



Assessing the Role of Teachers' Unions in the Adoption of Accountability Policies in Public Education

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Abstract

We investigate the role of teachers' unions in state policymaking in the context of *No Child Left Behind*. Our analyses of panel data show that political party control and region moderate the influence of teachers' unions in the adoption of accountability policies by states. Our analyses of marginal effects show that teachers' unions are not always against the adoption of stronger accountability policies and neither do they always align with the Democratic Party. Our findings suggest that the current dominant prescription in the policy debate for curtailing the collective bargaining rights of teachers' unions is not fully substantiated.

Keywords Teachers' unions · Collective bargaining · Policy adoption · No child left behind · Accountability

Introduction

Teacher unions have come under extensive scrutiny in recent decades as has the adversarial professional climate for teachers grown considerably. In the context of the US, many believe that the power of public teacher unions has diminished considerably as a result of a systematic “war” that has been waged against public sector collective bargaining since the 2010 mid-term elections (Smith 2013; Freeman and Han 2016). This systematic “war” against teacher unions has come in

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many forms. First, the victory of conservative Republicans in the 2010 state elections led to the introduction of laws that aimed either to weaken or to eliminate collective bargaining in states. The justification that was offered was that such agreements contributed to growing deficits and the new laws will allow state governments greater flexibility in responding to financial crises like the 2008–2009 recession. Ohio, Wisconsin, Indiana, Missouri, and Pennsylvania are few examples of states that have enacted anti-union legislations in recent years. Second, there is a systematic effort by opponents of unionization to portray teachers as against school reform, accountability and by default, against the interests of students. This growing anti-union wave is being sustained through a careful framing of teacher tenure as the primary reason behind failing schools (Smith 2013; Lathan 2011; Coulson 2010). Third, teacher unions have come under a series of legal challenges and setbacks recently in several state courts. Examples of these legal challenges include *Janus v. AFSCME* (2018), *Martinez v. Malloy* (2016), *Doe v. Antioch* (2015), and *Vergara vs. California* (2015). Several of these legal challenges were brought by anti-union advocacy groups such as “Students Matter,” “Stand for Children,” “Democrats for Education Reform,” and American Legislative Exchange Council.” These anti-union advocacy groups used the equal protection and education clauses in state Constitutions to portray a conflict between the interests of teachers and students before the Court (Superfine and Thompson 2016). Furthermore, rulings like that of *Janus v. AFSCME* (2018) where a 5–4 court majority ruled that public sector unions can no longer collect agency fees from nonmembers jeopardized the very survival of teacher unions in the U.S. Finally, the “war” against teacher unions has been perpetrated through the widespread use of a controversial tool called the Value Added Method (VAM). VAM is currently being used by several states to evaluate teacher effectiveness in raising students’ test scores and to distinguish ineffective teachers from effective teachers for personnel actions. It is important to note that in several recent state litigations evidence from VAM has proved central to the plaintiffs’ victory against teacher unions (Superfine and Thompson 2016, p. 592).

Globally also teachers and teachers’ unions have come under attack in countries that are pursuing neoliberal policies in education. International lending organizations such as the International Monetary Fund (IMF) and the World Bank have played influential roles in imposing market-based reforms in education across nations around the world. In their pursuit of transforming education around the world, these organizations have collaborated with the private foundations of the “billionaires’ club” in the global north (Weiner 2012; Compton and Weiner 2008; Ravitch 2010). In Compton & Weiner’s words, “whether in U.S. cities, Australia, Germany, Israel, the mountains of Chavez’s Venezuela, in civil war-torn Nepal, in Europe’s towns and countryside, or in the refugee camps of Sudan, teachers in every part of the world are in the forefront of the struggle to ensure that children receive an education.” (Compton and Weiner 2008; pp. 3). They are doing so in a climate where the meaning and goals of public education has changed, teachers are vilified for the lack of improvement in student achievement in standardized tests, and teacher unions’ power to win an alternative type of education has diminished considerably (Weiner 2012).

The decline in the power of teacher unions globally and especially in the United States and the assault on their collective bargaining rights have prompted teachers to take more aggressive strategies in voicing their concerns about their work conditions and to oppose any systematic efforts to diminish or eliminate their collective bargaining rights. Recent walk-outs organized by teachers in several U.S. states point to this fact. For example, on April 16, 2018 Colorado teachers rallied outside the state Capitol to demand for more funding for schools and opposed changes to the state's pension system. Teachers in West Virginia similarly walked out of their classrooms to protest low wages and rising health care costs. Thousands of teachers across the state of Arizona walked off the job on April 26, 2018 demanding an increase in school funding that matches pre-recession levels. In Oklahoma, teachers walked out recently hoping to win increases in school funding and more pay for support staff. In Kentucky, teachers are continuing their fight for better teacher compensation. These teacher protests hold significance because the underlying demands raised by them constitute the same bread and butter issues that teacher unions have always fought for on behalf of teachers.

Proponents of teachers' unions argue that teachers' unions are advocates for teachers' professional rights, development, and collective well-being which are not necessarily in conflict with policy reforms for better educational outcomes (Bascia 2005, 2009; Casey 2006). Studies demonstrate that the unions use collective bargaining to influence the social context within which teachers operate, thereby shaping teacher experiences and outcomes (Bascia 2005). For example, Eberts's synthesis of the literature shows that union bargaining raises teachers' compensation, improved their working conditions, and enhances their employment security (Ebert 2007). The author's analyses also showed a 15% increase in the cost of providing public education as a result of union bargaining leading to increased pay, better fringe benefits, improved work conditions including more standardized and regulated workplace, and protections against job loss (Eberts 2007, p. 182). Furthermore, numerous studies have identified a positive relationship between teachers unions and student achievement on standardized tests (Steelman et al. 2000; Nelson and Rosen 1996; Eberts and Stone 1984; Grimes and Register 1990; Kleiner and Petree 1988). Others have found the effect of unions on student performance to be mixed (Eberts 2007; Lindy 2011; Peltzman 1993). Eberts (2007) found that students of average ability attending school in union districts perform better on standardized tests compared to low-achieving and high-achieving students in those districts. However, the author also found that this gain in achievement does not compensate for the increase in cost of public education due to union bargaining for teachers (Eberts 2007, p. 175). In a more recent study, Vachon and Ma (2015) found that teacher unions are most beneficial to middle and high achieving students. Furthermore, through industrial and professional bargaining teachers secure higher salaries, credentialing and greater autonomy, which lead to improved student achievement in math (p. 391). Other studies have found either negative or no relationship between teachers' unions and outcomes such as educational productivity and resource allocation (Fuller et al. 2000; Hoxby 1996; Lovenheim 2009; Moe 2009).

The debate among researchers tends to be about mechanisms through which unions influence educational outcomes rather than the way unions influence

education policy (Bascia 2005). This is partially attributable to a lacuna of research in this area (Carini 2008). Indeed, Terry Moe (2009) called for additional research on the influence of teachers' unions across areas of government. Hartney and Flavin (2011) also reported that only few studies have examined the relationship between teachers' unions and variation in state education policy. These scholars argue that due to the substantial size of teachers' unions in the public sector, their influence is not limited to electoral campaigns of national and state politics, but also in policy-making (Moe 2009; Hartney and Flavin 2011; Choi and Chung 2016). Therefore, this research fills a gap in the literature by examining the influence of teachers' unions on public education policymaking across the U.S. states.

