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Abstract

This paper summarizes the research on the relationship between teacher unionization and educational outcomes at the state, district, school, and individual (student) levels. Although teachers are the largest organized professionals in the United States, much of educational policy literature has ignored unionization as a subject of study. An emerging consensus from the literature believes that collective bargaining raises teacher pay, increases district expenditure and reduces class size; however, union influence on student outcomes has not yet been established. The literature is unclear as to whether or not teacher unionization is associated with student graduation rates or standardized test scores.

Keywords: teachers union, teacher unionization, educational outcomes

Educational policy research often utilizes data sets that span multiple states to study policy effects on teacher pay, student dropout rates, and student achievement. One variable of interest that is frequently overlooked in a multi-state study is the presence of a teacher union. The size, strength, and legal standing of a teacher's union produce unique working conditions in the district where the union operates. Multistate studies that omit a unionization variable fail to control for preexisting state conditions when trying to isolate policy outcomes. This paper summarizes the research on the relationship between teacher unionization and educational outcomes at the state, district, school, and individual (student) levels. The following research questions are addressed:

- How does the extent of unionization influence outcomes, such as teacher pay and student achievement?

- What are the primary methodological and analytical traditions found in the published literature on the effects of unionization on various educational outcomes?
- What are the principal theoretical and conceptual traditions utilized in present efforts to understand the relationship?
- What are the current gaps in our understanding of the relationship between teacher unionization and educational outcomes and performance?

Teacher unionization has changed over time and is difficult to define. This paper first establishes what a "unionized" state is and how that is defined. Next, the popular theoretical and methodological traditions in union research are covered. Then, this paper summarizes key studies that link unionization to educational outcomes. Last, gaps in the literature are identified as well as possible future directions in research. Although teacher unions are often discussed in the educational policy realm, the academic literature has largely ignored unionization as a subject of study (Kleiner, 1990; Lott & Kenny, 2013). This literature review examines the evidence linking teacher unions to educational outcomes as well as identifies areas yet to be explored.

Background on Teachers' Unions

The landscape of teachers' unions that is seen today is the result of decades of ever-evolving power sharing between states, districts, and teachers. In 1963, 93% of the school districts in the US had active teacher organizations, but only 1% had a collective bargaining contract with its teachers (Hoxby, 1996). In contrast, the 1960s through the 1980s was a period of rapid growth for the collective bargaining power of teachers' unions (Hoxby, 1996). As states began allowing, and even requiring, collective bargaining, the number of teachers who worked under a contract that resulted from collective bargaining had increased to 36% by 1993. Hoxby found that the 1980s were a period of rapid change and expansion for unions; however, the unionization changes had stabilized by 1990.

While most of the education policy and funding decisions are made on the state and district level, there are two significant national teachers' unions in the United States, the American Federation of Teachers (AFT) and the National Educational Association (NEA) (Coulson, 2010; Duplantis, Chandler, & Geske, 1995; Steelman, Powell, & Carini, 2000). Both the AFT and the NEA are over one hundred years old, employ national lobbyists, and have members

in all 50 states. There are approximately 3.5 million teachers in the United States, making teaching the largest unionized profession (Kleiner, 2000).

Unionization Across the States

Broadly, a teachers' union is defined as a voting organization formed to represent teachers collectively. Each state varies on the degree to which unionization is allowed, presenting a challenge as to whether or not a state is truly "unionized." The unions have a unique legal standing in each state, and the extent to which a union can influence a particular issue can vary significantly across states. Several authors have divided the broad label of 'unionized' into multiple categories of influence in order to avoid the dichotomous assignment of unionized or non-unionized. There are three levels of unionized states: mandatory bargaining states, union permissive states, and 'right to work' states (Duplantis et al., 1995; Lindy, 2011).

According to an analysis by the National Council on Teacher Quality, the majority of states fall into the strictest category of protection for labor bargaining. Thirty states require that their districts collectively bargain with teachers and possess a state statute, which explicitly protects that right. Fifteen states allow individual districts to decide whether or not they will collectively bargain with the teacher unions. Should they decide to bargain, these states have statutes that do not mandate that they reach an agreement with the unions. Texas, Georgia, South Carolina, North Carolina and Virginia are the five states in which collective bargaining is explicitly prohibited by statute in the state constitution (National Council on Teacher Quality, n.d.).

