Abstract

The median voter theorem has regularly been used in economics to represent the behavior of teachers unions. Little empirical work, however, tests whether this framework is a good fit for teachers unions. The authors examine voting behavior in union representative elections between the National Education Association and the American Federation of Teachers and find evidence of divergent constituencies. The authors follow the empirical method of Jung et al. (1994) to investigate whether the median voter explains the outcomes of elections in 1977- 1979. If both teachers' unions select the platform desired by the median voter, there should be no systematic differences in voter preferences for unions. The authors find that these unions were fundamentally different and attracted distinct voting coalitions. The main implication of this study is that the effect of unions on important outcomes, such as wage structure, may be expected to vary based on which union is selected.

Since the explosion of union organizing in the 1960s, teachers unions have been a prominent agent in public education. By 1976, 22-26 percent of teachers belonged to unions.[1] Today 33.5 percent of teachers belong to a union.[2] Recently a series of teacher strikes and the Supreme Court decision to outlaw agency shops have focused national attention on these organizations.

The impact of teachers' unions on district budgets, particularly teacher salaries, and student achievement is a contentiously debated topic in the popular press. To better understand the outcomes generated by the interaction between districts and teachers unions, it is useful to understand teachers' union behavior. In the economics literature, a general theory of how teachers unions behave has yet to be proposed.[3] A first step in defining the objective function for a teachers' union would be to see if it is appropriate to use the median teacher to represent the preferences of a union.

Prior models of union organizing behavior (see e.g. Berkowitz (1954), Ashenfelter and Johnson (1969) and Farber (1978)), draw out the importance of the representative election process in the formation of decisive preferences. We are particularly interested in thinking about the role of the election process for teachers' organizing. In this context, the median voter framework offers a convenient modeling tool by allowing for the analysis of teacher's problems using the preferences of a single individual, the median voter. This analysis answers the preliminary question of are teachers representative elections best characterized by the canonical median voter theorem, where candidates move to the middle and the median teacher's preferences determine the outcome. We juxtapose the median decisive voter idea against theoretical results that suggest the tails of the distribution may better represent the decisive voter. For instance, the divergent voter model, developed by Palfrey (1984), or a Downsian

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[1] Union membership statistics vary by source. Freeman (1986) reports that 22% of teachers belong to unions according to the Current Population Survey. 26% of teachers belong to unions according to the Bureau of Labor Statistics. See Freeman (1986, 45).

[2] This statistic comes from the Bureau of Labor Statistics.

[3] The only paper we are aware of that proposes an explicit theoretical model is Babcock and Engberg (1997).

model, Downs (1957), with bimodal preferences and forward-looking voters, focus on voters in the tails. Our results allow us to comment on the type of voting model that appears to best fit the behavior of teachers.

During the 1960-1980 period, many school districts voted in union representative elections. These elections were held to determine who would represent the teachers in meetings and/or negotiations with the school districts and states. The winner of each election became the sole collective bargaining agent for a district's public school teachers. Teachers in the district, and in some cases principals, were eligible to vote in these elections and the winner was determined by a simple majority. Elections were typically conducted by private organizations such as the American Arbitration Association or the Statistical Tabulation Corporation. Some elections were conducted via mail-in ballots while others took place at a set date with secret ballots. In most districts, teachers could choose between the American Federation of Teachers (AFT) affiliate and the National Education Association (NEA) affiliate. Throughout this period the NEA and AFT were distinct organizations. Although the NEA became more willing to use traditional union tactics of collective bargaining and strikes over this period, the NEA remained committed to its roots as a professional organization and the AFT to its as a militant union.[4]

Historical work on this period recounts that the AFT and NEA had different proposals and approaches regarding salary negotiations, strikes, and walk outs.[5] There is some evidence that these unions also supported different groups of teachers and districts. It is, for example, believed that the NEA tailored its platform to be inclusive of African American teachers while the AFT did not. Informally, the AFT was considered to be the more militant union option (with ties to the AFL-CIO) [6], while the NEA was characterized as a professional organization.

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[4] See chapters 10-13 in Murphy (1990) for a discussion of the shifts in political leanings of these organizations.
[5] Murphy (1990), Warren (1989), and Scribner (2015).
[6] The AFL-CIO is the largest federation of unions in the United States, with members spanning several sectors

To discern the appropriate framework to understand teachers' union behavior, we examine the voting behavior of teachers in representative elections that occurred during 1977, 1978, and 1979.[7] We empirically assess competing models of voting behavior using a new and unique district-level dataset, consisting of vote counts and electoral outcomes from representative elections between the NEA and the AFT. The data were hand-collected from the NEA and AFT library archives in Washington, D.C. and Detroit, MI, respectively. We follow the empirical methodology of Jung et al. (1994).

From a policy perspective, understanding the coalitions and voting behavior of teachers unions will allow researchers to disentangle union and district actions. Further, by clearly defining the objective function of a particular teachers union, we will be more able to propose policy solutions that will receive support from both districts and unions.

Previous Literature and Theoretical Framework

We review theoretical literature on the canonical median voter model and other models of voting behavior to provide the appropriate frame for our results. We pay particular attention to literature that proposes empirical tests of these models. Since there are hundreds of empirical papers that use some version of the median voter model, our review of this literature draws out a few examples that are important for the teachers' union framework particularly. We include empirical evaluations of teachers unions that test the median voter model, but also empirical papers that highlight the importance of the tails of voter preference distribution.

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and jobs including plumbers, pilots, and actors.
[7] We use these years because it was the time period for which the data needed to conduct the study were available.

When referring to the median voter model, many papers call up the Hotelling-style model, attributed to Downs (1957)[8] Under this framework, competition for votes pulls candidates to a common central position favored by the median voter and voters do not have an incentive to abstain. In Downs (1957), when some of the basic conditions do not apply, and in many subsequent voting models (see e.g. Palfrey (1984), Morton (1987), and Francis and Kenny (1999)), competition for votes causes candidates to locate closer to the tails of the distribution. Downs (1957) points out that if voters' preferences are bimodal and the modes are located closer to the extreme preferences, then candidates will locate closer to the tails. Candidates may similarly be prevented from locating at the median if voters in the tails of the distribution choose to abstain. This can occur by relaxing either of the other basic assumptions, i.e. either because they are forward-looking or there is some uncertainty about the location of the candidates' platforms.

Palfrey (1984) develops an alternative voting model, sometimes called the divergent platform framework. Under the divergent platform framework, the tails of the distribution are decisive and candidates select different positions on issues in hopes of attracting different sets of constituents (Francis and Kenny 1999). Palfrey (1984) generates this result by assuming that there are two dominant parties and a third fringe party that threatens entry. Candidates locate closer to the tails to prevent the entry of this third party. This model seems closer in spirit to anecdotal evidence we have about teachers unions. The NEA and the AFT have continued to be the representatives of teachers from 1960 to present. Further, during the explosion of teacher organizing in the 1960s, the NEA and the AFT were sometimes challenged by independent locals. These situations, however, were often resolved by the independent local merging with one of the unions or breaking up.