Specifically, we analyze whether the bargaining power of teachers' unions influences state adoption of school accountability policies mandated under the federal *No Child Left Behind Act* (NCLB) of 2001. Based on the review of the extant literature, we develop a conceptual model in which the power of teachers' unions is conditioned by the political control of the Democratic Party along with the region of the country. Our research reveals that teachers' unions are not always associated with the adoption of weaker school accountability policies across states, and that they are not invariably aligned with the Democratic Party in influencing the adoption of unfavorable accountability reforms.

Teachers' Unions, State Politics, and Policy Making

The two major teachers' unions—the National Education Association (NEA) and the American Federation of Teachers (AFT)—have grown steadily over the years and today remain unquestionably very large and highly visible. However, their histories differ with AFT starting out as a labor union that embraced collective bargaining by its local affiliates who had more power compared to their sister organizations at the state level. In AFT, local entities collected dues and paid only a portion of those dues with state and national organizations. The NEA, on the other hand, started out as a professional organization and remained so for over a century. Unlike AFT, state organizations wielded more power in the NEA and were primarily responsible for collecting dues and sharing it with local affiliates. The NEA viewed collective bargaining for teachers as unprofessional and detrimental to the functioning of school administrators before it altered its stance in late 1960s in response to AFTs agitation for collective bargaining rights (Weiner 2012; pp. 51–52). Today, both AFT and NEA are known as “business unions” that are powerful forces in national and sub-national politics due to their growing membership, resources, political contributions, insider knowledge, and collective bargaining power (Hartney and Flavin 2011; Hess and Kelly 2006; Lovenheim 2009; Weiner 2012). Moreover, their domain of influence has expanded in the last two decades. Teachers' unions have a powerful grip on education politics and policy at state and national levels, while also bargaining for the collective at the local level (Hartney and Flavin 2011; Shelly 2008). The NEA has 50 state and about 14,000 local affiliates in school districts, and the AFT has 43 state and over 3000 local school district affiliates across the nation. Together, these two organizations have some 4.6 million members. The local affiliates engage in

bargaining with school boards, while the state and national bodies influence public education policymaking (Hess and Kelly 2006).

State governments bear major responsibilities for education policymaking although public education governance is a shared responsibility amongst local, state and federal actors (Epstein 2004). Consequently, education policy making is a process that is heavily influenced by state politics, which in turn is influenced by powerful organized interests like that of teachers' unions (Gray and Hanson 2008; Hartney and Flavin 2011). Opponents of teachers' unions have argued that the nature of education policies are such that teachers' unions have great advantages in ensuring that their preferred policies are enacted. In support of their argument, these scholars cite evidence that state legislators, chief state school officers, and members of state and local school boards who are typically responsible for deciding education policy are most often elected in low turnout, low awareness, and low interest elections (Moe 2006; Hrebendar and Thomas 2004). As a result, teachers' unions exercise disproportionate influence over school board elections and effectively elect the policymakers they will eventually bargain with and depend on for favorable policies (Hartney and Flavin 2011, p. 253). There is little unanimity, however, regarding the degree to which teachers' unions influence state education policymaking (Hartney and Flavin 2011; Shelly 2008). This is because while teachers' unions are active in all states, the power of these unions varies substantially across states and across school districts within states (Hartney and Flavin 2011; Farber 2006; Gray and Hanson 2008; Nownes et al. 1999). In fact, Gray and Hanson (2008) show that teachers' unions were most effective in 31 states, moderately effective in 17 states, and relatively ineffective in two states in 2006–2007. A more recent study conducted in 2012 by the Fordham Institute shows a state by state comparison of teacher union strength. The authors looked at five broad areas in order to rank states in terms of teacher union strength. These include “resources and memberships,” “involvement in politics,” “scope of bargaining,” “state policies,” and “perceived influence.” As per this study, some of the most powerful teachers' unions are in the states of Hawaii, Oregon, Montana, Pennsylvania, California, Illinois, New Jersey, New York and Washington while some of the weakest teachers' unions operate in Louisiana, Texas, Georgia, Mississippi, Florida among others (Winkler et al. 2012).

The power of teachers' unions is partially attributable to the states' regulation of collective bargaining. Indeed, the 50 states control interest group activities by regulating their ability to bargain (Gray and Hanson 2008). State-level collective bargaining legislation, passed between the 1950s and 1970s, govern collective bargaining agreements at the state and local levels (Farber 2006, p. 39). These laws also regulate the dimensions of union activity and determine the scope of issues that can be negotiated. Currently, 45 states have passed legislation that either allows teachers the right to bargain collectively or makes it mandatory for school districts to engage in collective bargaining with teachers' unions. For example, states with the strongest teachers' unions such as Hawaii, Oregon, Montana, Pennsylvania, California, Illinois, New Jersey, New York and Washington have all mandatory bargaining. Some states where teachers' unions are strong but not the strongest have mandatory bargaining (Vermont, Minnesota, Connecticut etc.) while others just permit bargaining (such as Ohio, West Virginia,

Alabama). Interestingly, there are about eight states that permit collective bargaining but prohibits agency fees. These are Alabama, Wyoming, Utah, Arizona, Arkansas, Mississippi, Oklahoma and Louisiana. Five states have legislation that explicitly bans both collective bargaining and agency fees. These are South Carolina, North Carolina, Virginia, Texas, and Georgia (Farber 2006; Freeman and Valletta 1988; Lovenheim 2009). Due to these variations in collective bargaining laws across states, teachers' unions wield differential power (Winkler et al. 2012; Farber 2006; Freeman and Valletta 1988). The index of favorableness of state laws toward collective bargaining developed by Freeman and Valetta (1988) and extended by Farber (2006) comprehensively captures this variation. We use this index as the measure of the strength of teachers' unions in states in our analyses in this study.

The scope of collective bargaining laws is at the very least sufficient but not essential in determining the power of teachers' unions in states. Another factor that determines the power of teachers' unions in states is their activism in state and local electoral politics (Moe 2003, 2006, 2009; Hartney and Flavin 2011). Studies have demonstrated that the strongest state teacher unions have donated significant amounts to candidates for state offices or political parties. According to the National Institute on Money in State Politics (2009), in states such as Oregon, Illinois, Indiana and Nebraska, which are home to some of the strongest teachers' unions, candidates for U.S. state office received anywhere between 3.23 and 3.69 percentage of their total campaign contributions from teachers' unions. Furthermore, some scholars argue that the majority of political contributions from teachers' unions go to the Democratic Party (Kahlenberg 2006) and that teachers' unions typically support the Democratic Party's candidates, contribute to their political campaigns, and almost always use their power exclusively in concert with the Democratic Party (Moe 2003). Their strong alliance is mutually beneficial as it offers both groups extended power (Moller et al. 2009). This political arrangement implies that teachers' unions are likely to be more powerful in influencing policymaking in states controlled by the Democratic Party, as compared to other states. While this line of argument suggested by the opponents of teachers' unions received a lot of enthusiasm in recent years, it needs deeper probing. For example, the Fordham Institute study found that teachers' unions focused their contributions on candidates as opposed to political parties in the state of Illinois, which is ranked at the top in terms of teacher union power. A mere 0.6 percent of donations to political parties in Illinois came from teacher unions. Furthermore, the study found that 14.2 percent of all delegates to the Democratic and Republican national conventions were teacher union members. Interestingly, the same study found that in Alabama, which per the study is ranked in tier 2 with "strong" teacher union but ranked in tier 1 on union involvement in politics, teacher unions donated large proportion to both candidates and political parties. In California, however, majority of union contribution went to state political parties and 12.3 percent of California delegates to the Democratic and Republic national conventions were teacher union members (Winkler et al. 2012). This shows that the oft-repeated alliance between the teacher unions and the Democratic Party is not so clear after all. To our knowledge, this is the only study that tested the above proposition by introducing a separate hypothesis.

