



Educational Psychology & Higher Education
Faculty Publications

Educational Psychology & Higher Education


6-6-2019

Negotiating the Great Recession: How Teacher Collective Bargaining Outcomes Change in Times of Financial Duress

Katharine O. Strunk
Michigan State University

Bradley D. Marianno
University of Nevada, Las Vegas, brad.marianno@unlv.edu

Follow this and additional works at: https://digitalscholarship.unlv.edu/edpsych_fac_articles

 Part of the [Collective Bargaining Commons](#), and the [Educational Administration and Supervision Commons](#)

Repository Citation

Strunk, K. O., Marianno, B. D. (2019). Negotiating the Great Recession: How Teacher Collective Bargaining Outcomes Change in Times of Financial Duress. *AERA Open*, 5(2), 1-18. SAGE Publications.
<http://dx.doi.org/10.1177/2332858419855089>

This Article is protected by copyright and/or related rights. It has been brought to you by Digital Scholarship@UNLV with permission from the rights-holder(s). You are free to use this Article in any way that is permitted by the copyright and related rights legislation that applies to your use. For other uses you need to obtain permission from the rights-holder(s) directly, unless additional rights are indicated by a Creative Commons license in the record and/or on the work itself.

This Article has been accepted for inclusion in Educational Psychology & Higher Education Faculty Publications by an authorized administrator of Digital Scholarship@UNLV. For more information, please contact digitalscholarship@unlv.edu.

Negotiating the Great Recession: How Teacher Collective Bargaining Outcomes Change in Times of Financial Duress

Katharine O. Strunk

Michigan State University

Bradley D. Marianno 

University of Nevada, Las Vegas

This article examines how teacher collective bargaining agreements (CBAs), teacher salaries, and class sizes changed during the Great Recession. Using a district-level data set of California teacher CBAs that includes measures of subarea contract strength and salaries from 2005–2006 and 2011–2012 tied to district-level longitudinal data, we estimate difference-in-difference models to examine bargaining outcomes for districts that should have been more or less fiscally constrained. We find that unions and administrators change critical elements of CBAs and district policy during times of fiscal duress. This includes increasing class sizes, reducing instructional time, and lowering base salaries to relieve financial pressures and negotiating increased protections for teachers in areas with less direct financial implications, including grievance procedures and nonteaching duties.

Keywords: *collective bargaining, teachers' unions, the Great Recession*

Introduction

The recent and ongoing spate of teacher strikes in large school districts like the Los Angeles Unified School District, Oakland Unified, and Denver Public Schools brought the inextricable connection between collective bargaining and school district budgets to the forefront of public attention. After a 6-day strike in early 2019, Los Angeles Unified and the local union agreed to a new collective bargaining agreement (CBA) that will cost the district approximately \$403 million over the next 3 years and add an additional \$183 million to the district's annual funding deficit, highlighting concerns that the district cannot afford the deal (Swaak, 2019). The Los Angeles County superintendent said the new contract "continues to move the District toward fiscal insolvency" and has threatened to take control of school district finances unless the district presents a balanced budget by early spring 2019 (Swaak, 2019). Similar concerns overshadowed the final contract agreed to in Oakland Unified, which required the school board to approve an immediate \$20 million in budget cuts to avoid fiscal insolvency (Harrington, 2019).

The experiences of school districts confirm what research suggests—the content of CBAs plays an important role in shaping district finances (Chambers, 1977; Duplantis, Chandler, & Geske, 1995; Eberts, 1983; Eberts & Stone,

1984; Gallagher, 1979; Strunk, 2011). Required or permitted in 45 states (Sanes & Schmitt, 2014), collective bargaining negotiations establish legally binding contracts that dictate workplace procedures that impact every aspect of teachers' work (e.g., teacher compensation, class size, leaves, seniority and staffing, the school day and year schedule, and general working conditions; Eberts, 2007; Hill, 2006; Strunk, 2012). Furthermore, research suggests that CBAs are fairly inflexible to change (Cowen & Fowles, 2013; Ingle & Wisman, 2018; McDonnell & Pascal, 1979; Strunk, et al., 2019). Once established, contract provisions can only be altered through subsequent negotiations, and the working conditions and compensation levels ensconced therein are difficult to alter as unions and district administrators are resistant to cede ground on the protections they have secured. Consequently, the financial commitments contained in CBAs can incur costs for years after negotiations are complete.

The dynamics of contract negotiations and in particular, resulting financial obligations are especially important during times of fiscal duress when school districts must reduce budgets in response to financial shocks. When state revenue streams decrease, for example, during periods of economic downturn when income and sales taxes drop (Chakrabarti, Livingston, & Setren, 2015; Leachman & Mai, 2014), school districts are vulnerable to drastic cuts. This is because in the



majority of states, substantial proportions of district revenues now come from state revenue streams (Leachman & Mai, 2014); by 2008, at the start of the Great Recession, the average district funded nearly half of its operating cost from state revenue sources (Evans, Schwab, & Wagner, 2019). The ways in which districts cut expenditures and on what matter. Prior research suggests that decreases in instructional-based expenditures as a result of fiscal shocks to school districts are associated with lower tests scores and lower rates of high school completion (Jackson, Wigger, & Xiong, 2018). Consequently, in times of financial duress, school districts need the flexibility to allocate scarce resources in ways that preserve instructional resources and ultimately student learning.

If what districts cut in times of financial duress matters for maintaining student learning, then if and how districts and unions alter CBAs may also be of prime importance. If CBAs are intractable even during times of financial duress, then the documents may protect key instructional conditions that are important for students, forcing districts to reduce expenditures in noncore operational areas (e.g., capital improvement projects) before turning to cuts in instructional resources. Alternatively, if unions push districts to maintain core working conditions for teachers (e.g., salary levels) in exchange for changes in contract language more directly related to instruction (e.g., school schedule), then CBAs may make it more difficult to maintain the integrity of classroom instruction as district revenues diminish. While prior research suggests that CBAs change very little, no study has looked at if and how districts and teachers' unions alter contractual agreements during times of financial duress.

In this article, we examine how CBAs are renegotiated to respond to changing fiscal contexts. We use as our case the Great Recession and California school districts. While most California districts rely heavily on state funding for their operating budgets and thus were severely affected by the recession, a subset of California school districts, called Basic Aid districts, were largely protected from state budget fluctuations because their local tax revenues exceeded the state-determined revenue limit. Using Basic Aid districts as a comparison group for the majority of districts that faced substantially diminished revenues during the recession, we examine how the content of CBAs, including compensation and staffing levels, change during times of fiscal constraint. Specifically, we ask: How do (a) CBAs, (b) teachers' salaries, and (c) pupil-teacher ratios change during times of recession-induced fiscal constraint?

We hypothesize that districts that work with their teachers' unions to negotiate CBAs that help alleviate fiscal pressures while maintaining instruction will seek flexibility in areas of the CBA that have financial implications (e.g., teacher salary levels) while leaving instructional priorities protected (e.g., instructional time and class sizes) in the contract. To compensate teachers for losses in contractual language with direct

fiscal implications, provisions that protect teachers' working conditions without increasing district expenditures may be enhanced (e.g., teacher transfer procedures, grievance protections, nonteaching responsibilities). To test these hypotheses and answer our research questions, we use a data set that includes measures of the restrictiveness of several critical areas of teachers' union contracts and teacher salaries (negotiated as part of the contracts) from the 2005–2006 and 2011–2012 school years alongside measures of pupil-teacher ratios as a proxy for class size. We estimate a series of difference-in-difference models, examining contract restrictiveness, salary, and staffing measures pre- and postrecession for districts that were more or less fiscally constrained.

We find that certain areas of the CBAs in districts facing financial hardship (i.e., non-Basic Aid districts) became relatively more restrictive after the recession relative to those in districts facing fewer budgetary pressures (i.e., Basic Aid districts). Contract areas that grew more restrictive include provisions governing school days and hours, grievance procedures, and nonteaching duties. Further, we find evidence that fiscally constrained districts reduced the salary of novice teachers while maintaining salary levels for more experienced teachers. Finally, we find larger class sizes in fiscally constrained districts relative to their wealthier Basic Aid counterparts after the recession, though these changes may result from differences in prerecession trends between the two groups. Together, these findings indicate that during times of fiscal constraint, districts and teachers' unions negotiate changes in their CBAs that directly reduce expenditures even though they may also have implications for instruction and student learning. They compensate teachers for these losses by enhancing the contract language surrounding working conditions that have little fiscal impact (e.g., teacher assignment, grievance processes, noninstructional time).

This paper proceeds as follows: In the following sections, we set forth a conceptual framework that outlines why and how CBAs might be expected to change as a result of economic pressures, highlight how the California context provides an important case for studying how contracts change in times of financial duress, outline the data and methods we use in our analysis, provide results, and conclude with a discussion of the implications of our results for how school districts navigate future budget shortfalls.

How Might CBAs Change in Times of Financial Duress?

District administrators operate their schools within federal and state funding contexts that dictate the flexibility with which administrators can allocate resources according to their specific needs. For instance, the federal government allocates Title I and other categorical funds that must go to targeted student subgroups and activities (U.S. Department

of Education, 2015). State governments similarly place restrictions on the use of dollars going to districts by establishing categorical requirements, base salaries for teachers, minimum instructional days in the school year and hours in the school day, and minimum class sizes, for example (Chingos & Blagg, 2017).

It is within these confines that district administrators make decisions about the allocation of remaining funds. However, even at this local level, administrators are subject to constraints in the form of the collectively bargained agreements negotiated with teachers' unions. CBAs dictate workplace procedures that impact every aspect of teachers' work and as a result, much of school and district operations (e.g., teacher compensation, class size, seniority and staffing, the school day and year schedule, teacher evaluations, grievance procedures, and other nonteaching duties; Eberts, 2007; Hill, 2006; Strunk, 2012). Once negotiated, administrators must work within these procedures for the duration of the contract (ranging usually from 1 to 5 years; e.g., in California, contracts must be renegotiated at least every 3 years). Nonetheless, given the strict and largely nonnegotiable federal and state funding parameters, CBAs offer local school districts one of their only opportunities to establish greater flexibility in reallocating dollars during times of financial duress.