Many papers have addressed the specificity and/or stability of the median voter outcome. Morton (1987) shows that the assumptions necessary for a model of majority rule provision of public

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[8] This model uses the setup proposed by Hotelling (1929). Bowen (1943) and Black (1958) are also contributors to the canonical median voter framework.

goods to yield the median voter's preferred amount of the public good are restrictive. If types of voters do not have symmetric utility functions, then the median voter outcome is difficult to achieve.

Figure 1 illustrates an application of the median voter theorem to our setting. We think of the continuum of preferences as spanning from conservative to militant. The model also requires that teachers have single-peaked preferences over the type of unionism. This means that a teacher will prefer a point on the continuum located closer to their ideal point.

In the median voter model with its basic assumptions, we would expect a tendency of candidates to adopt similar platforms. If both candidates are successful in catering to the median voter, voters would have trouble differentiating between the two candidate platforms and electoral outcomes would be expected to be close (Holcombe 1996).

An alternative voting framework that deserves attention in our particular setting is Alesina (1988). This model casts representatives as caring not only about maximizing votes, but also about the policy that is implemented. He shows that with forward-looking voters, repeated elections, and voters who care about the credibility of their party, median voter type outcomes can be achieved.

The result is similar to the ends against the middle median voter in the sense that the equilibrium will be located between the parties' policies, but its location may not be at the median.[9] His model also highlights the importance of binding commitments. If binding commitments are possible, the parties' platforms will be closer to the median–although not perfectly so –because of utility earned from being near their preferred policy position. This model is useful for thinking about the elections we study here because many of the criteria are satisfied, i.e. there are opportunities for repeat elections, the NEA and the AFT both have

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[9] If for instance, one party is favored in a district the model predicts that the outcome would be closer to its preferred policy. Voter's discount rates are also important to this model. Discount rates must be greater than both parties' probabilities of winning the election to provide adequate enforcement

national reputations to uphold, and voters likely are forward-looking. Abstentions are not used strategically in this model.

Many empirical tests of these models are designed to test the median voter theorem rather than compare alternatives. Some of these papers examine the impact of median constituency characteristics on public expenditures or other legislative outcomes, such as roll call records. There is a distinction to be made between the median voter determining the outcome of an election and the median voter's preferences dictating subsequent behavior of the elected official. Others have explored the determinants of spending in publicly provided services using the median income of voters. A major shift in the application of the median voter framework follows the work of Epple and Romano (1996). They show that preference heterogeneity is important for determining the decisive voter. Brunner and Ross (2010) provide a thorough empirical evaluation of whether the median income individual is decisive. They find that preference heterogeneity is important and that the ends against the middle story (Epple and Romano 1996) is consistent with their findings. Their evidence suggests that an income percentile below the median is decisive in educational bond referendums in California. Further, they test whether a model with two types of voters, yielding an overall bimodal distribution of preferences, fits some districts well. They provide evidence that in districts with this characteristic, the tails of the preferences are influential. The bulk of the empirical literature pertaining to the median voter framework seeks to test if the median voter aggregates demand for publicly provided services.

If papers such as these generate conclusive evidence supporting a median voter framework then analysis at the level of legislative outcomes would be sufficient, and the underlying voting behavior irrelevant. The evidence, however, for papers that focus on teachers unions is mixed. A large portion of the studies of teachers' unions examine their impact on wages (salary determination process and schedules). The median voter model provides an intuitive justification

for salary differences that may exist between unionized and non-unionized districts. A commonly held idea is that collective bargaining results in a salary structure that benefits median union members (usually senior teachers) at the expense of the marginal teachers (newer teachers)(Delaney 1985).

Many of the papers on teachers union wage impacts use the presence of a more statistically significant impact of education or experience on senior teachers wages as evidence in support of the median voter theorem. Babcock and Engberg (1999), for instance, use data from collective bargaining outcomes in Pennsylvania to study returns to education and tenure. Their results suggest that unions may increase the returns to education and experience for their median members. As noted by Romer and Rosenthal (1979), studies often show a statistical relation between median voter characteristics and outcomes, but fail to indicate whether those expenditures correspond to those desired by the median voter or to some multiple of that level. They are not able to remove the possibility that the decisive voters preferred returns are multiples of the median voters. They also note that their results on master's degrees do not robustly support the median voter theorem. Zwerling and Thomason (1995) find that the proportion of unionized teachers with higher levels of education and experience is positively correlated with a district's highest salaries. They view this as suggestive evidence of the median voter model. They find no impact of these characteristics on the lowest salaries in a district. The authors do not use the median experience for a district to examine its influence on bargaining outcomes, which would more directly test the median voter theorem. From their summary statistics, it appears that the median level of experience in the average union school is less than 6 years. Therefore, we view these results as also consistent with a divergent voter platform. White (1982) uses the median voter model to predict the effects of collective bargaining on wage structures for teachers and finds that union negotiations result in wage structures that increase the share of the earnings for the median teacher by examining their

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distance from the medians of the wage.

Our study differs from this literature in that we are looking at union representative elections rather than examining union behavior as it relates to salary negotiations within a given district. We focus on establishing the voting model that prevails in union representative elections before thinking about the outcomes that will prevail following an election. We think this first principles approach is warranted because of the indeterminacy in empirical papers that study negotiated outcomes directly.

Our research methodology follows the literature that attempts to test whether voter characteristics determine election outcomes. Our paper is the first we are aware of that applies this method to teachers' union representation. When two candidates for representation select the platform desired by the median voter, there should not be systematic differences in these voters' preferences for candidates (Jung et al. 1994).

Francis et al. (1994) study political mobility for the U.S. Congress in the 1960-88 period. They focus on the behavior of politicians seeking higher office, while also testing to see whether the median or divergent voter models provide a better fit. Their findings suggest that politicians are more likely to be catering to different types of voters. Jung et al. (1994) study political shirking, and find that political coalitions seem to matter in Senate elections, deeming the divergent platform model a better fit for most states. Asking a similar question, but with a richer dataset, Gerber and Lewis (2004) are able to construct direct measures of consumer preferences by examining individual ballots. They find that legislators in more homogeneous districts are more likely to fit the median voter framework. A slightly different approach consists of studying the utility of the representatives themselves. Levitt (1996) estimates Senator utility functions, and finds that Senators vote based on constituent preferences, Senator ideology, and the national party line. Levitt (1996) argues that these results "cast doubt" over the relevance of the median voter theorem.

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We follow these papers by looking for the impact of voter characteristics on vote outcomes. We also pay careful attention to the role of abstentions. Using abstentions to discipline parties is consistent with the median voter framework, rather than the Palfrey (1984) or Alesina (1988) models. A large difference between the study of elections in the Senate and teacher representation elections, is that most relevant negotiations for unions take place at a local level. In Senatorial elections, it is possible to have voters who are unfamiliar with local politicians or who do not like a specific candidate but will vote straight ticket for a party because they are concerned about what happens at the Federal level. For teachers union representation elections, since the bulk of negotiations take place between the union representative and the district, the direct vote and the local level are more relevant.