Beyond the numbers and partisan bickering over teachers' union power, it is important to offer a glimpse of a powerful teacher union. We consider the case of Chicago Teachers Union (CTU) in the state of Illinois to demonstrate the workings of a powerful union in the nation. This case is also interesting from this study's standpoint as it challenges the notion put forth by opponents of teacher unions that unions always work in tandem with the Democratic Party. The CTU fought against neoliberal policies in public education put forth by the Obama administration at the federal level and implemented in Chicago under the stewardship of the Democratic Party Mayor, Rahm Emanuel.

The CTU was founded in 1937 after successfully uniting many competing teachers' organizations in Chicago during the Great Depression. It was chartered as Local 1 of the American Federation of Teachers (AFT) and won collective bargaining rights in 1966. The state of Illinois where CTU operates is currently one of the twenty-one states that allows unions a very broad scope for collective bargaining, permits teacher strikes and also allows unions to collect agency fees from non-member teachers (Winkler et al. 2012). Currently, CTU has some 20,000 members who belong to the Chicago Public School system, which is the third largest in the country.¹

The CTU's declaration of a seven-day long teachers strike in September 2012 after its failed negotiation with the Chicago Board of Education grabbed headlines for several reasons. The strike came after a gap of 25 years and as such was new to most of its current members. The overwhelming participation of teachers in that strike and the successful outcome led many to believe that the future of teachers' unions lies in its transformation from "business unionism" to what many scholars called as "social justice" unionism (Weiner 2012). The rank-and-file rebellion within the CTU that led to the strike came after years of impasse since the 1990s that saw the transformation of the CTU from a progressive force in Chicago labor movement and municipal politics to one of the most conformist unions in the city by 2008 (Brogan 2014, p. 149; Lyons 2008). What transpired within the CTU during this period was common among most local affiliates of NEA and AFT who failed to mobilize its members and became either ineffective or complicit in combating neoliberal policies in education (Brogan 2014; pp. 146–149; Weiner 2012; Lyons 2008).

In 2009 inspired by Bush administration's No Child Left Behind (NCLB) and the Obama administration's Race to the Top (RTTP) programs, the Civic Committee of Chicago published a report advocating for "tough-minded" teacher accountability and evaluation policies in order to raise student performance in city schools. The committee further recommended "broad outsourcing of the management of failing schools to independent organizations." (Civic Committee 2009; p. 4; Brogan 2014; p. 148). The fiscal crisis at the state level in 2010 led to additional policies that galvanized both teachers and parents across socioeconomic groups. These policies included broad cuts in music and arts education and longer school days for Chicago public schools put forth by the democratic mayor of Chicago. To protest

¹ Per CTU website: <https://www.ctulocal1.org/union/member-information/>.

against these policies and organize a change within the CTU, a small group of teachers formed the Caucus of Rank and File Educators (CORE).

The CORE successfully led an aggressive grassroots campaign against school closure, privatization, and budget cuts and gained control over the CTU in a run-off election in 2010 (Brogan 2014). Since taking control over the CTU, the group spearheaded major internal reorganization and expanded the CTU's external outreach. The new leadership negotiated hard to stop neoliberal policies advocated by the democratic mayor of Chicago. When negotiations with the city failed in 2012, CTU members voted overwhelmingly to authorize a strike. The success of that strike led union leaders to organize a series of town hall meetings in major cities across the country to underscore the need for teachers' unions to transform from the traditional "business union" approach to a "social justice" oriented approach in order to bring real positive changes in education (Brogan 2014; Weiner 2012). The CTU's 2012 strike did not stop the Chicago city government's efforts to close public schools in predominantly low-income and minoritized neighborhoods under the guise of austerity and accountability. Instead it achieved two broad goals including (a) bringing to the forefront some of the perils of top-down accountability policies that were introduced through the federal No Child Left behind Act, and (b) it offered a new innovative pathway for teachers to organize themselves, gain community support and launch protests against such accountability policies at the local level.

Teachers' Unions and the No Child Left Behind (NCLB)

The NCLB Act was intended to address educational inequality by introducing standards, assessments, and accountability mechanisms for preventing schools from hiding low achievers and inflating overall results. The most controversial accountability provisions in NCLB included various sanctions against schools that failed to meet the required standards (Manna 2006; Moe 2006). NCLB imposed the adoption of various accountability provisions on states by linking the legislation with Title 1 funds.

Yet, even with these restrictions from the federal government, NCLB relied on state-level policy adoption and implementation, and this provided teachers' unions an opportunity to influence policy at the state level. NCLB has granted states considerable flexibility in developing standards and interventions, and subsequently, states have adopted and implemented widely different accountability policies (McDermott 2003; Wong and Shen 2002). While states that didn't have any accountability system in place before NCLB had to develop accountability policies from the scratch, others had to make adjustments to meet the requirement of the legislation (Goertz 2005; Shelly 2008). Scholars who've studied states' response to NCLB found that the requirements under the law posed different challenges for different states and spurred vigorous resistance from them (Shelly 2008; Kim 2003; Goertz 2005; Clarke 2007). States that had no accountability systems in place prior to NCLB or had weak previous accountability systems had very little turnaround time to meet the objectives under NCLB. Similarly, states that had a well-developed and rigorous accountability system in place had to modify their existing systems in

light of NCLB. States belonging to both these groups opposed NCLB (Shelly 2008; p. 450). Furthermore, NCLB relied on the states' system of intra-district school choice programs to successfully implement the closure of underperforming schools and allowing students the option to transfer. This caused states with less developed intra-district choice programs great difficulty and led to more resistance from such states (Shelly 2008; p. 451). Some scholars argue that the teachers' unions exerted an important influence on this differential adoption and implementation of accountability policies (Manna 2006; Moe 2006).

Opponents of unions argue that teachers' unions have an incentive to influence the adoption of accountability policies in public education because components of NCLB, particularly accountability policies, both threaten teachers' collective interests and provide new opportunities (Manna 2006; Moe 2006). Teachers' unions rarely express their opposition to accountability policies publicly because these policies have widespread public support. The adoption of extreme sanctions such as school reconstitution and school closure have been publicly resisted by teachers' unions (Moe 2006); they have also opposed the imposition of sanctions on failing schools because any attachment of consequences to schools has direct implications for teachers' job security (Moe 2006, p. 248). In addition, teachers' unions strongly oppose reassignment and transfer of teachers in the event of school reconstitution and teacher layoffs and have responded negatively through lawsuits and other forms of protest (Manna 2006).