Within the states that allow or require bargaining, there are labor topics that are explicitly provided for or outlawed by state statute during collective bargaining. For example, in Indiana, districts are required to collectively bargain for wages, but teachers' hours are a prohibited item of bargaining (National Council on Teacher Quality, n.d.). Comparisons across states are difficult because union influence is not equally expressed over the full range of bargaining issues, like hours, pay, class size or teacher tenure. In order to more precisely rank the influence of unions in each state, many researchers have attempted to define unionization in a variety of ways. While the presence or absence of a union contract is easy to measure, no consensus on the best way to count unionization exists.

Union Models

The way researchers ap-

proach union models can be contextualized in three important ways. The first way is to identify popular theoretical traditions in the union literature. The theoretical traditions are the ideological underpinnings of the study. The second approach is to evaluate the methodological traditions that a study draws on to analyze the data in the studies. The third method is to analyze how the author decides to count unionization. The decisions authors make in these three areas are critical to the framing and findings of the studies. After a discussion of relevant studies on the topic, the most influential methodological and theoretical traditions are summarized.

Theoretical Traditions

There are several common theoretical frameworks underlying many models in the teacher union literature: rent-seeking behavior, appealing to the median voter model, and Tiebout sorting. The premise of rent-seeking is that an organization will act in its own best interest (Krueger, 1974). When an author questions whether unions benefit themselves or the students, the theoretical underpinning for the model is rent-seeking. If a union is found to be rent-seeking, it would pursue higher pay, smaller classes, and strong tenure with no corresponding increase in quality. In rent-seeking unions, teacher conditions would improve; however, the students would not be better off, leading to the conclusion the policies were pursued out of self-interest. Union studies that question if the changes are beneficial for the students or the teachers are usually testing this theory. Rose and Stonstelie (2010) and Lindy (2011) utilized a rent-seeking framework as the premise of their papers, as they investigated teacher unions.

The median voter model states that a voting organization will appeal to the median of their population to maintain a majority of votes. Winters (2011) built upon this theoretical model to explain the union's defense of advanced degrees and teacher tenure. The union, in this case, is appealing to their median voter, or the average teacher. In an effort to appease the median voter, the voting organization will pursue policies that will be popular with the typical voter.

Finally, the Tiebout sorting theory suggests that people "vote with their feet," and if people are unhappy with their district, they will move. Thus, the deserted district will be forced to compete and improve quality to win people back, or the district offering the more desirable education will attract more people. Lovenheim (2009) used this theory to study outcomes of unionization.

Methodological Traditions

When examining the effect of unions, several popular methodological traditions are discussed in the union literature—difference-in-difference or the statistically similar panel data with fixed effects (Hoxby, 1996; Lovenheim, 2009). Difference-in-difference captures existing differences and subtracts them from the beginning and end time points to neutralize a difference that may exist from the outset. Panel data with fixed effects is very similar, but difference-in-difference has two groups compared at two points in time. Panel data with fixed effects allows multiple groups at multiple points in time to be analyzed (Lindy, 2011). Generalized Method of Moments (GMM) is a regression where certain variables can be frozen and treated as a constant and, thus, factored out while maintaining the consistency and asymptotically normal properties of the estimator (Winters, 2011). Ordinary Least Squares (OLS) is also frequently used as well as regression with Instrumental Variables (Duplantis et al., 1995; Lott & Kenny, 2013; Moe, 2009; Rose & Stonstelie, 2010; Steelman et al., 2000).

Methods for Calculating Unionization

Since no consensus in the field is currently established on the meaning of 'unionized', several different ways are used to determine if a state is unionized. In a seminal paper, Hoxby (1996) used a dummy variable for union presence in a state. Other researchers have since tried to quantify the strength of union presence on a variety of dimensions. Methods for obtaining a continuous rather than discrete measure of union strength include: a measure of financial power (Lott & Kenny, 2013), the percentage of a district or state that is a member (Duplantis et al., 1995; Steelman et al., 2000; Winters, 2011), the percentage of voters in union elections (Lovenheim, 2009), union friendly laws (Hoxby & Leigh, 2004), and a composite of multiple dimensions of influence (Moe, 2009; Rose & Stonstelie, 2010). States that appear strong on one metric may be weak on another, making an overall measure hard to obtain. From the literature, common metric that is widely accepted as a measure of union power has yet to be developed.