For this reason, we focus our study on the content of CBAs and in particular how the regulations within CBAs might shift when districts are faced with funding constraints. CBAs are made up of hundreds of individual policies, each negotiated between district administrators or school boards and the local teachers' unions. A growing literature shows that indeed, the policies contained in teacher CBAs are linked to school district expenditures (Chambers, 1977; Duplantis et al., 1995; Eberts, 1983; Eberts & Stone, 1984; Gallagher, 1979; Strunk, 2011). In particular, Eberts (1983), Eberts and Stone (1984), and Strunk (2011) found that districts expend more money per pupil in school districts where teachers' unions negotiate stronger contracts (defined as more restrictive or constraining of district administrators' actions) for their membership. Much of these expenditures are directed toward teacher and administrative salary costs (Eberts, 1983; Eberts & Stone, 1984; Kleiner & Petree, 1988; Marianno, Bruno, & Strunk, 2018; Strunk, 2011). Given these findings, when districts are subject to external financial constraints, whether because state funding formulas change, federal funding shifts, or local and state tax revenues decrease in ways that provide districts with fewer overall resources, district administrators must reallocate resources to live within their newly restricted fiscal realities. One obvious place to turn to look for flexibility is the CBA.

CBA policies can loosely be grouped into seven areas of regulations: (a) compensation, which incorporates both actual salaries for teachers at each "step" (experience level) and "lane" (educational credits or credentials) on the salary

schedule and the policies surrounding compensation such as whether bonuses are provided for specific kinds of teachers; (b) class size, including not only the maximum number of students per class but also what districts must do to compensate teachers if class size maximums are exceeded and by when; (c) school day and year schedule, such as the maximum length of the school day and year and when teachers can be on campus; (d) nonteaching duties, which includes whether teachers can be asked to take on adjunct duties, the amount of duty-free lunch and/or recess time and preparation time given to teachers each day or week, and requirements around the length and frequency of faculty meetings; (e) evaluation procedures for both tenured and nontenured teachers, including actions to be taken in the case of an unsatisfactory evaluation; (f) transfer and vacancy policies that dictate how districts can make decisions about which teachers can both voluntarily and be involuntarily transferred between positions and schools; and (g) grievance procedures, comprised of the process and timeline within which grievances must be filed and addressed (see Strunk, 2012, for a thorough discussion of the policies contained in these agreements and online Appendix A for lists of the specific contract provisions we include in each category).

The subareas of the contract can be placed into three overlapping categories in regards to the fiscal, instructional, and working condition implications that a change to that subarea might have on district operations. First, there are policies that have substantial financial implications for districts. In particular, regulations about teachers' compensation (both actual salary levels and the policies assigning "extra" compensation for specific duties, etc.), class size, and school day and year schedule. As district administrators and local teachers' unions renegotiate CBAs, collectively bargained provisions in these areas will require districts to reallocate resources. For instance, if CBAs require a maximum class size of, say, 22 students in grades K–3, then districts must hire more teachers (at the salary levels outlined in the CBA) to staff the extra classrooms and find additional classroom space to house the classes of students.

In addition, policies enshrined in the CBAs have direct implications for districts' instructional outcomes. For instance, policies governing maximum class size and the length of the school day will likely affect student achievement (Jepsen & Rivkin, 2009; Jez & Wassmer, 2015). Similarly, evaluation policies dictated by the CBAs, such as on what elements teachers can be evaluated, the frequency of observations, and the ways in which observations can be conducted, may have direct implications for student outcomes (e.g., Steinberg & Sartain, 2015; Taylor & Tyler, 2012).

Importantly, nearly all policies negotiated into CBAs will have implications for teachers' working conditions. Outside of compensation and class sizes (frequently discussed as teacher working conditions), regulations that dictate teacher

evaluations, staffing (transfer and vacancies), grievances, the school schedule, and nonteaching duties all provide teachers with protections to safeguard their working conditions. For instance, transfer and vacancy regulations can stop teachers from being transferred repeatedly after the start of a school year and enable more senior teachers to have greater discretion in their working assignments. Policies about teachers' noninstructional time can guarantee teachers duty-free lunches and breaks, constrain the amount of time teachers must be in faculty meetings, lighten their workload by restricting the number of preparations they must teach a year, and limit the hours they are expected or allowed to be on campus. Policies that outline grievance processes provide teachers with clear guidelines for how to bring concerns to school and district administrators and ensure their rights to due process and fair arbitration.

We show how these policies fall into the three outlined areas (fiscal, instructional, and working conditions) in Figure 1. As is made clear in this figure, contract subareas fall into more than one of these overlapping circles. Where CBA provisions are situated in this framework should be associated with how they are affected during contract negotiations that take place during times of fiscal duress. For example, if teachers' unions and administrators in financially constrained districts are seeking to relieve pressure on budgets while also trying to maintain student learning, they will first seek flexibility in those items that have fiscal implications and protect to the extent possible policies that will enhance instructional outcomes. This includes reductions in teacher compensation, which could have long-run effects on the ability of the district to attract and retain teachers but perhaps not immediate short-run impacts on instruction. To compensate teachers and teachers' unions for contractual cuts to subareas that have fiscal implications, we may expect districts and unions to increase the restrictiveness of nonpecuniary areas that enhance teachers' working conditions. For example, contracts in budget constrained districts might grow more restrictive in teacher staffing (transfer and vacancies), grievances, and nonteaching duties. Although we assume that unions and districts will work to safeguard policies with implications for instructional outcomes, secondary cuts may come in the way of increasing class sizes as these have direct and large implications for immediate fiscal solvency even as they are critical elements of teachers' working conditions and positive contributors to instructional outcomes. School schedules may become more restrictive to improve teachers' working conditions during times of financial constraint but potentially in the face of implications for student outcomes as instructional time diminishes.

The previous discussion requires the assumption that district administrators and local teachers' unions will work together to negotiate CBAs that maintain protections for teachers while enabling administrators to make resource allocation decisions in line with their fiscal constraints.

While seemingly innocuous on its face, this belief lies at the core of current debates about the role of teachers' unions in American education. In particular, supporters of teachers' unions taking an active role in local policy setting through collective bargaining argue that local unions, as the representatives of the educators who serve the students in the local context, will know best where excess can be trimmed and what must be preserved to maintain a strong and instructionally focused schooling environment for children (Bascia, 1994, 2005; Kerchner, Koppich, & Weeres, 1997). In contrast, however, are those who believe that teachers' unions are "rent-seeking" and will negotiate in the best interest of teachers even if those interests do not provide direct benefits to students (e.g., Chubb & Moe, 1990; Hoxby, 1996; Moe, 2011). Indeed, debates about the wisdom of recent teachers' unions' strikes in Los Angeles, Oakland, Denver, and Chicago center around the divergent beliefs that teachers' unions should or should not be allowed to dictate how resources are allocated through their collective bargaining negotiations during times of fiscal constraint. But, as in most debates surrounding teachers' unions, these disputes are largely devoid of any empirical evidence and instead rely solely on ideological beliefs about education governance (Strunk, Cowen, & Goldhaber, 2018).

To begin to provide some evidence to ground the debate, we examine how teachers' unions and their local district partners negotiate CBAs in times of severe fiscal constraint. In particular, we consider the *restrictiveness* of CBAs, which we define, following the literature, as the extent to which areas of the CBAs constrain district administrators' operational flexibility in managing their districts. Before delving too deeply into the ways in which we measure the outcomes of contract negotiations, we first discuss how California provides a case in which to empirically test how CBAs change in the face of financial constraint.

California in the Great Recession: A Case to Test Response to Fiscal Constraint

The Great Recession in California provides a case through which we can study how unions and district administrators and in particular how the contracts negotiated between the two parties respond in times of financial duress. The Great Recession officially spanned from December 2007 to June 2009 and was characterized by high unemployment rates, a substantial decrease in consumer spending, and considerable reductions in local and state tax revenues (Bureau of Labor Statistics, 2012, 2014; Gordon, 2012; National Bureau of Economic Research, 2010). California was hit relatively hard by the Great Recession, boasting joblessness rates over 10% (Bureau of Labor Statistics, 2012). Like other states, California also experienced severe budget cuts, including in education spending, and as elsewhere, these cuts extended beyond the formal end of the Great Recession. For instance,

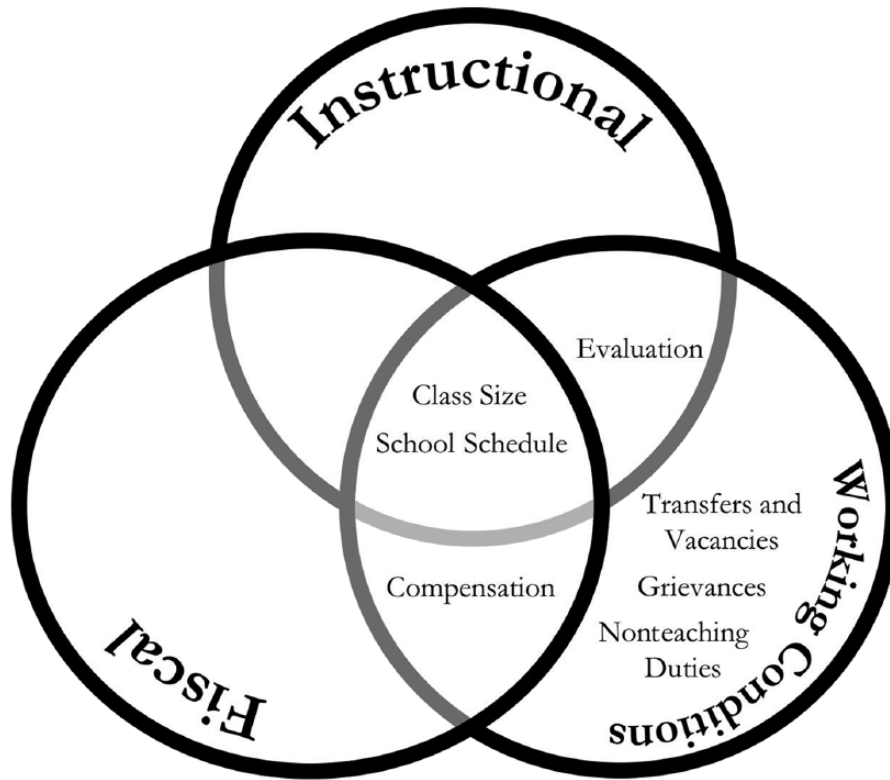


FIGURE 1. Framework for collective bargaining agreement changes during times of financial duress.

spending per student in California was 13.8% lower in 2014 relative to prerecessionary spending levels, with the state spending \$873 less per student than it did in 2008 (Leachman & Mai, 2014). Estimates further suggest that approximately 20,000 educators lost their jobs because of the recession in the 2011–2012 school year alone (Resmovits, 2013)

However, not all districts were similarly impacted by the recession. While most school districts in California receive the majority of their funds from state sources, a select group of districts benefit from significant local property tax revenues beyond the state revenue limit. This revenue disqualifies these districts from receiving general state funding. These districts, termed *Basic Aid* or *excess tax* districts, fund anywhere between 100% to more than 400% of the state revenue limit in local property taxes (Weston, 2013). Basic Aid districts tend to be smaller in size and are located in wealthy areas with high property values. In California, these districts are largely concentrated in the coastal and mountainous regions of the state (Weston, 2013).