Opponents of teachers' unions further claim that some provisions under the NCLB directly challenge the collective interests of teachers' unions, some provisions also open new opportunities (Peterson and West 2003). NCLB's focus on low-performing inner-city schools allow teachers' unions an opportunity to push for greater financial resources for inner-city schools. Similarly, teachers' unions use NCLB's focus on teacher quality to draw attention to lower teacher salaries and poor working conditions as potential barriers to the recruitment of qualified teachers. They also emphasize the need for teacher professional development to improve teacher quality. However, unions favor positive inducements, such as bonuses for high-performing teachers or rewards for schools. Teachers' unions have also used NCLB's focus on closing the achievement gaps between all subgroups to push for big-budget programs for special education kids so that more teachers could be hired (Peterson and West 2003).

The above arguments as to why teachers' unions are more likely to oppose adoption of strong accountability policies have come mostly from advocates of curtailing the power of teachers' unions. However, one recent comprehensive study that examined the causes of state resistance to NCLB found that interest groups have played a marginal role at best in influencing state resistance to NCLB and political factors didn't influence state decisions in adopting certain policies. The same study further notes that "the strength of a state's teacher's unions does not make it more likely to challenge NCLB" instead, the "extreme and unprecedented demands" that NCLB placed on states caused them to resist adoption of accountability policies (Shelly 2008; p. 459). Therefore, we test if the arguments put forth by opponents of teacher unions really hold up with our data. Following their logic, we hypothesize that states with more powerful teachers' unions are less likely to adopt stronger accountability policies in comparison to states

with weaker teachers' unions. Furthermore, consistent with their argument that teachers' unions use their bargaining power in concert with the Democratic Party, we further hypothesize that state political control moderates the relationship between the power of teachers' unions and the adoption of accountability policies by states.

The Importance of Regions

A study of policies across states must account for the region of the country, particularly when emphasizing the role of teachers' unions and party control (Carini 2008). Southern states have lower unionization rates than other regions (McDermott 2003); only 26.3% of schools in the South are covered by collective bargaining agreements in comparison to more than 75% schools in other regions (Carini 2008). Furthermore, unions are differentially effective in influencing policies across regions because the collective bargaining indices vary dramatically across states, and many states within regions have a similar collective bargaining index (Farber 2006). Therefore, the region of the country moderates the effect of unions' bargaining power on policymaking in public education.

The region of the country is also important because it moderates the association between political partisanship and the adoption of accountability policies across states. Several studies argue that political behavior and electoral politics show regional variation, i.e., southern Democrats are significantly more conservative than their non-southern counterparts (Songer and Davis 1990; Wright and Berkman 1986). Indeed, southern Democrats have voting patterns that mirror those of Republicans in other regions of the country, and they have adopted strong accountability policies as a result (McDermott 2003). Therefore, the influence of political party control on accountability policies under NCLB may be different for states in the South compared to that of other states.

Since both collective bargaining power of teachers' unions and political partisanship show regional variation, we therefore propose three additional hypotheses. First, we hypothesize that region (i.e. South/non-South) moderates the relationship between collective bargaining power of teachers' unions and adoption of strong accountability policies. Second, we hypothesize that southern states moderate the relationship between state political control by the Democratic Party and the adoption of accountability policies. Finally, our main hypothesis of interest is that political party control and the region of states moderate the relationship between the collective bargaining power of the teachers' unions and adoption of accountability policies. This three-way conceptualization is consistent with Carini's suggestion about disentangling the confounding effects of union power and region (2008).

Measures, Data Sources, Estimation Strategy and Results

Variables and Data

Our dependent variable is the set of NCLB mandated accountability policies adopted by states. One element of these accountability policies rewards those schools that

perform well on the Annual Yearly Progress (AYP) exams. Other elements require school districts to take mid-course corrective actions on schools that fail to meet the AYP targets. These corrective actions and sanctions come into force in three-stages (McGuinn 2006). In the improvement stage, schools receive technical assistance from districts if they fail to meet the AYP for two consecutive years. These failing schools also have to arrange transportation for their students who decide to move to another public school. One additional year of failure to reach the AYP target by these schools gives parents the option to use their share of Title 1 funds for private tutoring and other supplemental education services from third party providers. The corrective action stage sets in when schools fail to meet their annual AYP targets for four consecutive years. The sanctions on the failing schools at this stage include staff layoffs, curriculum modifications, revoking of management authority, and extension of instructional time. Subsequently, the reconstitution stage sets in when schools fail to attain AYP for five consecutive years in a row. The sanctions at this stage include change of governance structure of schools, state takeover, and reconstitution into charter schools. The district can also transfer school management to private companies during this stage (McGuinn 2006). Except for rewarding high performing schools, these accountability policies are punitive in nature and authorize sanctions against failing public schools. Table 1 defines these accountability policies.

The exact types of sanctions vary across states. The Education Counts database of *Education Week* contains longitudinal information on the adoption of these accountability policies by states. We performed a tetrachoric factor analysis on the adoption of different categories of sanctions and rewards on schools by states during the years 2002–2009 including (most notably) school closure, student transfer from persistently failing schools, conversion of persistently failing public schools into charters, reconstitution of failing schools, transfer of school governance to private management, and withholding of funds to failing public schools. The Education Counts database codes each of these elements of school accountability policy as “Yes” for states that adopted that particular sanction in a year and “No” otherwise. We assigned a numerical value of “1” to “Yes” and a value of “0” to “No.” We combined these variables into weighted factor scores and weighted additive index, which we used as our dependent variables.

Table 1 shows the proportion of states ever adopting each component of the accountability policy over the study period; the proportion of states that have each of the components of the accountability policy in place at the end of study period is also displayed. These two pieces of information, together, show that there is considerable variation in the adoption of components of accountability policies across states and time.

The strength of accountability systems in public education is a multidimensional concept (Table 1), and the factor analysis approach combines the individual components of an underlying concept in a meaningful and objective way (Kim and Mueller 1978). In our case, we used this approach to adequately combine the components of accountability policies to measure the strength of accountability policies adopted by states. Moe (2009) used a similar approach to measure the restrictiveness of collective bargaining in large school districts of California. However, for dichotomous variables, a factor analysis of the matrix of their tetrachoric correlations is more

Table 1 Definitions of types of sanctions in state accountability systems *Source:* Compiled by the authors from the education counts database of the education week