There are two other considerations that must be addressed when constructing a union model. The first issue is how to handle the data from Hawaii, as the whole state is one district with a strong union, resulting in a bilateral monopoly that does not exist in any other state (Winker, Scull, & Zeehandelaar,

2012). The second concern is properly controlling for the demographic difference in the South and the lack of teacher unions throughout that region. Even after controlling for demographics (race, percentage taking the test, parent education, and poverty), the South is still a statistically significant predictor of SAT scores (Steelman et al., 2000).

Union Presence and Student Outcomes

Several authors have attempted to quantify union influence on popular outcome metrics for student and school performance. Some authors have measured teacher union influence on student level outcomes, such as student graduation rates and student achievement., ther authors have focused on the district and school level outcome variables, like class size and district expenditure. The following section examines the evidence available on how a union affects its associated districts and students.

District Outcome: Expenditure and Class Size

A popular question in union research centers on if district expenditure is influenced in the presence of unions (Duplantis et al., 1995; Hoxby, 1996; Lovenheim, 2009; Winters, 2011). Class size has also been included as a proxy measure for district expenditure because of the cost of increased staffing (Rose & Stonstelie 2010). In a seminal paper, Hoxby (1996) examined why school production functions were positive before 1960, and increasing expenditure has had little to no effect thereafter on school achievement. This discovery means teachers could be modeled in an equation to show positive achievement gains for every dollar spent on a teacher's salary. Hoxby tested the hypothesis that unions could be one factor for the increasing, yet nonproductive, allocation of resources in schools by analyzing panel data from 10,509 districts, the National Bureau of Economic Research (NBER) and the Public Sector Collective Bargaining dataset, using difference-indifference. The most significant contribution of this study was the size, methodology and detail. The measure for school achievement was the high school dropout rate (16–19 not in school and no degree). A dummy variable was used for unionization in the time period a district unionized. A district was coded 'unionized' if at least 50% of the teachers were members and the district teaching contract was a result of collective bargaining. The study showed that the presence of unions increases the amount of district per pupil spending by 3%. Then, Hoxby (1996) used a passage of statewide laws as an Instrumental

Variable (IV), or proxy for unionization. Reanalyzing the data using difference-in-difference on the data with IVs, Hoxby (1996) found that per pupil expenditure increased by 12.3%, fortifying the original conclusion that per pupil spending increases are linked to unionization, even more than previous research had shown.

Duplantis et al. (1995) conducted a cross-sectional study on 11 states without collective bargaining provisions to determine the difference in teacher pay between union and nonunion districts. This analysis yielded corroborating results to the aforementioned studies. Analyzing only districts with over 10,000 students in 11 states using Ordinary Least Squares (OLS), the authors found that having a collective bargaining agreement in place is associated with a 15.5% increase in district spending (Duplantis, et al., 1995).

In response to studies showing unions increased district spending, Lovenheim (2009) cited Hoxby (1996) as a basis for research; but, where Hoxby coded unionization as a dummy variable, Lovenheim, instead, measured union strength by paper ballots cast in union elections with an interaction of length of unionization. Hypothesizing that unions have no impact on teacher pay or per student district expenditures, the outcome variable of high school dropouts was used (as Hoxby did) as a proxy for district achievement;however, the rate was slightly altered to include 14- to 18-year-olds. Lovenheim (2009) hand collected paper ballots cast for union leaders in Iowa, Minnesota and Indiana. This method was believed to be a more effective proxy for union strength because it captured active union activity in a district, thus the likelihood that the union influenced policy (Lovenheim, 2009). Using nonparametric regression on the original Hoxby question, the result was that unions are correlated with increased spending but do not have a statistically significant impact on per-student district expenditures given the strength or length of union presence (Lovenheim, 2009). As union participation increased, district spending also tended to increase. As the district spent more money on their students, neighboring students began to enter the district because of the Tiebout effect and increased the enrollment, which reduced the per pupil expenditure ratio (Lovenheim, 2009).

In a natural experiment in New Mexico, Lindy (2011) found that the presence of unions has no effect on the per pupil expenditure. Lindy exploited a natural experiment (where there is a naturally occurring,

non-experimental disruption to the variable of interest, which provides the researcher the opportunity to study the effect of the change with the same population) to examine unions before and after the legalization of unions in New Mexico. The result is in line with previous findings that unions do not appear to change per pupil expenditure.