Given that Basic Aid districts are not as dependent on state funding, they are better equipped to maintain revenue and expenditure levels during recessionary periods. Figure 2 shows total per pupil revenue for Basic Aid (BA) districts (red dash line with square markers) and non-Basic Aid (NBA) districts (blue solid line with square markers) from 2004 to 2012.¹ We see that as expected, BA districts had

higher revenues throughout the time under study. In both types of districts, total revenues gradually increased in the years leading up to the recession. When the recession hit in late 2007, NBA revenues leveled off and then declined in 2010. In contrast, BA revenues continued to increase gradually until 2009, decreasing very slightly in 2010 and 2011. Figure 2 demonstrates that expenditures follow similar patterns (expenditures lines have triangle markers).

These differences in revenue and expenditure patterns during and after the Great Recession suggest that we might expect differential changes in the restrictiveness of subareas of these districts' CBAs over that time period. Simply, the substantial decline in revenue levels for NBA districts relative to BA districts suggests that NBA districts were more likely to be forced to make difficult budgetary decisions during and after the Great Recession, whereas BA districts were less impacted by the recession altogether.

As discussed in the second section ("How Might CBAs Change in Times of Financial Duress?"), districts looking to make budget reductions will need to negotiate increased flexibility into their CBAs in areas with financial implications for districts and may in exchange, negotiate greater protections for teachers in other areas of the contracts. In particular, following from Figure 1, we hypothesize that tightened budgets may cause particularly financially strapped districts (i.e., NBA districts relative to BA districts)

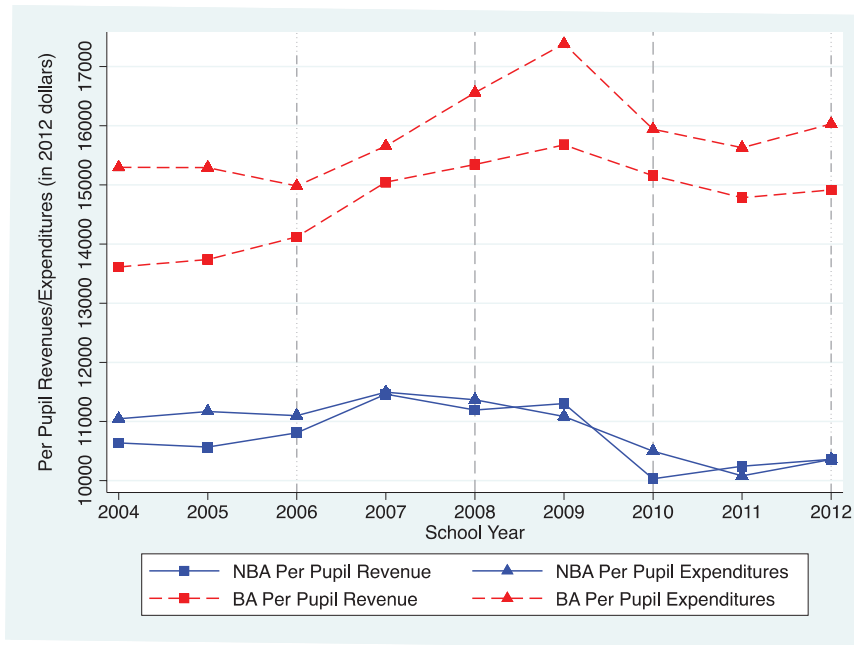


FIGURE 2. Trends in per pupil revenues and expenditures.

Note. The vertical dotted-dash lines show the pre (2005–2006) and post years (2011–2012) used in this study. The vertical dashed lines show the beginning and ending years of the recession (National Bureau of Economic Research, 2010).

to pay specific attention to areas of the CBA with financial implications for district operations. They may do this by lowering compensation for teachers by decreasing salaries or salary returns to experience, increasing class sizes, and reducing the number of instructional days and hours. Contract areas with little direct financial implication for districts but that improve teachers’ working conditions may be impacted in the opposite direction as districts and unions bargain for enhanced worker protections to compensate for diminished salaries and increased class sizes.

Data

Outcome Measures

We focus our analysis on 11 separate outcome measures, which we describe in detail in this section: the restrictiveness of seven separate subareas of the CBAs, three measures of teachers’ salaries, and district pupil-teacher ratio, which proxies for average district class size. In this article, we focus on the CBAs in place in 2005–2006 and therefore negotiated before the Great Recession and CBAs in place in 2011–2012, which either were negotiated during the Great Recession or directly thereafter, when districts were still impacted by recessionary budget cuts.² Following earlier work (e.g., Koski & Hornig, 2007; Marianno & Strunk, 2018; Strunk, 2011; Strunk & Grissom, 2010; Strunk & McEachin, 2011; Strunk & Reardon, 2010; Strunk et al., 2019), we include in our sample CBAs from school districts with four

or more schools because many smaller districts have quite different contracts than larger school districts and will react to recessionary pressures differently than larger districts.^{3,4} We collected CBAs from school districts by first downloading available CBAs from district websites. If the documents were not available on the websites, we emailed and then mailed public data requests to district human resources personnel and superintendents.

Subarea contract restrictiveness. Following Strunk and Reardon (2010), we create and analyze separate measures for seven subareas of the CBAs in both the pre- and post-years of analysis. These subareas represent the major policy sections of CBAs in California—compensation, class size, school days and hours, evaluation, grievances, nonteaching duties, and transfer and vacancy—and allow us to explore the tradeoffs in contract language made by unions and district administration during times of financial duress. Our measures of subarea CBA restrictiveness are developed from close content analysis of the collected CBAs. A reliable and valid measure of contract restrictiveness or strength should evaluate the degree to which a CBA constrains administrators’ actions while taking into account the reality that not all provisions included in CBAs actually restrict administrators—some constrain teachers, as well. Following the extant literature (e.g., Goldhaber, Lavery, & Theobald, 2014; Goldhaber, Lavery, Theobald, D’Entremont, & Fang, 2013; Strunk, 2011, 2012; Strunk & Grissom, 2010; Strunk & McEachin, 2011; Strunk & Reardon, 2010), we create such a

measure using an adaptation of the partial independence item response (PIIR) model developed by Reardon and Raudenbush (2006) and first applied to measuring the strength of CBAs by Strunk and Reardon (2010).

The PIIR model is a generalized hybrid of a discrete time hazard model and a Rasch model that adjusts for the conditional structure of “response” patterns in a CBA. The PIIR model measures the underlying latent restrictiveness of teachers’ union contract subareas using individual regulations found within the subareas. The model is estimated as a multilevel random effects logistic regression with contract items nested within contracts, predicting the likelihood that a given provision is included in a contract, dependent on the inclusion of an earlier contract provision and as a function of some latent level of subarea contract restrictiveness.

The model is formally estimated as follows: Let Y_{kig} equal the outcome (0, 1) of each item k in contract-year i in district g and h_{kig} represent the presence of the gate item for provision k in contract i in district g so that $\Phi_{kig} = \Pr(Y_{kig} = 1 | h_{kig} = 1)$. The gate item represents the conditional structure of CBAs, where the presence of a given item in a CBA subarea (in each year) is dependent on a higher order item being represented. For example, in the evaluation subarea of a contract, a contract can only specify the length of informal observations of tenured faculty members when it first stipulates that informal observations of tenured faculty members are allowed to take place. Thus, Φ_{kig} is the conditional probability of a positive response to item k for contract-year i in district g , conditional on passing through the gate item h_{kig} , where h_{kig} is equal to 1 when the gate item is represented in the CBA in a given year (Strunk & Reardon, 2010).