Sample

The data used in this analysis come from two sources: (1) hand-collected data from the NEA and AFT archives and (2) the Elementary and Secondary General Information System (ELSEGIS).[10] The hand-collected data were mainly collected from the NEA archives at Gelman Library, George Washington University and the AFT archives at Walter P. Reuther Library, Wayne State University. The data collection was also supplemented by box scores from *American Teacher*[11] microfilms at Auburn University. These data contain vote shares for representative elections that occurred between 1960-1980. We utilize the 1976-77 ELSEGIS data[12] and 1977, 1978, and 1979 representative elections in the following analysis.

The representative elections data contains both new and repeat elections[13] for 1977-1979. Due

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[10] We accessed the ELSEGIS data from the Inter-university Consortium for Political Social Research (ICPSR).

[11] The *American Teacher* was a periodical published by the AFT from 1955 to May 2013.

[12] This decision has been made due to the completeness of financial data for this year. Only during the 1976-1977 survey of districts financial status did the questionnaire ask about fringe benefits.

[13] 85 and 148 of the included districts have new and repeat elections, respectively.

to the NEA and AFT's fierce competition over districts, they both kept thorough records of repeated elections. To ensure our sample covers most of the districts with elections in these years, we collected data from both the NEA and the AFT archives. The data likely covers all of the repeat elections during these years due to the NEA and AFT's reporting of box scores. Looking at only the elections where the teachers have never had union representation, our sample covers 32,032 teachers. This accounts for 78 percent of the teachers newly covered by Collective Bargaining Agreements (CBAs) between 1977-1979.[14] Our data set, therefore, accounts for a substantial amount of teachers union activity during this period. The map in Figure 2 shows the location of certification elections included in our final sample. Darker shades represent a higher number of observations coming from those states. Our dataset spans 25 states. Even though there is no official record of how many elections took place during the 1977-1979 period in the United States, because we have records of all the elections the AFT and the NEA headquarters were aware of, our sample likely contains the majority (if not all) of the elections that took place during that period. [15]

In studying representative election behavior, it is important to consider the process by which the unions selected the amount of support to provide a local representative. In 1983, reflecting on earlier elections and ongoing campaigns the NEA National Office expressed that "at present and for some years, NEA's involvement is too often determined by the personal preferences of individual organizers, by the predilections or persuasiveness of individual managers, and by political pressures. The committee wanted to replace those ad hoc kinds of decision-making

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[14] We use Saltzman (1985) to find coverage of teachers in 1976 and 1979. Then we use the National Center for Education Statistics' *State Comparisons of Education Statistics* for teacher counts in these years. Between 1976 and 1979 40,976 teachers were newly covered by collective bargaining agreements.

[15] The only election information we would not be aware of would be elections that the NEA/AFT didn't report to their headquarters or election information that wasn't archived

with criteria..."[16] The AFT was a very different organization than the NEA from its inception. The AFT followed more of a district-up model and did not have the financial resources available to the NEA to organize and campaign in local elections (Murphy 1990). The locations where elections took place are more likely the result of district organization than selection by the AFT National Office.

The ELSEGIS dataset contains geographic, financial, staffing, and student demographic data for all U.S. districts. We use the geographic location and district name to match the ELSEGIS data to the vote shares. As is common in other election studies, data on votes linked to particular voters (in our case, teachers) is not available. We follow other studies by (1) using survey data from people in the same district and (2) proxying for voter characteristics using district-level variables (usually economic and demographic). If we assume that the goal of teachers' unions is to improve working conditions, district-level characteristics that provide information on working conditions available for teachers should provide good proxies for teacher constituencies.

We use the ELSEGIS data to construct the following district characteristics pertaining to students, teachers, and the fiscal state of the district. The student variables include: enrollment, proportion of students classified as poor, and the proportion of black students.[17] The variables which directly characterize teachers include: the proportion of secondary teachers, the proportion of new hires, average teacher salaries, and average fringe benefits. We also include urban/rural status, proportion of district revenue from state transfers, and debt to revenue ratio.

The enrollment figures come from the Census Postcard Survey of Districts, edited by the National Center for Education Statistics (NCES). Enrollment reflects district size. We expect to

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[16] Suggested Election Involvement Criteria, internal memo, issued post-January 18, 1983.

[17] We have also included the proportion of English language learners, special education, and Hispanic students in other specifications. We, however, found the results are not sensitive to this inclusion and they are not jointly significant.

find a positive impact on abstentions given that larger districts decrease the marginal impact of a vote. Although we have no priors on how enrollment may impact NEA or AFT votes, some historical sources suggest that AFT supported more small districts than the NEA (Murphy 1990).

We use a district's population metro code to assign urban/rural status and create a dummy variable for urban. The metro code is equal to 1 if a district is located within the central city of a Standard Metropolitan Statistical Area (SMSA), 2 if the district is located within the urban area of an SMSA, and 3 if the district is located outside of an SMSA. If the metro code is equal to 1, we classify the district as urban and assign it a value of 1 in our variable. If the metro code is 2 or 3, we classify the district as non-urban and assign it a value of 0.[18] We also wanted a measure of how much the state controls district finances. The fraction of district revenues from state transfers is computed by dividing state transfers by the sum of monies from 23 mutually exclusive revenue sources listed in a district's Census of Government's F-33 Survey. The debt to revenue ratio also comes from the F-33 Survey. We collect data on long-term and short-term district debt.[19] Our debt to revenue ratio is the sum of short and long term debt divided by the total district revenues, as computed for the state control variable.

Data on district-level teacher and student characteristics are also collected from the ELSEGIS data. The teacher characteristics we construct are average teacher salary, average fringe benefits, proportion of teachers that were hired in the current year, and proportion of teachers located in secondary schools. Average teacher salary is generated by dividing elementary and secondary teachers salaries by the total number of elementary and secondary teachers in a district. Average fringe benefits require us to sum all categories of fringe benefits, such as state retirement, local retirement, pension payments, health, hospital, and disability, life insurance, and unemployment

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[18] We have also tried classifying both 1 and 2 as urban. The results, however, are unchanged.

[19] We tried including these forms of debt separately in empirical specifications. Short-term debt to revenue ratio was not significant in any equation. Due to the small sample size, we decided to combine the two forms of debt.

compensation, and divide by the total number of teachers. Data on the salary and fringe amounts come from the F-33 Survey. The data for the faculty counts come from the EE0-5 Survey. Using the EE0-5 survey, we create the proportion of new teachers by dividing the number of new teachers hired by the total teachers in a district. We also use this source to create the proportion of teachers teaching in secondary schools.

The student characteristics we examine are the proportion of black, poor,[20] special education students, and English language learners students. The student characteristics data come from the National Institute of Education's special tabulations of Census data. Specific definitions of each variable are available in Table A1. We include student characteristics because teachers may have differential preferences over union services based on the students they serve.

To get a sense of the type of districts in our sample, we compare its summary statistics to the universe of public schools in the ELSEGIS data. The summary statistics for the full ELSEGIS sample are reported in Table A2 in the Appendix. The comparison shows that the districts where these elections occur are quite different than the average district in the U.S. [21] They are much larger than the average U.S. district, on average enrolling 8,800 more students. Similarly, these districts are more likely to be located in urban areas. 13.8 percent of the districts in the sample are located in city centers, while only 3.3 percent of U.S. school districts are located in these areas. Districts in our sample also have slightly more state control of their budgets (42.9 percent compared to 40.1 percent). They also have higher average salaries and fringe. The teaching force in our sample contains less new teachers and more secondary teachers. The proportion of poor students is 3 percentage points smaller in our sample. The proportion of black students between our sample and all U.S. districts is not statistically different.