Confirming the majority of findings, Rose & Stonstelie (2010) found that unions do decrease class size. By randomly sampling 771 out of 982 districts in California during the 1999-2000 school year and using OLS (with and without IV) and 2 Stage-Least-Squares, the authors found that, when controlling for demographics, larger unions yielded smaller class sizes with a lower ratio of pupils to teachers. The average class size is expected to be 1.2 students less in a large district compared to an average sized district (Rose & Stonstelie, 2010). The authors attribute this difference to the strength of the union in the larger district.

District Outcome: Teacher Pay

A growing body of evidence supports the hypothesis that the presence of a union increases teacher pay (Duplantis, et al., 1995; Hoxby, 1996; Rose & Stonstelie, 2010). Duplantis et al. (1995) found teachers working under a collective bargaining agreement earned 9.5% more than their counterparts in districts without one. Hoxby (1996) found that teachers who unionize get an increase of three to five percent in the time period for which they are unionizing, and this increase has a lagged effect of increasing pay compared to districts that unionize later, or never do.

Contrary to the previous findings, Lovenheim (2009) found that the strength of a union does not alter teacher pay, which is interesting because one of the top reasons teachers give for being in a union is to raise pay. Lovenheim (2009) also concluded that teachers' salaries were not found to increase in the long or short run due to unionization.

Winters (2011) examined the salary of experienced and inexperienced teachers based on the median voter model. Using this model, the author was interested in how union and nonunion districts prioritized the teacher pay scale. According to Schools and Staffing Survey (SASS), the average teacher has fifteen years experience and an advanced degree. The median voter model theorizes that unions would appeal to the median of their membership thus likely to favor policies that benefit the majority of members, in this case, experienced teachers. Linking three datasets (SASS, School District Demographic system and the Bureau of Labor Statistics) from 4,237

districts in the forty-eight contiguous states, union activity was measured by the legal status of collective bargaining and membership density; the data was analyzed with Generalized Method of Moments (GMM). The author found that, in districts with weak unions, the pay structure favors new hires (Winters, 2011). In districts with a strong union, the pay structure favors experience and advanced degrees. Controlling for the strength of the union and spillover effects from neighboring districts, teachers with experience earned up to 18–28% more than inexperienced teachers (Winters, 2011).

Student Outcome: High School Dropout Rate

Union presence is correlated with an increased number of high school dropouts; thus, when used as a proxy for school effectiveness, teacher unions appear to have a negative impact on student persistence (Hoxby, 1996; Lindy, 2011, Steelman, et al., 2000). Lovenheim (2009) found that there was a small decrease in high school graduation rates in the short run but no statistically significant effect of unions on dropouts in the long run. When comparing the means of districts that unionize with those that never do, Lovenheim (2009) found that non-unionized districts tend to be smaller and more rural with a higher poverty rate and fewer high school dropouts. The finding that union presence is more likely in an area with more high school dropouts indicates that, if unionization is used as a predictor for the dropout rate, endogeneity in the equation. Whatever triggers unionization within a population, something else simultaneously occurs,increasing the high school dropout rate. Therefore, studies that do not disentangle the simultaneous occurrence of the high school dropout rate and union presence will likely find that union presence decreases student persistence in high school.

Student Outcome: Achievement on Standardized Tests

A consensus has not been reached within the literature about the impact of unions on student achievement, in large, because of the variety of ways that unionization and achievement are defined. Several studies have tested for a possible relationship between union presence and student achievement.

Lott & Kenny (2013) authored a study of large districts (at least 10,000 students) in forty-two states. They operationalized union presence by monetary union dues. The authors regressed the dollar amount of union dues on reading and math scores in fourth grade. They found that students in states with the highest union dues (union

dues divided over the number of teachers and the number of students) had the lowest fourth grade test scores.

Two studies (Moe, 2009; Rose & Stonstelie, 2010) used the California Academic Performance Index (API) as a proxy for achievement. The API is a rating given to a California school on a scale of 200–1000. This number is a compilation score for yearly test achievement and test score growth. A measure is also reported for how well subpopulations are achieving within the school. Using the sum of the API outcome over four years, when teacher contracts were coded (using factor analysis), the more restrictive a teacher contract is to the district, the lower the API (Moe, 2009). In another study that measured union strength by size in California, the API scores in large districts with active unions were 3% lower than the average district score (Rose & Sonstelie, 2010).