The structural model then takes the following form:

$$\log \left[\frac{\Phi_{kig}}{1 - \Phi_{kig}} \right] = \theta_{ig} + \sum_{j=1}^K \gamma_j D_{jig} + \tau_i, \quad (1)$$

where the conditional probability of provision k appearing in contract-year i in district g is a function of θ_{ig} , or the latent subarea restrictiveness of CBA-year i in district g , γ_j , which is the coefficient on a vector of dummy variables for each contract item (D_{jig}) and represents the conditional restrictiveness of each item, and a year random effect, τ_i , which captures subarea restrictiveness in each year apart from the subarea-year specific restrictiveness measure. In sum, the model is estimating the log likelihood that a given contract provision is included in the CBA, conditional on the gate contract provision being included and as a function of latent subarea contract restrictiveness

In previous cross-sectional work, θ_i represented the latent level of CBA subarea restrictiveness in a given year. Here, θ_{ig} is the latent subarea restrictiveness in a given contract-year within a given district, g , and τ_i is the subarea restrictiveness associated with just each year. To accurately

capture the overall subarea restrictiveness of a contract in a given year, then, we now capture and add the contract/negotiation year random effect back to the estimated latent subarea restrictiveness ($\theta_{ig} + \tau_i$) to obtain the total subarea restrictiveness of a contract that district administrators experience in each individual year.⁵

Teacher salaries. We also take from the coded CBAs three measures of teachers’ salaries: teachers’ salaries at the beginning of their careers (base salary), at the end (the highest salary for teachers with 20 years of experience), and average salary returns to experience. The average salary returns to experience for school district i in year t is calculated as:

$$\pi_{it} = \frac{(\text{Max Salary at 20 years})_{it} - (\text{Base Salary})_{it}}{20}. \quad (2)$$

We examine teachers’ salaries and yearly returns to experience apart from other CBA policies surrounding compensation (and outlined in online Appendix Table A1) because teacher compensation is a critical driver of district expenditures and thus will be an important area for negotiation during times of fiscal duress. Because teacher salaries in California are almost always negotiated in a typical salary schedule based on experience and educational credits (Strunk, 2011, 2012), novice teachers’ and veteran teachers’ salaries do not always move in concert, and districts and unions may negotiate different salary increases (or decreases) for teachers at various points in the experience distribution. Median voter theory, which has frequently been applied to the discussion of union representation of members (e.g., Kaufman & Martinez-Vazquez, 1990), suggests that unions will negotiate in the best interest of their median member. In the case of experience, the median teacher in the average district in our sample has approximately 13 years of experience, suggesting that unions may be more likely to privilege the maintenance of salary levels for more experienced teachers and returns to experience rather than base salaries for novice teachers. Summary statistics for the three salary measures are also provided in Table 1.

Pupil-teacher ratio. Last, we generate a measure of average district pupil-teacher ratio to proxy class size. This measure is the total enrollment divided by the number of full-time equivalent teachers employed by the district, both of which are taken from the National Center for Education Statistics’s Common Core of Data (CCD) data set. We provide summary statistics for the pupil-teacher ratio in Table 1.

District Characteristics

We obtain the district demographic data used as independent variables in our models from the CCD and the California Department of Education’s (CDE) public access data sets. In

TABLE 1

Summary Statistics for Full Sample, Non-Basic Aid, and Basic Aid Districts on Contract Restrictiveness, Subarea Restrictiveness, Salary, and Pupil-Teacher Ratio Measures (2005–2006, 2011–2012)

	2005–2006 school year			2011–2012 school year			Δ 2005–2006 to 2011–2012		
	NBA (<i>n</i> = 384)	BA (<i>n</i> = 22)	NBA – BA	NBA (<i>n</i> = 384)	BA (<i>n</i> = 22)	NBA – BA	Δ NBA (<i>n</i> = 384)	Δ BA (<i>n</i> = 22)	NBA – BA
	Mean (<i>SD</i>)	Mean (<i>SD</i>)	Difference	Mean (<i>SD</i>)	Mean (<i>SD</i>)	Difference	Δ	Δ	DiD
Compensation	0.00 (0.18)	0.10 (0.24)	+	0.00 (0.16)	0.13 (0.15)	***	–0.01	0.03	–0.04
Class size	0.04 (0.23)	0.05 (0.28)		–0.03 (0.23)	–0.01 (0.28)		–0.08***	–0.06	–0.02
School days	–0.03 (0.09)	–0.04 (0.09)		0.08 (0.09)	0.04 (0.07)	*	0.11***	0.08**	0.03+
Evaluation	–0.01 (0.34)	0.07 (0.35)		0.02 (0.36)	0.03 (0.37)		0.04	–0.04	0.08
Grievances	–0.32 (0.13)	–0.33 (0.14)		0.15 (0.13)	0.10 (0.14)	+	0.47***	0.42***	0.05+
Nonteaching duties	–0.08 (0.11)	–0.05 (0.12)		0.07 (0.09)	0.04 (0.11)		0.15***	0.10**	0.05+
Transfer and vacancy	0.07 (0.26)	0.06 (0.23)		0.04 (0.28)	0.05 (0.27)		–0.03	–0.01	–0.01
Salary Measures	NBA (<i>n</i> = 283)	BA (<i>n</i> = 17)	NBA – BA	NBA (<i>n</i> = 283)	BA (<i>n</i> = 17)	NBA – BA	NBA (<i>n</i> = 283)	BA (<i>n</i> = 17)	DiD
Base salary	41,850.57 (4,569.91)	45,309.08 (4,051.96)	**	41,518.65 (4,137.41)	46,307.65 (4,939.66)	***	–331.92	998.57	–1,330.49**
MA salary with 20 years	78,769.45 (7,223.54)	87,936.66 (5,569.10)	***	74,636.09 (8,254.05)	87,216.13 (8,629.24)	***	–4,133.36***	–720.53	–3,412.83+
Average salary return on experience	1,849.46 (307.35)	2,131.38 (217.78)	***	1,651.93 (328.91)	2,045.42 (389.649)	***	–197.53***	–85.96	–111.57
Other	NBA full (<i>n</i> = 384)	BA (<i>n</i> = 22)	NBA – BA	NBA full (<i>n</i> = 384)	BA (<i>n</i> = 22)	NBA – BA	Δ NBA (<i>n</i> = 384)	Δ BA (<i>n</i> = 22)	DiD
Pupil-teacher ratio	21.11 (1.94)	18.39 (2.44)	***	23.60 (2.52)	19.93 (3.00)	***	2.49***	1.54+	0.95**

Note. The first two difference columns present results from two-sample *t* tests comparing group contract restrictiveness, subarea restrictiveness, and salary means for Non-Basic Aid (NBA) and Basic Aid (BA) districts in 2005–2006 and 2011–2012. The significance column tests the mean change on each outcome for BA and NBA districts separately from 2005–2006 and 2011–2012. The final difference column tests the unadjusted difference in these differences (DiD), or the difference in the group mean change on each outcome from 2005–2006 and 2011–2012 for NBA and BA districts.
+*p* < .10. **p* < .05. ***p* < .01. ****p* < .001.

particular, we include variables that have been shown to be related to contract restrictiveness (e.g., Strunk, 2012), including enrollment, urbanicity (urban, rural, suburban), level (elementary, high school, and unified district), and aggregate student characteristics such as the percentage of free and reduced-price lunch students. In addition, we examine district revenue and expenditure data. We lag each variable by 1 year in our models because the previous year's characteristics are more likely to influence contract strength than the current year (Strunk, 2011; Strunk & McEachin, 2011). Table 2 presents these summary statistics for NBA and BA districts in the

2005–2006 school year. In addition, because the National Education Association (NEA) bargains approximately 96% of the CBAs in California, we control in our models for any heterogeneity in contract restrictiveness related to the unique bargaining structure of the NEA. The state teachers' union groups school districts into 26 service center council districts throughout the state. The NEA staffs these service centers with personnel to coordinate local member efforts in bargaining and political activity, and previous work has shown important spillover effects occurring in CBAs negotiated within the same service center (Goldhaber et al., 2014; Strunk et al., 2019).

TABLE 2

Summary Statistics for Non-Basic Aid and Basic Aid Districts on Independent Variables (2005–2006, 2011–2012 school years)

	2005–2006 school year			2011–2012 school year		
	NBA (<i>n</i> = 384)	BA (<i>n</i> = 22)	NBA – BA	NBA (<i>n</i> = 384)	BA (<i>n</i> = 22)	NBA – BA
	Mean (<i>SD</i>)	Mean (<i>SD</i>)	Difference	Mean (<i>SD</i>)	Mean (<i>SD</i>)	Difference
Elementary district	0.319	0.455		0.319	0.455	
Unified district (reference)	0.589	0.409	+	0.589	0.409	+
High district	0.092	0.136		0.092	0.136	
Urban district	0.268	0.364		0.266	0.364	
Suburban district (reference)	0.646	0.591		0.620	0.591	
Rural district	0.086	0.045		0.115	0.045	
% White	0.397 (0.249)	0.610 (0.170)	***	0.339 (0.236)	0.531 (0.207)	***
% Black	0.053 (0.065)	0.021 (0.015)	***	0.044 (0.056)	0.017 (0.012)	***
% Hispanic	0.403 (0.256)	0.195 (0.165)	***	0.463 (0.255)	0.232 (0.168)	***
% Asian	0.105 (0.126)	0.134 (0.101)		0.107 (0.130)	0.144 (0.117)	
% FRL	0.432 (0.252)	0.175 (0.168)	***	0.273 (0.199)	0.134 (0.121)	***
Enrollment	13,035.210 (39,054.020)	5,298.636 (5,034.980)	***	12,733.350 (35,725.850)	5,662.636 (5,099.505)	***
Per pupil revenue (in 2012 dollars)	10,808.060 (2,979.434)	14,120.550 (3,102.641)	***	10,360.500 (6,960.751)	14,914.480 (4,872.322)	***
Per pupil expenditures (in 2012 dollars)	11,100.010 (3,172.718)	14,982.350 (4,193.639)	***	10,359.640 (7,240.017)	1,6030.550 (4,701.634)	***
Local per pupil revenues (in 2012 dollars)	3,895.63 (2,394.09)	11,545.42 (2,859.77)	***	3,980.605 (5,211.444)	12,793.850 (4,673.439)	***

Note. The difference column presents results from two-sample *t* tests comparing group means on key independent variables. NBA = Non-Basic Aid; BA = Basic Aid; FRL = free/reduced-price lunch.

+*p* < .10. ****p* < .001.

“Treatment”: Basic Aid Designation

We obtain information about the BA designation of California school districts in each year from the CDE’s School Fiscal Services Division’s Annual Supplemental Taxes Report. In California in 2005–2006, 8% of school districts were categorized as BA districts, relative to 13% in 2011–2012. Because BA districts are generally smaller (Weston, 2013), many BA districts have fewer than four schools, removing them from our sample. We are left with 22 BA districts in 2005–2006 and 2011–2012 (67% of all BA districts with four or more schools across the 2 years).