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[20] Poverty is measured using the Census definition.
[21] A better comparison group would be districts that will unionize or have unionized.

Summary statistics are presented in Table 1 for 183 school districts. The summary statistics show that the NEA is favored in our data set, with the NEA winning more of the elections than the AFT. A number of the elections are determined by relatively small vote margins. 25 percent of elections have a difference in vote shares of 10 percentage points or less. Further, 50 percent of elections are decided by 18.6 percentage points or less. It is important to note that these elections have relatively small numbers of eligible voters.

Identifying Coalitions in Teachers' Union Representative Elections

We adopt the empirical methodology used by Jung et al. (1994) to identify voter coalitions and apply it to teachers' union representative elections. [22] Jung et al. (1994) studied voting patterns in the U.S. Senate in 1978, 1980 and 1982. The authors specifically sought to explain why two Senators from the same state can vote so differently. The findings of Jung et al. (1994) suggest that for 35 states, Senators were drawing support from different segments of the state's population, as shown by examining county-level voting patterns. The Jung et al. (1994) model estimates voter coalitions. They regress Americans for Democratic Action scores [23] for Senators against supporter characteristics using average characteristics of the state.

We are interested in its application to the election of teachers' union representatives. If unions did indeed cater to differing platforms, we would expect the two unions to vary in militancy and policy preferences and union outcomes to differ based on type of union. The model associates the probabilities of voting for AFT rather than NEA union representation and not voting to constituent characteristics. We first focus on the implication of characteristics for the

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[22] Jung et al.'s (1994) focus was on examining shirking by politicians.
[23] Americans for Democratic Action scores use voting records to measure political liberalism.

decision between the AFT and the NEA directly. Then, the observed probabilities with respect to voters' decisions over the union representative can be written as

$$\hat{P}_{AFT,t} = \frac{m_{AFT,t}}{V_t} \tag{1}$$

where $m_{AFT,t}$ is the number of eligible teachers voting for the AFT and V_t is the number of voters in district t.

Since voters' behavior with regard to abstentions may signal extreme voters' attempts to discipline their favored representative or uncertainty in the process, we also look at the impact of district characteristics on abstentions. The observed probability of an abstention is

$$\hat{P}_{abstain,t} = \frac{m_{abstain,t}}{N_t} \tag{2}$$

where each school district t has $m_{abstain,t}$ teachers who choose to abstain and N_t teachers who are eligible voters.

We assume that the theoretical probability of voting for the AFT instead of the NEA or choosing to abstain can be written in the following deterministic way

$$L_{it} *= log \frac{P_{it}}{1-P_{it}} = \beta(voter\ characteristics)_{it} \tag{3}$$

where $i = AFT, abstain.$

Therefore, we can write the observed probabilities, L_{it} as follows:

$$L_{it} = log \frac{\hat{P}_{it}}{1-\hat{P}_{it}} = \beta(voter\ characteristics)_{it} + u_{it} \tag{4}$$

where $u_{it} = L_{it}* - L_{it}.$

Following Maddala (1983) and Jung et al. (1994), we can estimate these parameters with the following system of equations:

$$L_{AFT} = f(voter\ characteristics) \qquad (5)$$

$$L_{abstain} = f(voter\ characteristics) \qquad (6)$$

where L_{AFT} is the log odds ratio [24] of the AFT's share of the vote to the NEA's share of the vote in a school district and $L_{abstain}$ is the log odds ratio of the share of abstainers to eligible voters.

We also report an alternative specification that teases out how abstentions may differentially impact each union. This specification looks at the observed probabilities with respect to voters' decisions such that

$$\widehat{P_{it}} = \frac{m_{it}}{N_t} \qquad (7)$$

For i=1,2,3 and t=1,2,...T; Where m_{1t} is the number of eligible teachers voting for the AFT, m_{2t} is the number of eligible teachers voting for the NEA, and m_{3t} is the number of eligible teachers who abstain from voting in school district t. We then estimate the parameters with the following system of equations:

$$L_{AFT} = f(voter\ characteristics) \qquad (8)$$

$$L_{NEA} = f(voter\ characteristics) \qquad (9)$$

$$L_{ABS} = f(voter\ characteristics) \qquad (10)$$

where L_{AFT} is the logit function of the AFT's share of the vote in a school district, L_{NEA} is the logit function of the NEA's share, and L_{ABS} corresponds to abstainers.

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[24] i.e., log (x/1-x).

We similarly include district-level covariates which capture characteristics of the district, teachers, and students. If the median voter model explains teachers' voting behavior in these districts, then these characteristics should not influence L_{AFT}. Since teachers are the voters in representative elections, the state of their districts–particularly as it applies to the working conditions and compensation they face–may influence the union they choose to elect. We also consider student characteristics since teachers' workload and advocacy may be influenced by these factors. The district characteristics we include are whether the district is located in an urban area, the average teacher salary, the average teacher fringe benefits, the amount of state budgetary control, and the amount of debt. The student characteristics are the proportion of students who are black, the pro- portion of students classified as poor, and the total district enrollment. Additionally, we include the percentage of people in the district that voted for a Democratic candidate in the 1976 presidential election.

To avoid reverse causality, it is important that the representative elections we match occur after the measurement of the included covariates. In our initial specification we match representative elections that occurred during the 1977, 1978, and 1979 calendar years with the ELSEGIS data. There is some concern that some of the 1977 elections may have occurred between January and May of the 1976-1977 school year. Where we know the month of the election, we include the election only if it occurred after May. The original data, however, does not allow us to place the date of some elections more specifically than by calendar year.

We believe several factors mitigate this concern. First, the data used for enrollment, student characteristics, and teacher counts is all collected during the Fall of 1976. The only data collected after the school year is the financial data. The 1976-1977 financial information is recorded at the end of the school year and is not due until April 1978. For the debt to revenue variable, we are able to use the district's debt in Fall 1976. The average fringe and average salary are recorded at

the end of the year. The second factor that mitigates the reverse causality issue is that elections occurring during the Spring semester are likely to have little impact on current teacher contracts. We also include a specification that uses only 1978 and 1979 elections to check for similar results. The coefficients obtained from these regressions are then used to identify characteristics of constituents of both the AFT and the NEA. A union's coalition can be deduced using the sign and significance of coefficients estimated in equations (5) and (6). If a variable is not significant, we would expect voting for union representation to be based on attracting the median voter, rather than specific voter coalitions or teacher types.

Results

Tables 2 and 3 contains the results from the system of equations method discussed in Section 3 for our pooled data set containing 1977-1979 representative elections. We also separately investigate, the year 1977 in Table 4 and 5 and 1978-1979 in Table 6 and 7. We split the data set by years to check whether there is evidence that a median voter model may be a good fit in some years, but not others.[25] The first column of Tables 2, 4, and 6 examines the impact of a district's voter characteristics on the probability a vote will go to the AFT rather than to the NEA. The dependent variable here is the log odds of the AFT vote share to the NEA vote share. This is interpreted as the probability a vote will go to the AFT. This corresponds to equation (5) above. These results allow us to interpret the magnitude of a characteristics effect on the election outcome. The second column reports the results for abstentions. This column corresponds to equation (6).