Carini (2008) used data from the National Educational Longitudinal Study (NELS) from 1988 and 1990 to analyze test scores from 10,799 students. Prior knowledge was controlled for using the eighth grade test score, and the outcome measure was the history, reading, math and science standardized tenth grade test. Using OLS, Carini determined that in the first model, unions were associated with higher test scores; however, when further iterations of the models were run and all the controls were added, the effect size became insignificant.

When SAT and ACT scores are used as the proxy for achievement, unions do appear to positively influence scores. Lindy (2011) examined what happened when legal collective bargaining was prohibited and then reinstated in New Mexico. In 1999, the policy sunset on Collective Bargaining Rights; then, the subsequent 2003 Reauthorization of Collective Bargaining Rights provided a natural experiment to test the effect of unions on achievement longitudinally. Lindy (2011) analyzed panel data with fixed effects and found that the SAT scores of New Mexico students rose after the reinstatement of collective bargaining.

Similarly, Steelman et al. (2000) found that when controlling for demographics in the south, the SAT and ACT scores were raised in the presence of a higher percentage of teachers and staff in unions. This finding was key because the South has unique regional characteristics that can be overrepresented in the nonunion sample, as the South is the only region where unions are illegal.

K–12 achievement tests

can be difficult to compare across states because of the variation in standards and testing. In an attempt to work around this bias, SAT and ACT scores are used for proxies of achievement (Steelman, et al., 2000; Lindy, 2011); however, the state participation rate of eligible students on the SAT and ACT is a strong predictor of test scores (Powell & Steelman, 1996). If a state recruits more minorities and low socioeconomic status test takers in K–12, then, more likely, the scores will be lower because the percentage of wealthy, white college bound students taking the test will be lower (Powell & Steelman, 1996). Measuring unionization effects on student achievement with the SAT and ACT as a proxy for student achievement has the added problem of unionization being correlated with states that have a slightly higher dropout rate (Hoxby, 1996; Lindy, 2011, Steelman, et al., 2000, Lovenheim, 2009). As a result, one would expect that, when measuring the influence of unionization with SAT and ACT scores, a strong sorting effect has taken place in those states prior to the exam.

Further complicating matters, the level at which student achievement is operationalized has an impact on the outcome of the study. Carini (2008) concluded that studies where the data is highly aggregated to calculate student achievement are more likely to find negative effects of unionization than studies that use student level data.

Gaps in the Literature and Future Directions

Many studies have established a relationship between unionization and a variety of educational outcomes. Given that a variety of authors have found that unionization does have an impact on a multitude of educational outcomes, adding unionization as a control variable in future studies may improve policy models. Unfortunately, defining unionization is difficult, as the degree to which a state is unionized varies by district. Two studies propose a new method of calculating union strength for future research.

First, a joint study from the Fordham Institute and Education Reform Now ranks the 50 states across multiple dimensions of union strength (Winker, et al., 2012). This detailed 400-page analysis ranks the states by 37 variables across five dimensions of union influence. The authors findings generally support the division of states by the three bands of bargaining with the notable exception of North Carolina, which was ranked in the fourth, not the bottom fifth, tier even though collective bargaining is illegal in those districts (Winker et al., 2012). This

report is one of the most extensive attempts to rank union power across states; however, the rankings have yet to be used by a researcher as the definition of union influence in a research study. This preexisting measure would be interesting to test for union influence on educational outcomes, considering there are measures in multiple domains as well as an overall score for the state.

The second study used California district data to analyze union strength using district contracts (Strunk & Reardon, 2010). The authors applied test theory to contract items in districts to come up with a reliable score for union strength. This Partial Independence Item Response model looks at how rare an item is in district contracts and, then, ranks the items from least to most restrictive based on how rarely each appears in district contracts. Their latent trait model produced a ranking of 39 bargaining items in California teacher contracts that could be another useful preexisting measure for future research.

Further research is needed to develop more nuanced measures of teacher unionization. Because no consensus exists in the literature on how to measure union presence in a state, assessing preexisting measures of union strength is difficult. The effect of teacher unions on school outcomes is largely dependent upon the definition of unionization and the outcome measure selected; however, the future direction in the field is toward multiple measures of union strength.

Conclusion

Teacher unionization is a critical component of education policy in almost every state. The conclusion from the literature is that a relationship between teacher unionization and educational outcomes is evident at the various levels of education. Further, large-scale policy analyses that do not account for teacher unionization may be attributing differential policy effects to causes other than unionization. Theoretical models that control for teacher union strength are likely closer to accounting for the true policy climate in each state.

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