Tables 1 and 2 assess the comparability of the “treated” NBA and “untreated” BA districts in the pre-period as well as in the post-recession timeframe. Although Table 1 shows no significant differences between NBA and BA

districts on the CBA restrictiveness measures in 2005–2006, we do find pre-year differences in salary and pupil-teacher outcomes. Table 2 also shows that NBA districts tend to be larger in size and more diverse and enroll more impoverished students than their BA counterparts. Furthermore, as already shown in Figure 1, NBA districts generate less revenue and consequently expend less per pupil than BA districts. Although these results are not surprising (e.g., because BA districts are substantially wealthier, they can pay teachers more and have smaller classes), these pre-year differences could be symptomatic of a larger issue—that NBA and BA districts are different in salary and class size trends that would bias the difference-in-difference estimates. We return to this discussion at the end of the “Methods” section, when we highlight specification tests performed to assess potential bias.

TABLE 3

Difference in Difference Models Comparing Pre/Post-Recession Contract Restrictiveness for Non-Basic Aid Versus Basic Aid Districts

	Compensation (1)	Class size (2)	School days and hours (3)	Evaluation (4)	Grievances (5)	Nonteaching duties (6)	Transfer and vacancy (7)
Non-Basic Aid in 2005–2006	–0.034 (0.051)	0.035 (0.062)	–0.007 (0.021)	–0.048 (0.084)	0.016 (0.032)	–0.016 (0.029)	–0.030 (0.049)
Post (reference = pre)	0.033 (0.037)	–0.056 (0.035)	0.076*** (0.018)	–0.046 (0.043)	0.424*** (0.020)	0.096*** (0.024)	–0.020 (0.064)
Non-Basic Aid in 2005–2006 × Post	–0.029 (0.038)	–0.015 (0.036)	0.036* (0.018)	0.071 (0.046)	0.043* (0.021)	0.055* (0.025)	–0.013 (0.066)

Note. The bottom row includes the difference-in-difference estimates. Cluster robust standard errors are in parentheses. The interaction between Non-Basic Aid and the posttreatment indicator in Column 1, for example, is interpreted as the change in average compensation contract restrictiveness for Non-Basic Aid districts post-recession, subtracting out the change in average compensation contract restrictiveness for Basic Aid districts pre- and post-recession. All models control for student enrollment (ln) and the percentage of free and reduced-price lunch students, district location (urban, rural, suburban), district type (elementary district, high school district, unified district), and California Teachers' Association service center.

* $p < .05$. *** $p < .001$.

Methods

Research Question 1: How Do CBAs Change During Times of Recession-Induced Fiscal Constraint?

To answer our first research question, we estimate a series of difference-in-difference (DiD) models comparing CBA subarea strength in BA versus NBA districts pre- versus post-recession. We use districts' BA designation taken from 2005–2006, the base year of our analyses. The DiD models take the following general form:

$$Y_{it} = \alpha + \beta T_t + \gamma N_i + \delta(T_t * N_i) + X_{it}\eta + \omega_{it} + \varepsilon_{it}, \quad (3)$$

where Y_{it} represents one of the seven CBA subarea outcomes of interest: (a) compensation policies, (b) class size policies, (c) school days and hours, (d) evaluation, (e) grievances, (f) nonteaching duties, and (g) transfer and vacancies. α is a constant term, T_t is a time indicator that notes the time period (0 in 2005–2006 and 1 during the recession-impacted period, 2011–2012), N_i is an indicator for a NBA district that connotes “treatment” as a district susceptible to fiscal constraint, X_{it} is a vector of time-varying district-level covariates, ω_{it} is an NEA service center fixed effect, and ε_{it} is a random error term. δ is the DiD estimate of the treatment effect. Results from these models are shown in Table 3.

Research Question 2: How Do Teacher Salaries Change During Times of Recession-Induced Fiscal Constraint?

To answer our second research question, we estimate three DiD models that exactly follow Equation 3. Rather than Y_{it} representing the restrictiveness of CBA subareas, it instead denotes one of three salary outcomes of interest: (a) teachers' negotiated salaries at the beginning of their careers, at the first step and lane of the salary schedule (base salary);

(b) teachers' negotiated salaries at the end of their careers (the highest salary for teachers with 20 years of experience and a master's degree); and (c) average salary returns to experience over a teacher's career. Results are provided in Table 4.

Research Question 3: How Do Pupil-Teacher Ratios Change During Times of Recession-Induced Fiscal Constraint?

Because we derive CBA subarea restrictiveness and salary measures from the coded CBAs themselves, we only have these measures in one pre- and in one post-recession period, necessitating the use of a relatively simple DiD. However, because our pupil-teacher ratios are generated from a longitudinal panel of district-level data, we are able to specify a more flexible (and therefore more informative) difference-in-difference model that takes the form of an event study, showing the relationship between “treatment” (NBA status) and student-to-teacher ratio in each of the years before, during, and after the recession (e.g., Gershenson, 2016; Simon, Soni, & Cawley, 2017). This model takes the following form:

$$Y_{it} = \alpha + \tau_t + \tau_t * N_i \delta + \eta X_{it} + \omega_{it} + \varepsilon_{it}, \quad (4)$$

where the outcome Y_{it} is now the average pupil-to-teacher ratio in district i in year t . α is a constant term, and τ_t is a series of year indicators (i.e., year fixed effects) for each year in our panel from 2003–2004 through 2011–2012. Pre-recession years are 2003–2004 through 2006–2007, during recession years are 2007–2008 through 2010–2011, and we have our single post-recession year in 2011–2012. Because our other CBA measures come from 2005–2006, we use 2005–2006 as our pre-recession reference year. N_i is again an indicator for NBA district that connotes “treatment” as a

TABLE 4

Difference in Difference Models Comparing Pre/Post-Recession Salary for Non-Basic Aid Versus Basic Aid Districts

	Base salary (1)	MA salary with 20 years of experience (2)	Average salary return on experience (3)
Non-Basic Aid in 2005–2006	–2,489.864* (1,021.633)	–9,238.036*** (1,601.300)	–332.435*** (64.392)
Post (reference = pre)	1,021.407* (412.987)	–719.952 (1,879.738)	–86.992 (91.711)
Non-Basic Aid in 2005–2006 × Post	–1,270.446** (474.391)	–3,118.718 (1,921.609)	–99.495 (93.761)

Note. The bottom row includes the difference-in-difference estimates. Cluster robust standard errors are in parentheses. Teacher salaries were inflation adjusted to 2012 dollars. The interaction between Non-Basic Aid and the posttreatment indicator in Column 1, for example, is interpreted as the change in average base salary for Non-Basic Aid districts post-recession, subtracting out the change in base salary for Basic Aid districts pre- and post-recession. All models control for student enrollment (ln) and the percentage of free and reduced-price lunch students, district location (urban, rural, suburban), district type (elementary district, high school district, unified district), and California Teachers' Association service center.

* $p < .05$. ** $p < .01$. *** $p < .001$.

district susceptible to fiscal constraint. The pre-recession interactions provide evidence on whether pupil-teacher ratios in NBA versus BA districts were different pre-recession. We would expect very few differences in pre-recession years and large differences during and after the recession as NBA districts negotiate with unions to increase class sizes to cut costs. All other variables remain as in Equation 3. Results from these models are presented in Table 5. In our discussion answering these three research questions, we discuss a result as statistically significant if it has a p value of .05 or lower.

Limitations

Our study suffers from at least three limitations. First, our analysis is likely underpowered due to the large ratio of treated NBA districts to the small number of comparison BA districts with collective bargaining agreements in our data set. When we run power analyses and set our minimal detectable effects size at 0.036 and 0.055 units (which, as will be seen in the following, are the smallest and largest effect sizes we detect in our significant regressions on our subarea contract restrictiveness outcomes), we find that the probability that we will reject the null hypothesis on a true effect of 0.036 is 41% at $\alpha = .05$. The probability that we will reject the null hypothesis on a true effect of 0.055 is 72% at $\alpha = .05$. Although both fall below the 80% threshold and quickly drop further when we constrain our sample sizes further, we are still better powered than most studies in economics, which report a median statistical power of 18% (Ioannidis, Stanley, & Doucouliagos, 2017).

Second, we are unable to completely rule out that the observed differences between NBA and BA in the restrictiveness of CBA subareas or salary levels after the recession are due to pre-trend differences. We would ideally like to compare how CBA restrictiveness, salaries, and pupil-teacher ratios

were changing in both NBA and BA districts in the years before our analysis timeframe. Our event study specification enables this for pupil-teacher ratios. Unfortunately, we do not have CBA restrictiveness and salary measures before the 2005–2006 school year. Online Appendices B and C discuss in more detail how we attempt to mitigate concerns regarding discrepancies in pretreatment trends and differences in our treatment and control groups. Overall, we view our analysis as a necessary first step but not altogether sufficient in firmly establishing how school districts and unions work together to alter CBAs following shocks to school district finances.

Finally, as with any study that uses a single state (or district) as a case, our study is limited to districts in California and relies on California's unique school finance and union bargaining strength context. In addition, the data are derived from one of the worst economic downturns in California history. Consequently, this study should be viewed as one piece of information about CBA responses to fiscal constraint and should not be broadly generalized to other state contexts or less severe financial shocks. Rather, these results speak to what strong unions and school districts prioritize at the bargaining table in times of deep financial duress with implications for how districts in strong union states might navigate large financial troubles in the future.

Results

How Do CBAs Change During Times of Recession-Induced Fiscal Constraint?

Table 3 presents the DiD interaction coefficients (bottom row) from our estimation of Equation 3 for the main sample of treated NBA districts in comparison to the 22 BA districts. These coefficients provide estimates of the difference in average contract restrictiveness post-recession for NBA districts relative to BA districts in comparison to pre-recession

TABLE 5

Fully Parameterized Difference-in-Difference Models Comparing Pupil-Teacher Ratios for Non-Basic Aid Versus Basic Aid Districts

		Pupil-teacher ratio (1)
Pre-recession	Non-Basic Aid × 2003–2004	–0.702** (0.236)
	Non-Basic Aid × 2004–2005	–0.484* (0.189)
	Non-Basic Aid × 2005–2006 = reference	
	Non-Basic Aid × 2006–2007	0.155 (0.153)
During recession	Non-Basic Aid × 2007–2008	–0.102 (0.256)
	Non-Basic Aid × 2008–2009	0.264 (0.219)
	Non-Basic Aid × 2009–2010	0.349 (0.339)
	Non-Basic Aid × 2010–2011	0.873* (0.354)
Post-recession	Non-Basic Aid × 2011–2012	1.065*** (0.289)
Chi-squared test that pre-recession coefficients = 0		15.09**

Note. Provided are the dummied-out difference-in-difference estimates. Cluster robust standard errors are in parentheses. Per pupil revenues and expenditures were inflation adjusted to 2012 dollars. The interaction between Non-Basic Aid and the year indicator in Column 1, Row 1, for example, is interpreted as the difference in the pupil-teacher ratio in 2003–2004 between Non-Basic Aid and Basic Aid districts, relative to the difference in 2005–2006. All models control for student enrollment (ln), the percentage of free and reduced-price lunch students, district location (urban, rural, suburban), and district type (elementary district, high school district, unified district).