The results of our alternative specification, which examines the probability a district will vote for a particular candidate or abstain, allows us to better characterize the role of abstentions. These results are reported in Tables 3, 5, and 7. The log odds of the AFT (NEA) vote relative to a district's

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[25] This choice is motivated by the fact that presidential elections have been shown to fit the MVT in some years and not in others.

eligible voters is the dependent variable in column (1) (column (2)). Column (3) reports the impact of characteristics on abstentions. Column (3) is the same specification as column (2) in Tables 2, 4, and 6 and is reproduced in these tables for readability.

Collectively the results provide evidence that divergent coalitions support the NEA and AFT. In all specifications, average teacher salaries decrease the probability that the AFT receives the vote rather than the NEA. The proportion of secondary teachers in the district, also, has significant differential impacts across specifications. It increases the odds of the AFT receiving the vote. In the full sample (Tables 2 and 3) and the 1977 sample (Tables 4 and 5), an urban location, increased fringe benefits, and the amount of district debt to revenue all increase the probability the AFT receives the vote. The level of state budgetary control decreases the probability of the AFT receiving the vote.

In Table 2 column (1), the coefficient on average teacher salary is negative, reflecting that lower teacher salaries prior to the election increase the odds that a vote will go to the AFT. To understand the magnitude of this effect it is helpful to transform the log odds change into odds and ultimately discuss the impact on the vote margin. To think about a plausible impact, we examine these changes for a 1 standard deviation increase in average salaries. A \$4137 increase causes a 0.827 change in the odds of AFT receiving the vote rather than NEA ($exp(-0.0046 * 41.37)$). This can further be translated into the resulting probability of AFT receiving a vote. To understand the magnitude of each characteristics' effect, we calculate vote shares by starting at the 50 percent majority cutoff.

Therefore, a 0.827 change in odds would result in $P_{AFT,t} = 0.453 \left(\frac{P_{AFT,t}}{1-P_{AFT,t}} = 0.827 * \frac{0.50}{1-0.50} \right)$

Therefore a 1 standard deviation change in the average salary could increase the votes for the AFT by 4.7 percentage points. This would result in a 9.4 percentage point swing in the votes. This is substantial given that 75 percent of elections in our sample have a margin of 33 percentage points or less and 25 percent of elections have a margin of 10 percentage points or less. The effect is 39.8 percent of the average vote margin. The magnitude of this characteristic is practically significant. The sizable magnitude reinforces that these union elections are best characterized by a voting model where the tails are influential.

Another part of teacher's compensation, also, impacts the odds a vote will go to the AFT. The effect, however, moves votes in the opposite direction of the teacher salary result. Increasing the average fringe by 1 standard deviation, or $2,128, increases votes for the AFT from 50 percent to 53.2 percent. This would produce a 6.4 percentage point change in the vote margin between the NEA and AFT. Since fringe benefits are tax deductible, a smaller increase in fringe than required for teacher's salaries would increase teachers' overall compensation in the same way. Therefore, it appears that teachers valued overall compensation, but sought different representation depending on the needs of the district.

The level of state budgetary control also has a significant negative impact on the odds of voting for the AFT over the NEA. Increasing the share of funds coming from the state by 18.1 percentage points (one standard deviation) would decrease the odds to 0.917. This would cause the probability of voting for the AFT to drop by 2.2 percentage points. This amounts to a 4.4 percentage point change in the vote margin in favor of the AFT, which is 18.6 percent of the average vote margin.

There are also distinct coalitions with regards to the amount of debt a district holds relative to its revenue. The amount of debt to revenue held by a district prior to an election increases the odds

of voting for the AFT. A one standard deviation increase in the debt to revenue ratio would increase the odds for the AFT to 1.120. This generates a 6 percentage point increase in the vote margin, which is 25.4 percent of the mean vote margin. Higher debt to revenue ratios likely curtail the ability of a union to increase wages or benefits. Therefore, these districts may require a more militant union stance to create change.

An increase in the proportion of black students increases the odds of a vote going to the AFT. A one standard deviation increase in the proportion of black students, 16 percentage points, would increase the odds of the AFT receiving the vote to 1.08. Using the 50 percent cutoff as a baseline, this would result in a favorable increase in the percentage of votes for the AFT to 51.9 percent. The resulting change to the vote margin would be 3.8 percentage points or 16.1 percent of the mean vote margin.

Finally, there are also distinct coalitions with regards to the fraction of teachers that are secondary. Districts with higher fractions of teachers that are secondary are attracted to AFT. A 22.2 percentage point (one standard deviation) increase in secondary teachers would increase the odds of AFT receiving the vote by 1.15. Starting with a 50/50 race, this would change the margin between AFT and NEA votes by 7 percentage points, which is 29.7 percent of the mean vote margin. This result is also consistent with surveys in the literature examining voting coalitions for New York City, Boston, and a suburban community in the 1960s (Lowe (1965), Rosenthal (1966)). This result may be a consequence of secondary schools having more male teachers or teachers with master's degrees than elementary schools.

The significant impact of these characteristics illustrates the differences between these organizations. The evidence supports the view that the unions were providing differentiated products to the teachers they represented.[26] The results highlight that the median voter theorem,

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[26] Palfrey (1984) points out that the divergent voter model he develops "seems suitable for application to....the study

by which the median teacher's preferences are met by both representatives, does not fit with our findings. If the median voter model prevails there should be no systematic relationship between characteristics of the districts, teachers, or students and the odds of a union receiving the votes because the outcome would be random.

Abstentions appear to play an important role in these elections. Table 2 column (2) shows the impact of constituency characteristics on abstentions. The outcome in this equation is the log odds of abstaining rather than voting. We also report a specification in Table 3 that allows us to examine the impact of characteristics on votes that will go to NEA and AFT separately. Column (3) of Table 3 repeats Table 2 column (2). This is done for readabilty. The outcome for columns (1) and (2) is the log odds of voting for the particular representative (AFT in column (1) and NEA in column (2)) rather than voting for the other or abstaining. This specification highlights how changes in votes created by abstentions are shifting votes to or from a particular union.

There are three significant variables in the Table 3 column (3) specification, the proportion of black students, the proportion of debt to district revenues, and the political affiliation of voters in the district. One of these, Democratic political affiliation, decrease the number of abstentions, but does not have differential impacts on the NEA's and AFT's odds of winning the election. This variable likely captures pro-union sentiment. Therefore, it is reasonable to have less abstentions in locations with stronger Democratic constituencies. The proportion of black students and total

of oligopoly models with differentiated products."

debt to revenue within a district, however, differentially impact the NEA and the AFT.

The political affiliation of a district, measured by the percentage of citizens in the county voting for the Democratic candidate in the last election, decreases abstentions. A 7.240 percentage point increase (one standard deviation) in Democratic votes decreases the odds of abstaining to 0.858, which is equivalent to a 1.7 percentage point decrease in abstentions. This appears to contribute votes to the AFT and NEA symmetrically.

