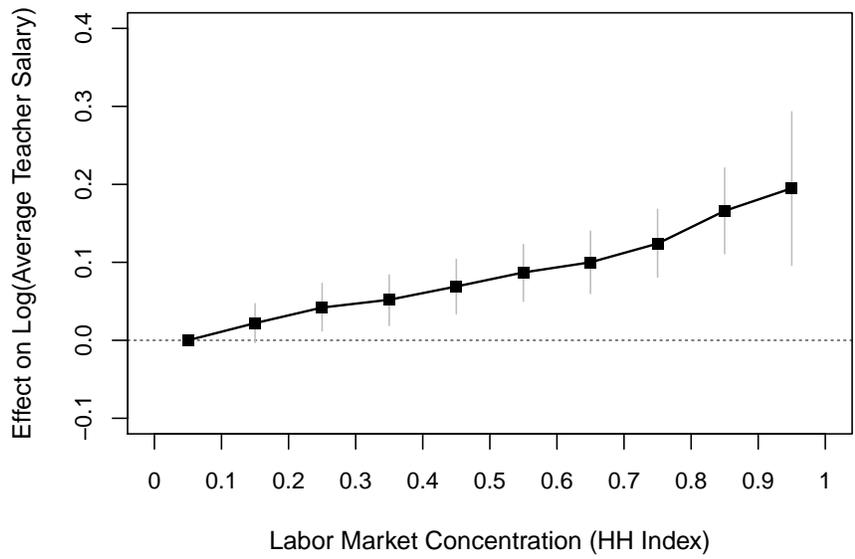
To examine potentially nonlinear effects, I divide the HHI measure into ten equally sized bins and estimate a nonparametric model that does not impose functional form assumptions on the relationship between competition and compensation. The coefficients and associated confidence intervals are plotted in Figure 1. The top panel presents the results from the aggregate, county-level model, while the bottom panel reports estimates from the district-level specification. Both suggest that a marginal increase in market concentration matters more in already concentrated markets, and this is particularly pronounced in the school district sample. Increasing the HHI from 0 to 0.5 has a minimal impact on salaries in the district sample but the slope increases sharply when concentration exceeds 0.7, although the individual point estimates are somewhat imprecise. It's noteworthy that there is no evidence of greater concentration producing downward pressures on salaries at any level of baseline market concentration, in contrast with the predictions from the standard monopsony model.

Although there are a variety of plausible explanations for the nonlinear nature of the effects, these results are consistent with the “yardstick competition” mechanism. In a competitive environment, a modest increase in market concentration is unlikely to matter because voters would continue to have access to comparative information from a sufficient number of neighbouring districts to construct a meaningful benchmark. At very high levels of market concentration, in counties where just one big district employs an overwhelming majority of teachers,²³ voters, taxpayers, school board members, and administrators are likely to find it much more difficult to track down useful comparative data on teacher compensation, however.

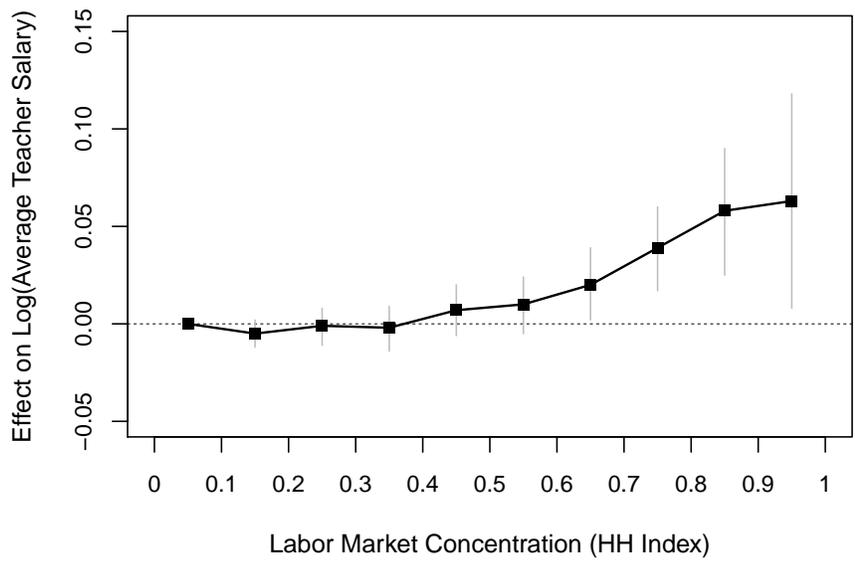
Taken as a whole, the results suggest that weakened voter oversight, rather than an increase in political influence of educator interest groups, is probably responsible for the

²³In the average county with HHI above 0.7, the largest district employs more than 80 percent of all teachers.

higher salaries in less competitive teacher labor markets.



(a) Effects of Concentration on Change in Average County Salary



(b) Effects of Concentration on Within-District Change in Salary

Figure 1: Nonlinear Relationship Between Labor Market Concentration and Teacher Pay

Note: Vertical gray lines mark the 95 percent confidence intervals around each estimate.

Discussion

In analyzing changes in teacher compensation over time, I find that school boards fail to negotiate the most favorable financial terms for the taxpayers they represent. In areas where individual districts largely dominate the market for teachers, and where they face minimal threat of good educators leaving for higher salaries in other schools, school boards do not take advantage of their market power to realize lower costs. Instead, salaries rise with labor market concentration, suggesting that public employee compensation policies are driven primarily by political calculations rather than efficiency considerations or market pressures. These findings are consistent with the notion that elected officials in local government face competing political pressures that may militate against government cost-effectiveness.