* $p < .05$. ** $p < .01$. *** $p < .001$.

outcome levels, controlling for common factors that impacted both NBA and BA districts over the observation time period. We find that CBAs in districts that face substantial financial constraints (NBA districts) appear to grow more restrictive in three of the seven subareas under study, school days and hours (Column 3), grievance (Column 5), and nonteaching duties (Column 6), relative to changes over the same time period in less constrained (BA) districts. Notably, both NBA and BA CBAs in these subareas become more restrictive, but NBA districts that are facing greater financial constraints grow even more restrictive over the course of the Great Recession. This is shown in Figure 3 as well as in summary statistics in Table 1 and the coefficients in Table 3

Specifically, school days/hours regulations in CBAs grew 0.036, or 40% of a pre-year *SD*, more restrictive in NBA than BA districts over the course of the recession (summary statistics, including standard deviations for the contract restrictiveness subareas, can be found in Table 1). This effect has meaningful implications for the kinds of policies negotiated into CBAs. For instance, a 40% *SD* change in school days and hours increases the probability that the average contract limits the teacher workday to less than 7 hours by nearly 20% or by 6 percentage points—from 33% to 39%.⁶ Similarly, grievance procedures grew more restrictive post-recession by 0.043 units (33% of an

SD) in NBA relative to BA districts. Nonteaching duty provisions in CBAs increased in restrictiveness by 50% of an *SD* (0.055) in the financially strapped NBA districts relative to BA districts. Again, to place this into context, a 50% *SD* change in nonteaching duties increases the probability that the average contract places limits on the length and quantity of teacher meetings by 5%.

Together, the difference-in-difference analyses suggest that Non-Basic Aid districts experienced significant changes to the restrictiveness of their CBAs relative to the contracts of their less financially constrained counterparts in the aftermath of the recession.

How Do Teacher Salaries Change During Times of Recession-Induced Fiscal Constraint?

In times of fiscal duress, districts and unions must negotiate over salaries in addition to working conditions and protections regulated by CBAs (Kober & Rentner, 2011). We saw previously that specific areas of CBAs become more restrictive to administrators when districts face severe financial hardships. In this section, we examine how teacher salaries change in districts suffering from greater fiscal constraint.

Results from our DiD models are presented in Table 4. We find that salaries in NBA districts decreased at both the

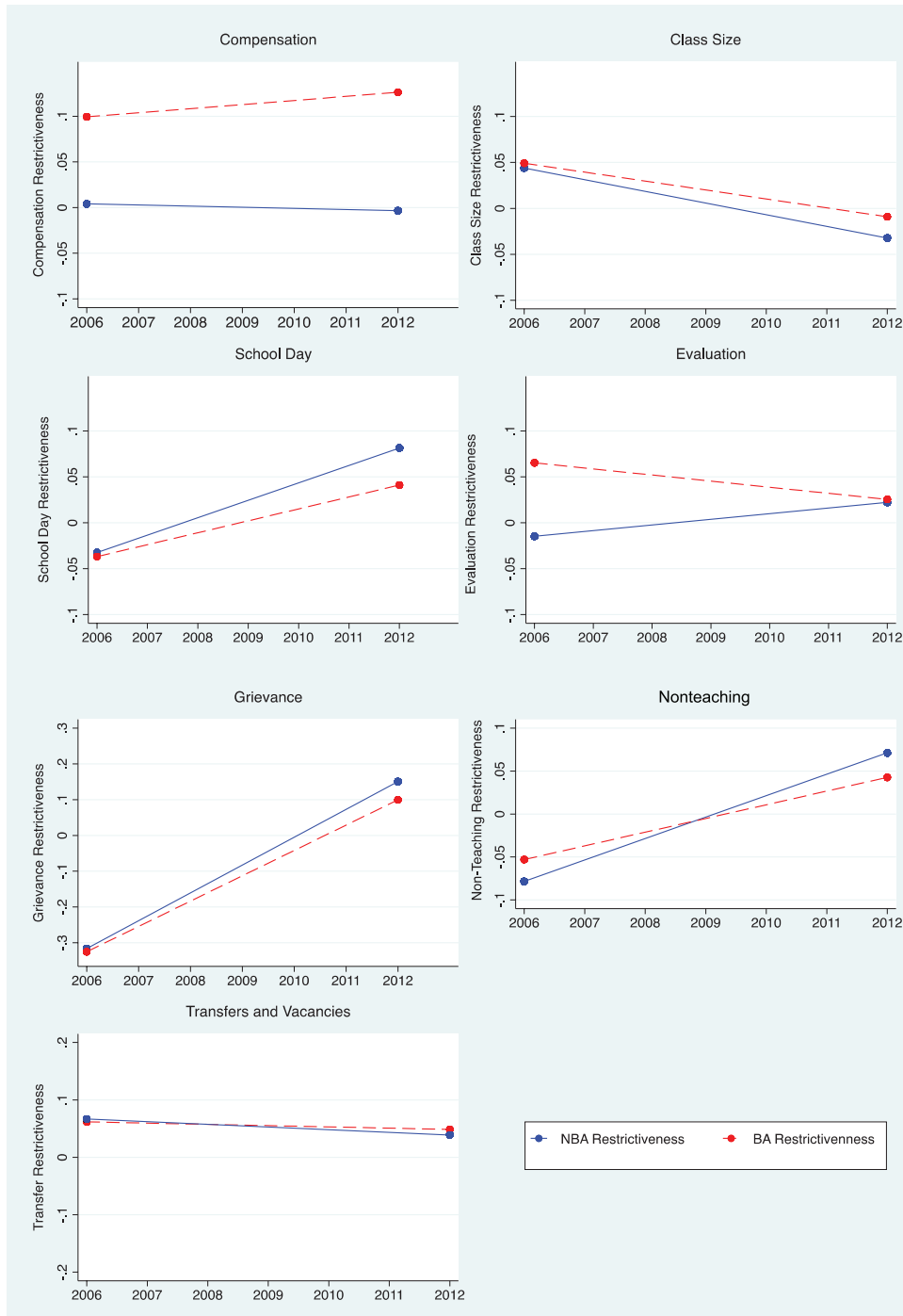


FIGURE 3. Trends in subarea restrictiveness.

bottom and top of the salary schedule and the average salary returns to experience decreased over the course of the recession relative to teacher salaries and experience returns in BA districts. However, these relationships are only statistically significant ($p < .01$) for novice teacher entering teaching at the base level of the salary schedule. This reinforces predictions that unions may bargain in the interests of their more

senior teachers, reducing base salaries before negotiating reductions for veterans.

How Do Pupil-Teacher Ratios Change During Times of Recession-Induced Fiscal Constraint?

Table 5 (Column 1) shows our results from our event study (Equation 4). We find that pupil-teacher ratios in NBA



FIGURE 4. Trends in pupil-teacher ratios.

Note. The vertical dashed lines show the beginning and ending years of the recession (National Bureau of Economic Research, 2010).

districts increased steadily over time, and in the 2010–2011 (during recession) and 2011–2012 (post-recession) years, pupil-teacher ratios in NBA districts were 0.87 and 1.07 students per teacher larger than in 2005–2006, respectively.

Figure 4 and Table 5 also provide some evidence of pre-recession trends in pupil-teacher ratios for NBA relative to BA districts. Although Figure 4, which shows unadjusted trends in pupil-teacher ratios for NBA versus BA districts since the 2003–2004 school year, suggests that both NBA and BA pupil-teacher ratios began to decline in the 2003–2004 school year, with BA ratios declining at a faster rate, the event study results shown in Table 5 show that in fact, once we have adjusted for the set of covariates discussed in the “Data” and “Methods” sections, NBA pupil-teacher ratios were decreasing at a significantly faster rate than in comparison Basic Aid districts. As is shown in the bottom of Table 5, we reject the null hypothesis on the chi-square test that the pre-recession trends are equivalent ($p < .01$). Given that the pre-recession trends suggest movement in the opposite direction of our post-recession treatment effect, our observed effect may be biased downward but not upward. Consequently, we may be underestimating the positive impact of the recession on pupil-teacher ratios in NBA relative to BA districts.

Conclusion

There are few forces more important, and perhaps more controversial, in the provision of public education than teachers’ unions and their collective bargaining rights and

the financing of K–12 schools. This article examines the interaction of the two; we assess how the CBAs negotiated between teachers’ unions and local school district administrators change during times of severe fiscal constraint, as evidenced by the Great Recession.

We find that school districts and teachers’ unions make changes to key instructional resources during times of fiscal constraint in ways that may not benefit students. We find suggestive evidence that unions and administrators negotiated increased class sizes and decreased instructional hours in financially constrained districts. This is in addition to cuts to teacher salaries, which may not have short-term effects on instruction but serve as one of the most important working conditions for teachers. In compensation for these changes, we find some evidence that teachers’ unions “traded” for nonpecuniary contract language that increased the restrictiveness of union contracts in key areas, namely, nonteaching duties and grievance procedures. These policy subareas do not directly impact districts’ bottom lines but likely do constrain administrators’ flexibility in tackling important educational problems. For instance, more restrictive nonteaching duties provisions might make it such that districts cannot ask teachers to come to extra professional development meetings or cannot schedule faculty meetings to address problems of practice. They might require that administrators provide more duty-free time to teachers and/or reduce their expected contributions to oversight of after-school activities (adjunct duties). Similarly, grievance subarea restrictiveness suggests that administrators have less flexibility to address disagreements between teachers and

administrators and that these disagreements last longer and take more teacher and administrator time to resolve.