The proportion of black students in a district increases the odds of abstention. A one standard deviation increase in this proportion changes the odds of abstention by 1.247 and results in a 2.8 percentage point increase in abstentions. In this case, there is an interaction between the amount of abstentions and the margin between the unions. Table 3 makes clear that the abstentions come from a decrease in votes for the NEA and do not impact the AFT votes. This variable likely proxies for higher proportions of black teachers. The finding is, therefore, consistent with historical accounts of the NEA's slower integration of black teachers. Although the NEA espoused civil rights messages, they were very slow to integrate locals in districts with all black and all white locals (Murphy 1990). Black teachers affiliated with the NEA may have used abstentions to bring attention to this issue.

The proportion of district debt to revenue increases abstentions. This is likely the result of a decreased benefit to voting in districts that are more heavily constrained. High debt to revenue ratios are an indicator of potential insolvency by the school district. When a district becomes insolvent control of the budget is given to the county or state department of education. Even before the point of insolvency, increasing debt to revenue ratios may signal less bargaining space for teachers. In Table 3, the signs of the coefficients in columns (1) and (2) is not consistent with changes only from abstentions. Therefore, this characteristic also induces voters to shift from voting for NEA to AFT.

The results of Table 4 and 6 largely confirm the results presented in Table 2. Table 5 and 7 present similar results using the alternative specification of the outcome variables that captures the probability that a vote will go to a particular representative rather than the probability of voting for one of the unions. Table 4, which presents the results for 1977 only, shows that student enrollment, being located in an urban environment, average teacher salary, average teacher fringe, the proportion of secondary teachers, the amount of state budgetary control, and the amount of district debt to revenue prior to election have statistically significant impacts on vote outcomes. All of the characteristics, except enrollment, are similarly signed and significant in Table 2. Enrollment is not significant in Table 2, although the sign is the same.

Table 6 presents the results for 1978 and 1979 elections. [27] Two of the seven characteristics, average teacher salary and the proportion of teachers in secondary schools, identified in Table 2 are statistically significant. All characteristics have consistent signs across these tables. The decline in the number of significant characteristics represents less decisive characteristics in these years, but still supports the divergent voters framework.

Similar to Table 2, the impact of characteristics on abstentions reported in Table 4 column (2) supports the view that abstentions may be used to discipline representatives and create divergence. In addition to the proportion of black students and the Democratic leanings of a district, the 1977 elections show that enrollment, the level of average fringe benefits, and the proportion of new teachers impact abstentions. The signs and magnitude of effects for the proportion of black students and the proportion of constituents in the county voting Democrat are similar across the two tables. Larger districts, as measured by enrollment, have more abstentions. This result is consistent with the marginal effect of a vote being smaller in large districts. Higher levels of average fringe benefits also increase abstentions. A one standard deviation increase in teacher

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[27] Due to sample size constraints, reporting them separately is not useful.

fringe increases the odds of abstention to 0.178. The proportion of new teachers also increases the odds of abstention. This seems reasonable since new teachers may have higher information costs than established teachers. Table 6 depicts no role for abstentions. No characteristic significantly impacts the odds of abstaining.

The characteristics of teachers, students, and the district appear to be related to the odds of a particular organization winning. Our results are inconsistent with a decisive median voter. Instead, the tails of the distribution of voter preferences may contain important information about the decisive voters preferences. We find evidence that abstentions are important in the 1977 elections, but not in the 1978 and 1979 elections. Where abstentions play an important role, this may be the result of voters strategically using votes to discipline parties that deviate too far from their preference. Our results appear consistent with a divergent platform framework, but do not provide definitive results on the mechanism that creates the divergence. The 1977 results are consistent with the Downsian framework with forward looking voters or uncertainty about representatives' platforms due to the use of abstentions. Since the 1978-1979 results do not show a role for abstentions, they are possibly better explained by Palfrey (1984) or Alesina (1988) models.

Conclusion

Since the actions of teachers' unions impact the functioning of our education systems, understanding the preferences that dictate union behavior is important. We add to the literature on teacher unionism by highlighting the political economy aspects of union organizing. Our paper identifies the preferences of union members and how they are aggregated. We show that during 1977-79 representative elections, the NEA and the AFT garnered support from distinct electoral coalitions.

The proportion of secondary teachers and the average salary of teachers in the district prior to an election impact vote shares in all specifications. This supports the view that a divergent voter framework better fits the teachers union representative elections in this period. An increase in the proportion of secondary teachers favors the AFT being elected. The magnitude of this impact is sizable, a one standard deviation increase in the proportion of secondary teachers would increase the vote margin of a 50/50 election by 7 percentage points, or 29.7 percent of the mean vote margin. Increasing the average salary by one standard deviation ($4137) would decrease votes going to the AFT. Again, the magnitude of the effect is practically significant. The change would increase the vote margin by 9.4 percentage points, or 39.8 percent of the average vote margin.

Teachers during the 1977 elections coalesce around more decisive variables than teachers during the 1978-1979 elections. In 1977, an urban location, the level of teacher fringe, and the amount of district debt to revenues all positively impact votes for the AFT. Enrollment and the level of state control of a district's budget decrease the probability a vote will go to the AFT. The role of abstentions also differs in these two years. In 1977, the results are consistent with a Downsian model where abstentions are used to discipline representatives. In contrast, the 1978-1979 elections show no role for abstentions. Both provide evidence that the divergent voter framework is appropriate, but the same mechanism does not appear in both years.

The impact of these results is that researchers should consider these two unions as distinct, particularly in data from this period. Unions supported by different constituencies may generate heterogeneous effects in districts. Further, models of teachers' union behavior should focus on teachers in the tails.

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Conflicts of Interest

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Author Biographies

Jessica Merkle is an Assistant Professor in the Department of Economics at Auburn University. She received her doctorate in Economics from the University of Florida. Her research interests are in labor and economics of education. She is particularly interested in the role of teachers' unions. More generally, her work aims to understand the role of educational institutions and the constraints these institutions place on decision-making and voice. She employs quasi-experimental, reduced-form, and meta-analytic techniques to provide empirical evidence to answer related questions.

Michelle A. Phillips is a Visiting Assistant Professor at the University of Florida. She obtained her Ph.D. from the University of Florida. Her research focuses on the political economy of school textbook selection policies and on teachers' unions. She has also worked in studies relating to infrastructure regulation.

Tables

Table 1:
Summary Statistics

	Mean	Standard Deviation	Minimum	Maximum
Votes Shares				
Share of votes for AFT	0.466	0.144	0.005	0.857
Share of votes for NEA	0.534	0.144	0.143	0.995
Vote margin	0.236	0.179	0.007	0.990
Share of abstentions from eligible voters	0.112	0.073	0.002	0.417
Voting Odds				
Odds of AFT receiving a vote rather than NEA	1.048	0.751	0.005	6
Odds of abstention rather than casting a vote	0.134	0.106	0.003	0.714
District Characteristics				
Enrollment (in 100s of students)	137.169	210.341	4.62	1590.38
Distict located in urban area	0.158	0.366	0	1
Proportion of district revenues from state transfers	0.420	0.169	0.090	0.816
Total district debt to district revenues	0.428	0.343	0	1.653
Percent voting Democrat in presidential election	49.421	7.240	31.7	66.3
Teacher Characteristics				
Average teacher salary (in 100s of dollars)	209.876	41.370	51.752	328.601
Average teacher fringe (in 100s of dollars)	31.379	21.276	0	111.616
Proportion of teachers hired in current year	0.069	0.0622	0	0.481
Proportion of teachers in secondary schools	0.511	0.222	0	1
Student Characteristics				
Proportion of students classified as poor	0.143	0.105	0.019	0.573
Proportion of black students	0.080	0.160	0	0.959

We have data on 183 representative elections occurring between 1977-1979 in U.S. school districts. The unit of

observation is a district-academic year.