No.	Type of sanction	Definition in the education counts database	Percent of states adopting the policy	
			2003–2009	2009
1.	Conversion of schools into charters	State accountability system includes the option of closing down low-performing schools and reopening them as charters. States get credit if the sanctions apply statewide, not just to Title I schools	36	32
2.	Permitting student transfers	State accountability system includes the option of allowing students at low-performing schools to transfer to other schools. States get credit if the sanctions apply statewide, not just to Title I schools	48	34
3.	School reconstitution	State accountability system includes the option of removing or releasing some or all teachers and/or administrators in a school or requiring all school staff to reapply for their positions in low-performing schools. States get credit if the sanctions apply statewide, not just to Title I schools	70	56
4.	School closure	State accountability system includes the option of completely closing down low-performing schools. States get credit if the sanctions apply statewide, not just to Title I schools	40	28
5.	Turning schools over to private management	State accountability system includes the option of turning over the management of low-performing schools to private/non-profit firms. States get credit if the sanctions apply statewide, not just to Title I schools	42	34
6.	Withholding funds	State accountability system includes the option to withhold funds from low-performing schools. States get credit if the sanctions apply statewide, not just to Title I schools	18	12
7.	Reward	State has a program(s) to reward successful or high-performing schools with extra funding/money although rewards do not have to be tied to a statewide rating system	82	38
8.	Sanctions on low performing schools	State imposes sanctions such as school closure or reconstitution on low-performing schools. States get credit if the sanctions apply statewide, not just to Title I schools	74	62
9.	New curriculum [^]	State accountability system includes the option of implementing a new curriculum in low-performing schools. States get credit if the sanctions apply statewide, not just to Title I schools	52	46
10.	Restructuring [#]	State accountability system includes the option of restructuring low-performing schools. States get credit if the sanctions apply statewide, not just to Title I schools	58 [#]	

Table 1 (continued)

No.	Type of sanction	Definition in the education counts database	Percent of states adopting the policy	
			2003–2009	2009
11.	Turning schools to state education agency [^]	State accountability system includes the option of turning over the management of low-performing schools to the state education agency. States get credit if the sanctions apply statewide, not just to Title I schools	46	42
12.	Supplemental services [^]	State accountability system includes the option of offering supplemental services to low-performing schools. States get credit if the sanctions apply statewide, not just to Title I schools	42	32

Educunts database includes information on first eight categories for all the years in this study's sample period

#Educunts database collected information on restructuring only for the year 2007

[^]and Educunts data for the years 2007 onward include information on new curriculum, supplemental services, and handing schools over to state education agency

appropriate (Uebersax 2000).² We also adopted an alternate option to construct a weighted additive index of the various sanctions. Moreover, the weighted tetrachoric factor scores and the weighted additive index have interval-level measure, and hence they are amenable to an array of regression techniques. We reversed the direction of the dichotomous variable on reward for high performing schools in order to align the measurements of all the components of school accountability policy and used subjective weights for each of the sanctions to calculate the tetrachoric factor scores and the additive index. Our use of significantly higher weights for several components of accountability policies is based on the fact that these components may threaten teachers' collective interests, such as those teachers' unions that have publicly resisted the adoption of extreme sanctions (i.e., school reconstitution and school closure) (Manna 2006; Moe 2006). Teachers' unions have also publicly opposed the imposition of sanctions on failing schools because any attachment of consequences to schools has direct implications for teachers' job security (Moe 2006, p. 248). Teachers' unions also strongly oppose reassignment and transfer of teachers in the event of school reconstitution and teacher layoffs. The note below Table 2 lists the assignment of different weights for various components of the accountability policy.

The inter-item reliability measure supports the weighted tetrachoric factor scores and the weighted additive index. The Cronbach's alpha is quite high at 0.88. We calculated the weighted tetrachoric factor scores and the weighted additive index for each year separately and then combined them together to form a panel. We followed this approach because the states did not adopt all of the 12 components of accountability policies in all the years in the study period, and because this approach preserved any potential autocorrelations within states in the adoption of accountability policies. The weighted tetrachoric factor scores and the weighted additive index, which will henceforth be referred to as *accountability policies*, reflect the strength of accountability systems. A lower value indicates that the strength of the accountability system in a state in a given year is weak.

Our main independent variable is the strength of teachers' unions, measured with an index of the strength of collective bargaining rights for local school teachers in states. Freeman and Valletta (1988) originally developed this index and Farber (2006) has extended it until 2004. We have carried forward this index for each state up to 2009. There is very little time-series variation in the collective bargaining rights index (Farber 2006). States account for 74.9% of this variation, followed by year (0.05%) and the remainder by the type of public employee group (Farber 2006, pp. 42–43).

² We chose the weighted tetrachoric factor analysis over other alternatives because each of the sanctions only partially represents the underlying strength of the state accountability system. One option is to treat each type of sanction (including rewards for high performing schools) as a different dependent variable. There are two problems with this. Apart from only partially capturing the strength of the adopted accountability system in states, the dichotomous nature of the measurement of individual sanctions also imposes restrictions on the possible types of statistical analyses. The factor scores overcome these challenges by measuring the underlying strength of adopted accountability policies objectively on the basis of how closely the various types of sanctions hang together (Moe 2009).

Table 2 Descriptive statistics

Variable	Mean	SD
Weighted Tetrachoric factor scores [#] on the strength of accountability policies adopted in states	0.30	1.70
Weighted Additive Index [#] on the strength of accountability policies adopted in states	6.43	6.40
Collective bargaining rights index (Farber 2006)	4.70	1.89
Percentage of teachers covered by collective bargaining agreements	71.62	21.17
Ranney Index of democratic party control	.49	0.16
Dummy for southern states	.32	0.47
State citizen ideology (Berry et al. 2010)	53.25	16.15
Neither an election year for governor nor a year after an election	0.5	0.5
Education expenditure per pupil	8854	1953
Percentage of school age students	17.96	1.2
Percent of minoritized students	32.25	17.74
Average SAT verbal score/total possible score	0.67	0.04
Average freshman graduation rates	75.1	7.61
Number of students in public schools	968,776	1,120,018
Proportion of private schools	0.33	0.16
Log of median household income	4.70	0.07
Log of state population	6.56	.44
Proportion of urban population	0.71	0.15
Real per capita GDP in chained 2005 US dollars	40,609	7465
Number of administrators per school district	11	29.47
Share of local funding of public education	38.06	12.76
Number of students in school district	9099	25,984
Presence of school sanction policy in 2000	0.36	0.48
Number of observations	400	

[#]Weights applied for the two measures of the strength of accountability systems follow the following linear equation: (3*convertc + stransfe + 3*sreconst + 4*sclosure + 3*spvtman + 2*withholdfunds + lowperform + suppleservice + 2*newcurri + 3*stateagency + reward); where the direction of the measure for reward has been reversed to align with measures of other components of the accountability system

This scale-based measure captures the legal environment of the strength of collective bargaining in each state more comprehensively than other alternatives including the percentage of unionized public school teachers or percentage of school teachers covered by collective bargaining agreements. Hoxby (1996) argued that a simple count of unionized members does not give a full picture of their power. This is because in many instances existing teachers' professional associations were transformed into teachers' unions and often retained their original professional orientation rather than identifying with the larger labor movements (Hoxby 1996). Consequently, the large membership base of teachers' unions may overstate their political influence. Using data on collective bargaining provisions in large school districts of California, several recent studies have also emphasized the effect of the strength

of collective bargaining contracts between teachers' unions and school districts on student performance, educational productivity, and resource allocation rather than relying on the percentage of teachers as members of teachers' unions for the purpose (Moe 2009; Strunk and Grissom 2010; Strunk and McEachin 2011). Given the focus of this paper on the broader issue of state policy adoption, measuring the legal environment with regard to collective bargaining is a better strategy than simply using union membership rates or the percentage of teachers covered by collective bargaining. The recent legislative fight over curtailment of collective bargaining rights in Wisconsin also supports the importance of legal environment of collective bargaining. Moreover, union coverage is significantly higher in states that have more favorable collective bargaining rights for all types of workers (Farber 2006). Union coverage is the "fraction of workers who report either being a union member or being a nonmember covered by a collective bargaining agreement" (Farber 2006, p. 43). We also noted high correlations (not shown here) between the collective bargaining rights index, the percentage of teachers covered by collective bargaining, and the percentage of unionized teachers. However, consistent with the practice in the empirical literature, we included the percentage of teachers covered by collective bargaining as an alternate measure for the collective bargaining power of teachers' unions.