Together, these findings have implications for how teachers' unions and schools district navigate periods of financial strain in the future. Although the degree of financial duress faced by school districts during the Great Recession was unprecedented, financial struggles are not a thing of the past. As districts work to balance growing pension liabilities with ongoing operational needs, navigate cyclical recessionary patterns, see their enrollments decline, and experience competitive pressures from alternative schooling options such as charter schools, most if not all public school districts in the United States will face mounting fiscal pressure (Arsen, DeLuca, Ni, & Bates, 2015; Bifulco & Reback, 2014; Dolan, 2016; EdSource, 2012; Favot, 2016; Shaffer, 2016). School district administrators may turn to their CBAs to both maintain key instructional resources, like class sizes and instructional hours, and generate financial flexibility in other areas like teacher compensation. Because it's unlikely that administrators will be able to secure this flexibility without compensating teachers in some other way, they may have to increase the restrictiveness of contract language in nonpecuniary contracts areas like teacher transfers and grievances. While these policies may enhance teacher working conditions, they also may make it more difficult for administrators to flexibly operate their districts to address the needs of their students and schools.

We also hope that this study helps pave the way for additional research on the intricacies of collective bargaining in an era of changing union power. Our study suggests that cuts to CBAs during a large fiscal shock were not unilaterally beneficial for students, or school districts, or teachers' unions, thereby indicating that tradeoffs were made at the bargaining table. With the growing #RedforEd movement, teachers' unions have been organizing strikes in states and cities across the country, demanding (and winning) higher salaries, smaller class sizes, and additional support staff. This showcase of union bargaining power is likely, in part, a response to the recent Supreme Court ruling in *Janus vs. The American Federation of State, County, and Municipal Employees* (2018), which prohibited the collection of "fair share" fees from nonunion public sector employees for the cost of union bargaining services. As a result, our understanding of the implications of teachers' union power, especially in contract negotiations, may need to be updated even further. We are aware that there are similar data on CBA content available in states outside of California. Further work in a similar vein can help assess the degree to which our results are generalizable outside of California and the Great Recession. Moreover, we believe that there is a need for qualitative work that can get inside the negotiations as they are underway to assess why administrators and unions make the decisions they do at the bargaining table. Such empirical evidence will help inform both theory and practice.

Acknowledgments

Funding for this study was provided in part by the National Academy of Education/Spencer Foundation Postdoctoral Fellowship. We gratefully acknowledge Leslie Landers, Michelle Widener, and Dara Zeehandelaar for their invaluable research support. We would also like to thank all of the school district personnel who provided us with copies of their collective bargaining agreements. In addition, we are grateful to Josh Cowen, Geert Ridder, and session participants at the annual meetings of the Association for Education Finance and Policy, the Association for Public Policy Analysis and Management, and the American Educational Research Association for valuable feedback. The views expressed in this article do not necessarily reflect those of Michigan State University, the University of Nevada, Las Vegas, any of the districts included in this study, or the study's sponsors. Responsibility for any and all errors rests solely with the authors.

Notes

1. We generate Figure 2 based on our sample of 406 school districts in California with four or more schools with collective bargaining agreement (CBA) data from the 2005–2006 and 2011–2012 school years. The figure compares 22 Basic Aid (BA) districts (defined in 2005–2006) to the main sample of 384 Non-Basic Aid (NBA) school districts (blue). Revenue values are inflation-adjusted. Figures using the complete set of data on California districts look substantially the same and are available on request. Figure 2 suggests that revenues are lower than expenditures. This is because the NCES data set used in our analyses excludes from its definition of revenue a set of financing sources available to districts but not officially accounted as revenue by the California Department of Education (e.g., emergency apportionments, proceeds from sale or lease purchase of land and buildings, etc.). When we adjust the definition of revenue using California's Standardized Accounting Code Structure financial data, our results are the same. Available from the authors on request.

2. The data for this article come from a data set of negotiated CBAs between school districts and teachers' unions in California in place during the 2005–2006 and 2011–2012 school years. CBAs are generally renegotiated every 3 years, although not all districts are able to reach new contract agreements within the required 3-year timeframe. These districts roll over their existing contracts unchanged from the previous negotiation cycle. These CBAs are included in the database even if the contract is identical to what was collected in the previous round of data collection because these CBAs still govern school and district operations in the absence of new contracts. This impacts very few of the CBAs in our sample: fewer than 2% of districts had the same CBAs in place between 2005–2006 and 2011–2012.

3. In particular, many contract policies (e.g., teacher transfer and grievance provisions) do not affect districts with only a few schools or affect them to a much lesser extent. For example, which teachers receive priority for voluntary transfer decision is less important in school districts with only one or two schools than in larger school districts because there are fewer transfer options.

4. In total, our set of contracts contains 466 (80%) of California school district contracts from the 2005–2006 school year and 487 (83%) from the 2011–2012 school year. The longitudinal sample contains CBAs for 406 school districts collected in 2005–2006

and 2011–2012, which represents 73% of the total population of California districts with four or more schools in both years. To examine whether missing data may bias our results, we regress an indicator that equals 1 if the district is missing from our pre- or post-sample on our set of observable covariates. These results are presented in online Appendix Table D1. We find very few observable differences between sampled and missing BA districts in either the pre- or post-recession years. The only significant difference is in the post-year, when missing BA districts have a slightly higher probability of being rural. In the pre-year, we also see few significant differences between missing and nonmissing NBA districts. Missing NBA districts are more likely to be rural and have fewer Asian students. In the post-recession year, missing NBA districts are more likely to be rural and significantly less likely to be in urban or suburban locations. In addition, they have higher proportions of low-income and White students and lower proportions of Black, Hispanic, and Asian students. They are also significantly smaller. Note that in California, rural districts are smaller and have higher proportions of White and low-income students than their urban counterparts. All of these factors substantiate our hypothesis that CBAs missing from our sample result from smaller central office staffs that constrain their ability to respond to public data requests or post documents to websites. In other words, the failure of districts to respond to our request for CBAs or post them on their website is likely not associated with the strength of the teachers' union or the district or union's likelihood of negotiating more or less flexible contracts independent of their size. Nonetheless, given these differences in the post-year for NBA districts, we note that our sample of districts with four or more schools is not necessarily representative of the population of districts with four or more schools in California.

5. We also include 2008–2009 CBA data in the generation of these partial independence item response (PIIR) measures. We do not include 2008–2009 CBA restrictiveness measures in our analysis because it is unclear if this year should be classified as a pre-treatment or a treatment year. Presumably, the CBAs negotiated to be in effect in the 2008–2009 school year were negotiated by summer 2008 but really any time in the 3 years before summer 2008 (so, as early as summer 2005). This suggests that it is more likely that these CBAs are from pretreatment years. However, at least some of them may have been negotiated during the recession, in the summer of 2008. As such, we focus our analysis on CBAs that were negotiated before the recession (in place by 2005–2006) compared to those that were negotiated either during or after the recession (in place by 2011–2012). The inclusion of the 2008–2009 CBAs in the generation of the PIIR measure should not bias our results as it simply lends more information to the generation of the relative restrictiveness measure for each district in each year.

6. The conditional severities (γ_k) from the PIIR model capture the value of contract restrictiveness at which a given item has 0.5 likelihood of appearing in a contract. The severities are easily converted into conditional probabilities at a given level of contract restrictiveness using the following formula: $\phi_k = \exp((\bar{x} + s) - \gamma_k) / (1 + \exp((\bar{x} + s) - \gamma_k))$, where γ_k represents the conditional severity of the item and \bar{x} and s are constants that represent the sample mean and standard deviation of contract restrictiveness. We can further convert the conditional probabilities into marginal probabilities by multiplying the conditional probability of a given item by the conditional probabilities of its gate items. The resulting marginal probability tells us the

probability of a given item appearing in a contract at a given level of contract restrictiveness.

ORCID iD

Bradley D. Marianno  <https://orcid.org/0000-0002-3846-4041>

References

- Arsen, D., DeLuca, T. A., Ni, Y., & Bates, M. (2015). Which districts get into financial trouble and why: Michigan's story. *Journal of Education Finance*, 42(2), 100–126.
- Bascia, N. (1994). *Unions in teachers' professional lives: Social, intellectual, and practical concerns*. New York, NY: Teachers College Press.
- Bascia, N. (2005). Triage or tapestry? Teacher unions' work in an era of systemic reform. In N. Bascia, A. Cumming, A. Datnow, K. Leithwood, & D. Livingstone (Eds.), *International handbook of educational policy* (pp. 593–609). Dordrecht, the Netherlands: Springer.
- Bifulco, R., & Reback, R. (2014). Fiscal impacts of charter schools. *Education Finance and Policy*, 9(1), 86–107.
- Bureau of Labor Statistics. (2012, February). *The recession of 2007–2009*. Retrieved from http://www.bls.gov/spotlight/2012/recession/pdf/recession_bls_spotlight.pdf
- Bureau of Labor Statistics. (2014, October). *Consumer spending and U.S. employment from the 2007–2009 recession through 2022*. Retrieved from <http://www.bls.gov/opub/mlr/2014/article/consumer-spending-and-us-employment-from-the-recession-through-2022.htm>
- Chakrabarti, R., Livingston, M., & Setren, E. (2015). The Great Recession's impact on school district finances in New York State. *Economic Policy Review*, 12(1), 45–66.
- Chambers, J. G. (1977). The impact of collective bargaining for teachers on resource allocation in public school districts. *Journal of Urban Economics*, 4(3), 324–339.
- Chingos, M., & Blagg, K. (2017). *Making sense of state school funding policy*. Retrieved from https://www.urban.org/sites/default/files/publication/94961/making-sense-of-state-school-funding-policy_0.pdf
- Chubb, J. E., & Moe, T. M. (1990). *Politics, markets & America's schools*. Washington, DC: The Brookings Institution.
- Cowen, J. M., & Fowles, J. (2013). Same contract, different day? An analysis of teacher bargaining agreements in Louisville since 1979. *Teachers College Record*, 115(5), 1–30.
- Dolan, J. (2016, September). The pension gap." *Los Angeles Times*. Retrieved from <http://www.latimes.com/projects/la-me-pension-crisis-davis-deal/>
- Duplantis, M. M., Chandler, T. D., & Geske, T. G. (1995). The growth and impact of teachers' unions in states without collective bargaining legislation. *Economics of Education Review*, 14(2), 167–178.
- Eberts, R. W. (1983). How unions affect management decisions: Evidence from public schools. *Journal of Labor Research*, 4(3), 239–247.
- Eberts, R. W. (2007). Teachers unions and student performance: Help or hindrance? *The Future of Children*, 17(1), 175–200.
- Eberts, R. W., & Stone, J. A. (1984). *Unions and public schools: The effect of collective bargaining on American education*. Lexington, MA: Lexington Books.