Table 2:

The Impact of Coalition Characteristics on the Probability of Voting for a Representative

	Log Odds	
	(1)	(2)
	AFT/NEA	Abstain/Vote
Enrollment (in 100s of students)	−0.0001	0.0007
	(0.0002)	(0.0005)
Distict located in urban area	0.163***	−0.332
	(0.063)	(0.248)
Average teacher salary (in 100s of dollars)	−0.005***	0.002
	(0.001)	(0.002)
Average teacher fringe (in 100s of dollars)	0.006***	0.003
	(0.002)	(0.004)
Fraction of teachers hired in current year	−0.120	0.691
	(0.370)	(0.770)
Fraction of secondary teachers	0.630***	0.103
	(0.142)	(0.262)
Fraction of students classified as poor	−0.306	−0.817
	(0.333)	(0.922)
Fraction of black students	0.478**	1.138**
	(0.190)	(0.527)
Fraction of district revenues from state transfers	−0.515**	−0.366
	(0.208)	(0.414)
Total district debt to district revenues	0.332***	0.352*
	(0.100)	(0.194)
1976 Percent Democrat Vote	0.003	−0.021**
	(0.006)	(0.008)
Observations	183	183

The outcomes variables are logit transformations of the vote shares. For definitions of variables, see Table A1 in the appendix. The unit of observation is a district-academic year. Results are obtained from estimating equations 5 and 6. Year dummies and legal dummies, capturing public sector unions' right to bargain, are included. There are a few districts that held elections in two of our sample years. We have checked for the sensitivity of our results to this inclusion. The results are robust. Standard errors are clustered at the state level and presented in parentheses. *, **, and *** indicate statistical significance at 10 percent, 5 percent, and 1 percent levels, respectively.

Table 3:

The Impact of Coalition Characteristics on the Probability a Vote Will Go to a Representative

	Log Odds		
	(1)	(2)	(3)
	NEA	AFT	Abstain
Enrollment (in 100s of students)	−0.0001	−0.0003	0.0007
	(0.0001)	(0.0002)	(0.0005)
Distict located in urban area	−0.095	0.194**	−0.332
	(0.083)	(0.086)	(0.248)
Average teacher salary (in 100s of dollars)	0.003***	−0.005***	0.002
	(0.001)	(0.001)	(0.002)
Average teacher fringe (in 100s of dollars)	−0.005***	0.004*	0.003
	(0.002)	(0.002)	(0.004)
Fraction of teachers hired in current year	−0.114	−0.231	0.691
	(0.287)	(0.437)	(0.770)
Fraction of secondary teachers	−0.663***	0.499***	0.103
	(0.112)	(0.140)	(0.262)
Fraction of students classified as poor	0.486**	−0.060	−0.817
	(0.239)	(0.400)	(0.922)
Fraction of black students	−0.616***	0.187	1.138**
	(0.198)	(0.206)	(0.527)
Fraction of district revenues from state transfers	0.373***	−0.413*	−0.366
	(0.147)	(0.245)	(0.414)
Total district debt to district revenues	−0.264***	0.284***	0.352*
	(0.090)	(0.106)	(0.194)
1976 Percent Democrat Vote	0.002	0.006	−0.021***
	(0.005)	(0.006)	(0.008)
Observations	183	183	183

The outcomes variables are logit transformations of the vote shares. For definitions of variables, see Table A1. The unit of observation is a district-academic year. Results are obtained from estimating equations 8-10. There are a few districts that held elections in two of our sample years. We have checked for the sensitivity of our results to this inclusion. The results are robust. Standard errors are presented in parentheses.

*, **, and *** indicate statistical significance at 10 percent, 5 percent, and 1 percent levels, respectively.

Table 4:

The Impact of Coalition Characteristics on the Probability of Voting for a Representative (1977)

| | Log Odds | |
	(1) AFT/NEA	(2) Abstain/Vote
Enrollment (in 100s of students)	−0.0008**	0.003***
	(0.0004)	(0.0004)
Distict located in urban area	0.434***	−0.328
	(0.102)	(0.327)
Average teacher salary (in 100s of dollars)	−0.005**	−0.0004
	(0.002)	(0.002)
Average teacher fringe (in 100s of dollars)	0.010***	0.007*
	(0.003)	(0.004)
Fraction of teachers hired in current year	−1.067	0.956*
	(0.871)	(0.562)
Fraction of secondary teachers	0.528**	0.313
	(0.238)	(0.195)
Fraction of students classified as poor	0.215	−1.453
	(0.545)	(1.008)
Fraction of black students	0.262	0.604*
	(0.178)	(0.357)
Fraction of district revenues from state transfers	−0.842***	0.237
	(0.338)	(0.864)
Total district debt to district revenues	0.684***	0.179
	(0.224)	(0.193)
1976 Percent Democrat Vote	0.004	−0.019**
	(0.012)	(0.007)
Observations	87	87

The outcomes variables are logit transformations of the vote shares. For definitions of variables, see Table A1 in the appendix. The unit of observation is a district-academic year. Results are obtained from estimating equations 5 and 6. Legal dummies, capturing public sector unions' right to bargain, are included. There are a few districts that held elections in two of our sample years. We have checked for the sensitivity of our results to this inclusion. The results are robust. Standard errors are clustered at the state level and presented in parentheses.

*, **, and *** indicate statistical significance at 10 percent, 5 percent, and 1 percent levels, respectively.

Table 5:
The Impact of Coalition Characteristics on the Probability a Vote Will Go to a Representative (1977)

	Log Odds		
	(1) NEA	(2) AFT	(3) Abstain
Enrollment (in 100s of students)	−0.00004 (0.0003)	−0.001*** (0.0004)	0.003*** (0.0004)
District located in urban area	−0.198* (0.105)	0.509*** (0.074)	−0.328 (0.327)
Average teacher salary (in 100s of dollars)	0.004** (0.002)	−0.004** (0.002)	−0.0004 (0.002)
Average teacher fringe (in 100s of dollars)	−0.009*** (0.003)	0.007** (0.003)	0.007** (0.004)
Fraction of teachers hired in current year	0.580 (0.571)	−1.310 (0.837)	0.956** (0.562)
Fraction of secondary teachers	−0.729*** (0.196)	0.342* (0.203)	0.313** (0.195)
Fraction of students classified as poor	0.608 (0.388)	0.745 (0.562)	−1.453 (1.008)
Fraction of black students	−0.411* (0.236)	0.019 (0.122)	0.604* (0.357)
Fraction of district revenues from state transfers	0.298 (0.241)	−0.820** (0.389)	0.237 (0.864)
Total district debt to district revenues	−0.370** (0.183)	0.691*** (0.201)	0.178 (0.193)
1976 Percent Democrat Vote	0.004 (0.009)	0.007 (0.012)	−0.019*** (0.007)
Observations	87	87	87

The outcomes variables are logit transformations of the vote shares. For definitions of variables, see Table A1. The unit of observation is a district-academic year. Results are obtained from estimating equations 8-10. There are a few districts that held elections in two of our sample years. We have checked for the sensitivity of our results to this inclusion. The results are robust. Standard errors are presented in parentheses. *, **, and *** indicate statistical significance at 10 percent, 5 percent, and 1 percent levels, respectively.