The index of the strength of collective bargaining rights captures eight different groups of states (Farber 2006; Freeman and Valletta 1988) in which bargaining:

1. Is legally prohibited;
2. Is not legally prohibited but with absence of provisions;
3. Is permitted but do not require employers to negotiate with unionized workers;
4. Is permitted; unions are allowed to meet and present offers to their employers, but employers retain the discretion to take unilateral decision;
5. Is considered a duty but without specific dispute resolution mechanism;
6. Is considered a duty and dispute resolution occurs through fact finding mechanisms that entail the intervention of a neutral third party that is not empowered to implement a settlement;
7. Is considered a duty, and unions are allowed to strike to make their case;
8. Is considered a duty with compulsory interest arbitration, which empowers the neutral third party to determine the terms of the agreement and guarantee closure of the process.

These eight categories are ranked in order of increasing favorableness for union activities (Farber 2006, p. 42). Although the index of collective bargaining power of teachers' unions is an ordinal measure with eight distinct values, the general practice in the literature that examines the influence of teachers' unions in education policy is to treat this index as a continuous measure (Frandsen 2011; Hartney and Flavin 2011; Hirsch et al. 2011). Sociological and psychometric methodologists state that when there are five or more categories, there is relatively little harm in treating ordinal scales as continuous variables (Johnson and Creech 1983; Zumbo and Zimmerman 1993).

Apart from teachers' unions, our conceptual model entails measuring political party control and region of the states. We measured political control in a state as the extent of Democratic Party's control of the two houses of legislature and the proportion of popular votes won by the Democratic gubernatorial candidates. Following Wong and Shen (2002) and Holbrook and LaRaja (2008), we employed the Ranney Index to measure the degree of the Democratic Party's control in each of the states. The Ranney Index is the average of four proportions: 1. The average proportion of the popular vote won by Democratic gubernatorial candidates; 2. The average proportion of seats held by Democrats in the state house of representatives in all sessions; 3. The average proportion of seats held by Democrats in the state senate in all sessions; and 4. The proportion of all gubernatorial, senate, and house terms that were controlled by Democrats. For Nebraska, we used the average proportion of popular votes won by the Democratic gubernatorial candidate as a measure of Democratic Party control because the state legislative elections in the state are nonpartisan. A value greater than 0.5 on the Ranney Index indicates that the Democratic Party politically controls the state; otherwise the Republican Party is in control. We divided states into southern and non-southern regions based on the Census Bureau's classification.

Several other important factors also contribute to differences in states' adoption of NCLB mandated accountability policies including educational, institutional, economic, and political factors (McDermott 2003). Scholars have emphasized regional effects in explaining diffusion of innovative policies from early adopters to neighboring states (Berry and Berry 1990; Mooney and Lee 1995). However, Mooney (2001) has raised question regarding the direction of regional effects over time. It is unclear whether adoption of a policy by a neighboring state is more or less likely to influence a state to adopt similar policies.

Political culture is another factor that accounts for variation in policy adoption (Gray and Hanson 2008; McGuinn 2006). We controlled for off-election years and for Elazar's citizen's ideology in this regard. Several recent studies include a measure for state political culture in terms of state government ideology (Berry et al. 1998, 2010). However, since the Ranney Index also reflects the general political ideology prevailing in a state, we did not include state government ideology as an additional measure for state political culture. Following McDermott (2003) and Wong and Shen (2002), we also controlled for state size and wealth. We measured a state's size and wealth in terms of log of population, log of median household income, proportion of urban population, and per capita real GDP. The public education sector specific control variables that were included are: per pupil expenditure on public education; percentage of school age population in a state; number of students in public schools; percentage of private schools in a state; percentage of minoritized students; and average SAT verbal scores and averaged freshman graduation rates for public schools. We also control for centralization of education sector in a state. We included the number of administrators and officials per school district, the number of students per school district, and the proportion of local funding in the public education sector. Instead of using education finance lawsuits as a proxy for the strength of the past accountability system (McDermott

2003), we directly included the existence of school sanctions in a state in 2000. Table 2 provides the means and standard deviations for the variables.

Our dataset comprises a panel of 50 states for years 2002–2009. The *Education Counts* database on the adoption of accountability policies by states shows considerable variation across states and across time. There are notable variations over time in the adoption of individual accountability policies within a state. Therefore, the panel nature of our dataset is appropriate in capturing these variations. Moreover, the panel dataset has more observations and therefore addresses the problems in statistical analyses with small samples in comparative state studies. The unit of analysis is state-year.

Analytical Model

We employed multi-level linear random effects regression models to test our hypotheses because time is nested within states.³ In these models, the random state-specific time-invariant unobserved factors are assumed to be uncorrelated with regressors in the panel data regression equation (Cameron and Trivedi 2009). We employed a random effects model because we conducted the Hausman tests to compare the fit of fixed effects versus random effects models and we did not find evidence against the consistency of coefficients from random effects models.⁴ We estimate statistical significance based on robust standard errors in our models. These robust standard errors account for heteroskedasticity and serial correlation in the error term.

The multi-level linear regression model is appropriate because the nature of our sample is such that data on each state for various years cluster within that state. Therefore, level one for our hierarchical data is state-year and level two is state. Clustering of cases around higher level of units produces inefficient coefficients because errors are correlated, and there may be group-specific error variances (DiPrete and Forristal 1994; Kaufman 1995; Roscigno et al. 2006). The multi-level regression

³ The policy adoption literature relies on the Event History Analysis (EHA) model (Berry and Berry 1990; Wong and Shen 2002). One of the key assumptions in the EHA model is that once a policy is adopted in any year, it remains in place in all subsequent years. In case of the adoption of accountability policies by states, this important assumption does not hold (McDermott 2003; Wong and Shen 2002). There is variation in adoption of individual policies over time within a state as per the Education Counts database. This variation renders the use of EHA models inappropriate. Additionally, the EHA permits analysis of only one of the several accountability policies at a time. This constraint rules out an analysis of the factors affecting the strength of accountability system adopted by states as a whole.