- EdSource. (2012, May). *Schools under stress: Pressures mount on California's school district*. Retrieved from <https://edsources.org/wp-content/publications/pub12-stress-factors-final.pdf>
- Evans, W. N., Schwab, R. M., & Wagner, K. L. (2019). The Great Recession and public education. *Education Finance and Policy*, 14(2), 299–326.
- Favot, S. (2016, September). 4 things to know about LAUSD's pension costs and other benefits obligations for its teachers and other staff. *LA School Report*. Retrieved from <http://laschoolreport.com/4-things-to-know-about-lausds-pension-obligations-for-its-teachers-and-other-staff/>
- Gallagher, D. G. (1979). Teacher negotiations, school district expenditures, and taxation levels. *Educational Administration Quarterly*, 15(1), 67–82.
- Gershenson, S. (2016). Performance standards and employee effort: Evidence from teacher absences. *Journal of Policy Analysis and Management*, 35(3), 615–638.
- Goldhaber, D., Lavery, L., & Theobald, R. (2014). My end of the bargain are there cross-district effects in teacher contract provisions? *ILR Review*, 67(4), 1274–1305.
- Goldhaber, D., Lavery, L., Theobald, R., D'Entremont, D., & Fang, Y. (2013). Teacher collective bargaining: Assessing the internal validity of partial independence item response measures of contract restrictiveness. *SAGE Open*, 3(2).
- Gordon, T. (2012). *State and local budgets and the Great Recession*. Retrieved from <http://www.brookings.edu/research/articles/2012/12/state-local-budgets-gordon>
- Harrington, T. (2019, March). Oakland school board cuts \$20.2 million from budget, including 100 jobs. *EdSource*. Retrieved from <https://edsources.org/2019/oakland-school-board-cuts-20-2-million-from-budget-including-100-jobs/609483>
- Hill, P. T. (2006). The cost of collecting bargaining agreements and related district policies. In J. Hannaway, & A. J. Rotherham (Eds.), *Collective bargaining in education: Negotiating change in today's schools* (pp. 89–110). Cambridge, MA: Harvard Education Press.
- Hoxby, C. M. (1996). How teachers' unions affect education production. *The Quarterly Journal of Economics*, 111(3), 671–718.
- Ingle, W. K., & Wisman, R. A. (2018). Extending the work of Cowen and Fowles: A historical analysis of Kentucky teacher contracts. *Educational Policy*, 32(2), 313–333.
- Ioannidis, J., Stanley, T. D., & Doucouliagos, H. (2017). The power of bias in economics research. *The Economic Journal*, 127(605), F236–F265.
- Jackson, C. K., Wigger, C., & Xiong, H. (2018). *Do school spending cuts matter? evidence from the great recession* (No. w24203). Cambridge, MA: National Bureau of Economic Research.
- Jepsen, C., & Rivkin, S. (2009). Class size reduction and student achievement the potential tradeoff between teacher quality and class size. *Journal of Human Resources*, 44(1), 223–250.
- Jez, S. J., & Wassmer, R. W. (2015). The impact of learning time on academic achievement. *Education and Urban Society*, 47(3), 284–306.
- Kaufman, B. E., & Martinez-Vazquez, J. (1990). Monopoly, efficient contract, and median voter models of union wage determination: A critical comparison. *Journal of Labor Research*, 11(4), 401–423.
- Kerchner, C. T., Koppich, J. E., & Weeres, J. G. (1997). *United mind workers: Unions and teaching in the knowledge society*. San Francisco, CA: Jossey-Bass Inc.
- Kleiner, M. M., & Petree, D. L. (1988). Unionism and licensing of public school teachers: Impact on wages and educational output. In R. B. Freeman, & C. Ichniowski (Eds.), *When public sector workers unionize* (pp. 305–322). Chicago, IL: University of Chicago Press.
- Kober, N., & Rentner, D. S. (2011). *Strained schools face bleak future: Districts foresee budget cuts, teacher layoffs, and a slowing of education reform efforts*. Retrieved from <http://files.eric.ed.gov/fulltext/ED521335.pdf>
- Koski, W. S., & Horng, E. L. (2007). Facilitating the teacher quality gap? Collective bargaining agreements, teacher hiring and transfer rules, and teacher assignment among schools in California. *Education Finance and Policy*, 2(3), 262–300.
- Leachman, M., & Mai, C. (2014). *Most states funding schools less than before the recession*. Retrieved from <http://www.bls.gov/opub/mlr/2014/article/consumer-spending-and-us-employment-from-the-recession-through-2022.htm>
- Marianno, B. D., Bruno, P., & Strunk, K. O. (2018). *The efficiency effects of public sector unions: Longitudinal evidence from California school districts*. Unpublished working paper.
- Marianno, B. D., & Strunk, K. O. (2018). The bad end of the bargain?: Revisiting the relationship between collective bargaining agreements and student achievement. *Economics of Education Review*, 65, 93–106.
- McDonnell, L., & Pascal, A. (1979). *Organized teachers in American schools*. Retrieved from <http://www.rand.org/pubs/reports/R2407.html>
- Moe, T. M. (2011). *Special interest: Teachers unions and America's public schools*. Brookings Institution Press.
- National Bureau of Economic Research. (2010). *Business cycle dating committee report*. Retrieved from <http://www.nber.org/cycles/sept2010.html>
- Reardon, S. F., & Raudenbush, S. W. (2006). A partial independence item response model for surveys with filter questions. *Journal of Sociological Methods*, 36, 257–300.
- Resmovits, J. (2013, March 14). California teacher layoffs decline because of Prop 30. *Huffington Post*. Retrieved from http://www.huffingtonpost.com/2013/03/14/california-teacher-layoffs-prop-30_n_2879260.html
- Sanes, M., & Schmitt, J. (2014). *Regulation of public sector collective bargaining in the states*. Washington, DC: Center for Economic and Policy Research.
- Shaffer, L. (2016). *Citi: Risk of global recession rising*. Retrieved from <http://www.cnbc.com/2016/02/25/citi-risk-of-global-recession-rising.html>
- Simon, K., Soni, A., & Cawley, J. (2017). The impact of health insurance on preventive care and health behaviors: Evidence from the first two years of the ACA Medicaid expansions. *Journal of Policy Analysis and Management*, 36(2), 390–417.
- Steinberg, M. P., & Sartain, L. (2015). Does teacher evaluation improve school performance? Experimental evidence from Chicago's Excellence in Teaching project. *Education Finance and Policy*, 10(4), 535–572.
- Strunk, K. O. (2011). Are teachers' unions really to blame? Collective bargaining agreements and their relationships with district resource allocation and student performance in California. *Education Finance and Policy*, 6(3), 354–398.
- Strunk, K. O. (2012). Policy poison or promise: Exploring the dual nature of California school district collective bargaining

- agreements. *Educational Administration Quarterly*, 48(3), 506–547.
- Strunk, K. O., Cowen, J., & Goldhaber, D. (2018, March). Please, let research inform the union debate. *Education Next*. Retrieved from <https://www.educationnext.org/please-let-research-inform-union-debate/>
- Strunk, K. O., Goldhaber, D., Cowen, J., Marianno, B. D., Kilbride, T., & Theobald, R. (2019). *Collective bargaining and state-level reforms: Assessing changes to the restrictiveness of collective bargaining agreements across three states*. Unpublished working paper.
- Strunk, K. O., & Grissom, J. A. (2010). Do strong unions shape district policies?: Collective bargaining, teacher contract restrictiveness, and the political power of teachers' unions. *Educational Evaluation and Policy Analysis*, 32(3), 389–406.
- Strunk, K. O., & McEachin, A. (2011). Accountability under constraint: The relationship between collective bargaining agreements and California schools' and districts' performance under No Child Left Behind. *American Educational Research Journal*, 48(4), 871–903.
- Strunk, K. O., & Reardon, S. F. (2010). Measuring the strength of teachers' unions: An empirical application of the partial independence item response approach. *Journal of Educational and Behavioral Statistics*, 35(6), 629–670.
- Swaak, T. (2019). *A look into the LAUSD, UTLA contract deal that's ending the 6-day teacher strike in Los Angeles*. Retrieved from <https://www.the74million.org/article/a-look-into-the-laUSD-utla-contract-deal-that-could-end-the-6-day-teacher-strike-in-los-angeles/>
- Taylor, E. S., & Tyler, J. H. (2012). The effect of evaluation on teacher performance. *American Economic Review*, 102(7), 3628–3651.
- U.S. Department of Education. (2015). *Improving basic programs operated by local educational agencies (Title I, Part A)*. Retrieved from <https://nces.ed.gov/fastfacts/display.asp?id=158>
- Weston, M. (2013). *Basic aid school districts*. Retrieved from http://www.ppic.org/content/pubs/report/R_913MWR.pdf

Authors

KATHARINE O. STRUNK is a professor of education policy and, by courtesy, economics, the Clifford E. Erickson Distinguished Chair in Education at Michigan State University, and the co-director of the Michigan State University Education Policy Innovation Collaborative (EPIC). Strunk's research is focused on three areas under the broad umbrella of K–12 education governance: teachers' unions and the collective bargaining agreements they negotiate with school districts, teacher evaluation and compensation, and accountability policies.

BRADLEY D. MARIANNO is an assistant professor of educational policy and leadership at the University of Nevada, Las Vegas. His research focuses on the consequences of local and state education policy change for educational governance with a substantive focus on teacher labor policy and the politics of policy decision making and implementation.