Table 6:

The Impact of Coalition Characteristics on the Probability of Voting for a Representative (1978 and 1979)

	Log Odds	
	(1) AFT/NEA	(2) Abstain/Vote
Enrollment (in 100s of students)	0.00004	0.0001
	(0.0001)	(0.0004)
Distict located in urban area	0.111	−0.334
	(0.118)	(0.336)
Average teacher salary (in 100s of dollars)	−0.004**	0.004
	(0.002)	(0.003)
Average teacher fringe (in 100s of dollars)	0.001	0.001
	(0.003)	(0.007)
Fraction of teachers hired in current year	0.705	2.053
	(1.077)	(1.581)
Fraction of secondary teachers	0.798***	0.181
	(0.302)	(0.564)
Fraction of students classified as poor	−0.542	−0.397
	(0.451)	(0.949)
Fraction of black students	0.366	1.509
	(0.405)	(1.052)
Fraction of district revenues from state transfers	−0.283	−0.692
	(0.290)	(0.519)
Total district debt to district revenues	0.115	0.415
	(0.149)	(0.292)
1976 Percent Democrat Vote	−0.002	−0.024
	(0.007)	(0.022)
Observations	96	96

The outcomes variables are logit transformations of the vote shares. For definitions of variables, see Table A1 in the appendix. The unit of observation is a district-academic year. Results are obtained from estimating equations 5 and 6. Legal dummies, capturing public sector unions' right to bargain, are included. There are a few districts that held elections in two of our sample years. We have checked for the sensitivity of our results to this inclusion. The results are robust. Standard errors are clustered at the state level and presented in parentheses.

*, **, and *** indicate statistical significance at 10 percent, 5 percent, and 1 percent levels, respectively.

Table 7:
The Impact of Coalition Characteristics on the Probability a Vote Will Go to a Representative
(1978 and 1979)

| | Log Odds | | |
| | (1) | (2) | (3) |
	NEA	AFT	Abstain
Enrollment (in 100s of students)	−0.0001	−0.000002	0.0001
	(0.0001)	(0.0002)	(0.0004)
Distict located in urban area	−0.073	0.102	−0.334
	(0.141)	(0.123)	(0.336)
Average teacher salary (in 100s of dollars)	0.002	−0.004***	0.004
	(0.0016)	(0.0015)	(0.0029)
Average teacher fringe (in 100s of dollars)	−0.001	−0.0002	0.001
	(0.004)	(0.003)	(0.007)
Fraction of teachers hired in current year	−1.012	0.543	2.053
	(0.891)	(1.209)	(1.581)
Fraction of secondary teachers	−0.740***	0.654**	0.181
	(0.298)	(0.278)	(0.564)
Fraction of students classified as poor	0.404	−0.493	−0.397
	(0.461)	(0.412)	(0.949)
Fraction of black students	−0.535*	0.141	1.509
	(0.300)	(0.509)	(1.052)
Fraction of district revenues from state transfers	0.419*	−0.182	−0.692
	(0.249)	(0.326)	(0.519)
Total district debt to district revenues	−0.181	0.022	0.415
	(0.156)	(0.150)	(0.292)
1976 Percent Democrat Vote	0.003	0.001	−0.024
	(0.007)	(0.007)	(0.022)
Observations	96	96	96

The outcomes variables are logit transformations of the vote shares. For definitions of variables, see Table A1. The unit of observation is a district-academic year. Results are obtained from estimating equations 8-10. There are a few districts that held elections in two of our sample years. We have checked for the sensitivity of our results to this inclusion. The results are robust. Standard errors are presented in parentheses. *, **, and *** indicate statistical significance at 10 percent, 5 percent, and 1 percent levels, respectively.

Appendix

Table A1:
Description of Variables

	Description
Vote Shares	
Share of votes for AFT	Votes for AFT/(Votes for AFT + Votes for NEA)
Share of votes for NEA	Votes for AFT/(Votes for AFT + Votes for NEA)
Share of abstentions from eligible voters	Number of abstentions/Number of teachers in bargaining unit
Voting Odds	
Odds of AFT receiving a vote rather than NEA	Share of Votes for AFT/ Share of Votes for NEA
Odds of abstention rather than casting a vote	Share of Abstentions/Share of Votes
District Characteristics	
Enrollment (in 100s of students)	Number of students enrolled in a school from Census Postcard Survey of Districts/100
District located in an urban area	District is located in the cenral city of an SMSA
Proportion of district revenues from state transfers	State transfers/Total district revenue
Total district debt to district revenue	District short-term and long-term debt/Total district revenue
Percent voting Democrat in presidential election	Percentage of voters in the district who cast a vote for the Democratic candidate in the 1976 presidential election.
Teacher Characteristics	
Average teacher salary (in 100s of dollars)	Total expenditures on teacher salaries/(100 *Number of teachers in the district)
Average teacher fringe (in 100s of dollars)	Total expenditures on teacher fringe/(100*Number of teachers in the district)
Proportion of teachers hired in current year	Number of new teachers/Number of teachers in district
Proportion of teachers in secondary schools	Number of teachers located in secondary schools/Number of teachers in district
Student Characteristics	
Proportion of students classified as poor	Number of students classified as in poverty or receiving welfare/Total students in district
Proportion of black students	Number of black students/Total students in district

Table A2:
Summary Statistics for All U.S. Districts 1976-77

	Mean	Standard Deviation	Minimum	Maximum
District Characteristics				
Enrollment (in 100s of students)	32.178	141.421	1	10748.51
Distict located in urban area	0.033	0.178	0	1
Proportion of district revenues from state transfers	0.401	0.173	0	0.915
Total district debt to district revenues	0.406	0.413	0	8.114
Teacher Characteristics				
Average teacher salary (in 100s of dollars)	174.627	46.622	31.984	394.616
Average teacher fringe (in 100s of dollars)	21.947	20.533	0	192.591
Proportion of teachers hired in current year	0.108	0.081	0	0.846
Proportion of teachers in secondary schools	0.465	0.188	0	1
Student Characteristics				
Proportion of students classified as poor	0.176	0.152	0	0.995
Proportion of black students	0.058	0.144	0	0.998
Observations	13626			

This table compares the districts in our sample to the universe of school districts in 1976-77 using the Elementary

and Secondary General Information System (ELSEGIS) data. This is the year corresponding to the ELSEGIS data

used in our sample.

Figure A1: Political platform in teachers union representation election on an issue space ranging from conservative to militant.

Figure A2: Location of certification elections in sample