⁴ Out of the two widely used basic panel data models in applied social science research, the fixed effects model assumes the random state-specific time-invariant unobserved factors to be correlated with the included factors in the model (Cameron and Trivedi 2009). This flexibility allows accounting for a limited form of endogeneity (Cameron and Trivedi 2009). One major practical problem with using the fixed effects model in our case, however, is that it can consistently estimate only the coefficients of the time-varying regressors (Cameron and Trivedi 2009). But several components of the interaction term in our panel data model in Eq. 1 are time-invariant. These include collective bargaining index, South, and collective bargaining index*South. The estimation of the fixed effects panel data model does not provide the coefficients of these components because they are perfectly collinear with the state-specific time-invariant unobserved factors. However, it is important to include all components of the interaction term in the regression model so that marginal effects of the key variables in the interaction term can be estimated and tested for statistical significance (Brambor et al. 2006). Therefore, we employ the multi-level linear

model addresses this error in estimation and also produces accurate standard errors for making inferences. Following Raudenbush and Bryk (2002, pp. 231–233) and Cameron and Trivedi (2009), the basic reduced form of the two-level Hierarchical Linear Model is as follows.

$$Y_{it} = x'_{it}\beta + u_i + \epsilon_{it} ; \quad (1)$$

where Y_{it} is accountability policy adopted in state i in year t ; and $x'_{it}\beta$ includes the three-way interaction term $\beta_1 * cbind_{it} + \beta_2 * Ranney_ind_{it} + \beta_3 * South_{it} + \beta_4 * cbind_{it} * Ranney_ind_{it} + \beta_5 * cbind_{it} * South_{it} + \beta_6 * Ranney_ind_{it} * South_{it} + \beta_7 * cbind_{it} * Ranney_ind_{it} * South_{it}$; and $x'_{it}\beta$ also includes additive linear terms for other control variables; and u_i is errors for each state; and ϵ_{it} is the independently and identically distributed random error term.

Additionally, post-estimation marginal analyses of the results from the multi-level linear regressions for interactive models were performed to test hypotheses. These additional analyses were performed to separate marginal effects of the power of teachers' unions from political party control and regions. Specifically, we estimated the partial coefficients and their statistical significance (Brambor et al. 2006; Craw 2008; Dawson and Richter 2006). The following first order derivative of the regression equation in (1) with respect to collective bargaining index estimates its marginal effects on policy adoption:

$$\beta_1 + \beta_4 * Ranney_ind + \beta_5 * South + \beta_7 * Ranney_ind * South \quad (2)$$

We estimated marginal effects and statistical tests to verify if the differences in marginal slopes at different combinations of specific values of the moderating variables are different from zero. We applied Bonferroni adjusted standard errors to test the statistical significance of these differences in the marginal slopes (Dawson and Richter 2006). For a typical non-Southern state with an average *Ranney_index*, Eq. 2 also forms the basis for calculating the main effects of the collective bargaining power of teachers' unions.

We tested the possibility of outliers/influential cases in our models. Following Cameron and Trivedi (2009, pp. 92–93), we ran the leverage measure—dfits statistics, using STATA for all our models. Our diagnostic based on the dfits threshold (Cameron and Trivedi 2009) ruled out the existence of any potential outlier in our regression models. We excluded the number of students per school district in a state because this number is highly correlated with number of administrators and officials per school district. Our diagnostic test of variance inflating factor (vif) also ruled out presence of multicollinearity among remaining independent variables.

Footnote 4 (continued)

regression model, which is a sub-type of random effects model, to estimate our interactive panel data model in equation.

Table 3 Results of the multi-level linear regression models for the weighted tetrachoric factor scores on the strength of the adoption of accountability policies in public education by states

Measures of the strength of teachers' unions	Collective bargaining index		Percent under collective bargaining	
	Simple model	Full model	Simple model	Full model
Union strength	0.039 (0.051)	0.066 (0.053)	−0.004 (0.005)	−0.004 (0.006)
Ranney Index	0.687 [^] (0.399)	1.353* (0.554)	0.857 [^] (0.480)	1.333* (0.545)
Dummy for southern states	0.608** (0.194)	0.579** (0.214)	0.391* (0.191)	0.416 [^] (0.240)
State citizen ideology		−0.004 (0.007)		−0.002 (0.007)
Neither an election year for governor nor a year after an election		0.002 (0.170)		−0.004 (0.170)
Education expenditure per pupil		−0.000 (0.000)		−0.000 (0.000)
Percentage of school age students		0.101 (0.076)		0.108 (0.083)
Percent of minoritized students		0.002 (0.009)		−0.002 (0.010)
Average SAT verbal score		−2.083 (2.333)		−1.537 (2.220)
Average freshman graduation rates		0.013 (0.019)		0.013 (0.019)
Number of students in public schools		0.000 (0.000)		0.000 (0.000)
Proportion of private schools		−0.583 (0.415)		−0.287 (0.493)
Log of state population		−0.060 (0.323)		−0.084 (0.286)
Log of median household income		−0.328 (1.430)		−0.219 (1.467)
Proportion of urban population		−0.166 (0.848)		0.067 (0.730)
Real per capita GDP		−0.000 (0.000)		−0.000 (0.000)
Average number of administrators		0.003 (0.003)		0.004 (0.003)
Share of local funding		0.002 (0.006)		0.000 (0.006)
Presence of sanction policy in 2000		0.007 (0.165)		−0.015 (0.171)
Constant	−0.420 (0.369)	0.403 (5.791)	0.044 (0.354)	−0.142 (5.735)
Wald χ^2	14.43**	216.29***	14.44**	290.44***

*** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$; [^] $p < 0.1$; standard errors in parentheses

Results

Table 3 presents main results for the multi-level linear regression model with robust standard errors, when the dependent variable is measured as the weighted tetrachoric factor score. Table 4 similarly presents main results for the multi-level linear regression model with robust standard errors, when the dependent variable is measured as the weighted additive index. The four models in Table 3 and the eight models in Table 4 include the two measures of teacher union strength—the collective bargaining index and the percentage of teachers' unions covered by collective bargaining agreements.

Table 4 Results of the multi-level linear regression models for the weighted additive index on the strength of the adoption of accountability policies in public education by states

Measures of the strength of teachers' unions	Additive models				Interactive models			
	Collective bargaining index		Percent under collective bargaining		Collective bargaining index		Percent under collective bargaining	
	Simple model	Full model	Simple model	Full model	Simple model	Full model	Simple model	Full model
Union strength*Ramney Index*south					13.554* (5.681)	13.340** (4.675)	0.775^ (0.410)	0.644^ (0.335)
Union strength*Ramney Index					-4.600* (2.230)	-5.363** (1.997)	-0.196 (0.237)	-0.230 (0.227)
Union strength*south					-4.829 (2.951)	-4.550^ (2.522)	-0.441* (0.220)	-0.336^ (0.176)
Ramney Index*south					-63.564*** (19.185)	-51.195** (16.234)	-56.437* (27.408)	-37.774 (25.495)
Union strength	0.258 (0.378)	0.223 (0.390)	-0.056^ (0.032)	-0.052^ (0.028)	1.653* (0.827)	1.911* (0.842)	0.055 (0.1054)	0.052 (0.107)
Ramney Index	5.936 (4.335)	-1.887 (4.319)	6.506 (4.293)	-1.571 (4.202)	34.133** (11.617)	26.437* (11.161)	25.565 (20.206)	17.073 (20.711)
Dummy for southern states	4.592** (1.742)	3.807 (2.469)	2.353 (1.889)	2.423 (2.391)	28.308** (9.509)	20.033* (9.508)	33.290* (13.479)	21.574 (13.263)
State citizen ideology		0.012 (0.033)		0.019 (0.034)		0.023 (0.026)		0.016 (0.032)
Neither an election year for governor nor a year after an election		0.247 (0.361)		0.237 (0.359)		0.290 (0.342)		0.244 (0.355)
Education expenditure per pupil		0.001** (0.000)		0.001** (0.000)		0.001** (0.000)		0.001*** (0.000)
Percentage of school age students		-0.590 (0.569)		-0.641 (0.584)		-0.572 (0.513)		-0.737 (0.579)
Percent of minoritized students		0.120* (0.056)		0.092 (0.056)		0.113* (0.052)		0.082 (0.055)
Average SAT verbal score		44.396* (19.794)		44.072* (20.260)		36.312^ (21.304)		44.843* (20.625)