One limitation of my analysis, however, is that I do not observe teacher quality. It is possible that that higher salaries in less competitive labor markets simply reflect better teachers. For example, reduced risk that educators leave for better employment options nearby might incentivize districts to invest more in professional development that improves their teaching (e.g., Acemoglu and Pischke 1998). Although I cannot test this directly, it is noteworthy that Hoxby (1999) finds both improved student achievement and higher productivity in more competitive education markets, suggesting that differences in teacher quality are unlikely to explain my results.

It is useful to consider the implications of these results in other policy domains, including health care. To provide one example, many advocates argue in favor of a single-payer health care system based in part on cost savings that could be achieved through the government exercising greater market power to negotiate more favorable prices.²⁴ In its analysis of

²⁴See, e.g., Josh Katz, Kevin Quealy, and Margot Sanger-Katz, “Would ‘Medicare for All’ Save Billions or Cost Billions?” *New York Times*, Oct. 16, 2019, <https://www.nytimes.com/interactive/2019/04/10/upshot/medicare-for-all-bernie-sanders-cost-estimates.html>. It is important to note that greater

how “Medicare for All” would affect national health care spending,²⁵ for example, the RAND Corporation assumes that the government would negotiate provider rates that are considerably lower than those paid by private insurance companies today. My findings suggest that these cost savings cannot be assumed, and realizing them depends on the political incentives facing elected officials and program administrators.

Another useful illustration of how interest group pressures can impede government efficiency comes from the Medicare program. Although many critics note that Medicare cannot negotiate drug prices under the Part D prescription coverage program, that is not true for Part A (covering hospitalization) and Part B (physician services). Yet the evidence suggests that the federal government does not fully exercise its market power to realize maximal savings for taxpayers in either. For example, traditional Medicare does not reimburse hospitals at rates that are lower than private insurers who administer the Medicare Advantage program (Baker et al. 2016), even though these private insurers have much less buying power than the federal government. In her extensive study of Medicare physician reimbursements, Laugesen (2016) also documents how well-organized medical societies have effectively captured the rate-setting process and found creative ways to undermine cost-saving efforts and game the rules to win higher reimbursement fees (see also Gordon and Rashin Forthcoming).

My findings suggest that similar dynamics play out in the context of teacher compensation at the local level. One implication of the results, however, is that jurisdictional competition can help prevent interest group capture. I argue that “yardstick competition” helps voters identify (or at least deter) inefficiency, particularly in policy areas where voters may face significant informational asymmetries.

market power is just one mechanism through which savings would be achieved. The other is the reduction of administrative costs, something my analysis does not address.

²⁵https://www.rand.org/pubs/research_reports/RR3106.html

Conclusion

Theoretical models make competing predictions about how jurisdictional competition impacts government efficiency. From one perspective, competition introduces market-like forces that lead to spending discipline. From another, more centralized provision can allow the government to use its collective buying power to negotiate more favorable terms and lower costs.

Testing these hypotheses in the context of teacher compensation, I find evidence most consistent with the latter perspective. Elected officials do not appear to use advantageous market conditions to negotiate down the costs of public sector compensation in the same ways firms do in the private sector. Instead, I show that salaries are lowest when the market for public sector employees is most competitive, suggesting that decentralizing spending decisions can indeed pay efficiency dividends.

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Supplemental Appendix

Table A1: Labor Market Concentration and Average Teacher Compensation with State-Year Fixed Effects

VARIABLES	(1) log(Salary)	(2) log(Benefits)	(3) log(Tot. Comp.)
HHI	0.126*** (0.0336)	0.156*** (0.0389)	0.133*** (0.0332)
Observations	38,296	38,296	38,296
R-squared	0.594	0.883	0.741
Number of Counties	1,870	1,870	1,870
Time-Varying Controls	X	X	X
County FE	X	X	X
State-Year FE	X	X	X

Robust standard errors clustered by county in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Control variables include percent of enrolled students who are white, percent free and reduced-priced lunch, and the log of total county teacher employment (FTEs).

Table A2: Testing Parallel Trends: Lags and Leads

VARIABLES	(1) log(Tot. Comp.)	(2) log(Tot. Comp.)
HHH _{t-1}	-0.0602 (0.0371)	-0.0206 (0.0177)
HHI _t	0.227*** (0.0673)	0.0944*** (0.0172)
HHI _{t+1} ,	-0.0728** (0.0340)	-0.0209 (0.0145)
HHI _{t+2} ,	0.0139 (0.0218)	-0.0394*** (0.0120)
HHI _{t+3} ,	0.0365 (0.0237)	0.0232 (0.0154)
Unit	County	District
Time-Varying Controls	X	X
Unit FE	X	X
Year FE	X	X

Robust standard errors in parentheses clustered by county and district, respectively

*** p<0.01, ** p<0.05, * p<0.1

Control variables include percent of enrolled students who are white, percent free and reduced-priced lunch, and the log of total county teacher employment (FTEs).

Table A3: Measuring Commute Zone-Level Market Concentration

VARIABLES	(1) log(Salary)	(2) log(Salary)
HHI (County)	0.0550*** (0.0209)	0.0704*** (0.0251)
HHI (Commute Zone)	0.0157*** (0.00325)	0.0156*** (0.00326)
Market Share		-0.000511 (0.000382)
Observations	239,945	239,945
R-squared	0.160	0.160
Number of School Districts	15,146	15,146
Time-Varying Controls	X	X
District FE	Yes	Yes
Time FE	Years	Years

Robust standard errors clustered by school district in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Control variables include percent of enrolled students who are white, percent free and reduced-priced lunch, and the log of total district teacher employment (FTEs).