Table 4 (continued)

Measures of the strength of teachers' unions	Additive models				Interactive models			
	Collective bargaining index		Percent under collective bargaining		Collective bargaining index		Percent under collective bargaining	
	Simple model	Full model	Simple model	Full model	Simple model	Full model	Simple model	Full model
Average freshman graduation rates		-0.038 (0.093)		-0.030 (0.090)		-0.024 (0.088)		-0.029 (0.085)
Number of students in public schools		0.000** (0.000)		0.000** (0.000)		0.000** (0.000)		0.000*** (0.000)
Proportion of private schools		-0.672 (3.411)		0.351 (3.402)		0.048 (3.123)		0.725 (3.503)
Log of state population		-1.094 (3.270)		-1.318 (3.270)		0.341 (3.367)		-2.164 (3.375)
Log of median household income		5.581 (10.061)		7.415 (10.273)		4.522 (7.949)		7.522 (9.650)
Proportion of urban population		-3.170 (9.180)		-0.784 (9.373)		-5.507 (9.814)		2.646 (9.072)
Real per capita GDP		-0.000 (0.000)		-0.000 (0.000)		-0.000 (0.000)		-0.000 (0.000)
Average number of administrators		0.019 (0.013)		0.023^ (0.012)		0.017 (0.015)		0.014 (0.014)
Share of local funding		-0.018 (0.063)		-0.029 (0.062)		-0.033 (0.057)		-0.037 (0.062)
Presence of sanction policy in 2000		2.434 (1.408)		2.332 (1.466)		1.934^ (1.167)		2.047 (1.416)
Constant	0.829 (2.517)	-40.208 (45.201)	6.487* (2.981)	-43.017 (45.382)	-8.115^ (4.535)	-46.955 (40.116)	-3.795 (8.902)	-46.636 (43.973)
Wald χ^2	15.53**	284.97***	16.41**	305.24***	51.03***	519.44***	23.75**	399.97***

*** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$; ^ $p < 0.1$; standard errors in parentheses

Results in Table 3 show that the three-way interactions did not turn out to be significant in any of the models, when the dependent variable was measured as the weighted tetrachoric factor score. In fact, we ran a series of multi-level linear regression models to test all possible two-way interactions of the collective bargaining power of teachers' unions with the Ranney Index and states in the South, but we did not find evidence for any interaction. We also performed a similar check for the Ranney Index. Therefore, results in Table 3 do not confirm our main hypothesis that Democratic Party control and the region of the country moderate the influence of collective bargaining power of teachers' unions on the adoption of accountability policy in states. Results for the simple as well full models for the two measures of the power of teachers' unions in Table 3 also do not reject the null hypothesis that the collective bargaining power of teachers' unions does not influence the adoption of accountability policies by states in public education. However, results in Table 3 show that southern states are more likely to adopt stronger accountability policies than non-southern states. Contrary to the position of conservative scholars, Table 3 also shows that higher Democratic Party control in states is associated with stronger accountability policies in those states. Our sensitivity analyses (not shown here) show that the results in Table 3 do not change with marginal changes in the assigned weights for tetrachoric factor scores. None of the control variables attained statistical significance in full models when the accountability policy was measured by weighted tetrachoric factor scores.

In Table 4, the dependent variable is measured as a weighted additive index; results show that the three-way interactions for the two measures of teachers' union power is statistically significant ($p < .01$ for the model with the collective bargaining power of teachers' unions and $p < .1$ for the model with the percent of teachers covered under collective bargaining agreements). Based on the Likelihood Ratio, AIC, and BIC tests (not shown here), the three-way interaction models fit the data better than any simpler models. These results confirm our main hypothesis. Teachers' unions interact with Democratic Party's control and the regional location of states in influencing the adoption of accountability policies. Our sensitivity analyses (not shown here) also show that the results in Table 4 do not change with marginal changes in the assigned weights for the weighted additive index. Among states with average Democratic Party control, the main effects of the collective bargaining power of teachers' unions in non-Southern states is -0.72 , but the effect is statistically not significant (not shown in tables). Among states with average Democratic Party control, the main effects of the collective bargaining power of teachers' unions in southern states is 1.27 with $p < .05$ (not shown in tables). This result implies that southern states with average Democratic Party control are more likely to adopt stronger accountability policies with an increase in the collective bargaining power of teachers' unions. Similarly, among states with average Democratic Party control, the main effects of the percent of teachers covered under collective bargaining agreements in non-southern states is statistically not significant (not shown in tables). However, among states with average Democratic Party control, the main effects of the percent of teachers covered under collective bargaining agreements in southern states is -0.08 with $p < .05$ (not shown in tables). This result implies that Southern states with average Democratic Party control are more likely to adopt

weaker accountability policies with an increase in percent of teachers covered under collective bargaining agreements. This result is inconsistent with the more plausible measure of the collective bargaining power of teachers' unions.

Among several control variables the per pupil education expenditure, the percent of minoritized students, the average SAT verbal score, and the number of students in public schools all attained positive and significant relationship with the adoption of stronger accountability policies by states in interactive models. Similarly, the previous adoption of accountability policies up to the year 2000 positively and significantly influenced the adoption of stronger accountability policies by states during 2002–2009. Other control variables did not show a statistical association with the adoption of accountability policy by states.

Table 5 provides the marginal effects⁵ for the power of teachers' unions on the adoption of accountability policies by states at different combinations of political party control and regions. Figures 1 and 2 and Table 6 further elaborate on the substantive interpretation of the statistical significance of these interactions. These figures graphically plot the marginal effects presented in Table 5 for the two measures of the power of teachers' unions. The horizontal axis in each figure measures the Ranney Index of political party control. The Ranney Index can take values between 0 and 1. For our purpose, we consider three different values of the Ranney Index after taking into consideration the distribution of states in the entire range of values between 0.13 and 0.83. A low value (.35, i.e., about one standard deviation below the mean) on this index indicates high Republican Party control, a value in the middle (.5) indicates split party control and a high value (.65, i.e., about one standard deviation above the mean) indicates high Democratic Party control. The vertical axis measures the change in the level of accountability policies per unit change in teacher union power (i.e. the marginal slopes). The continuous and the dotted lines in the graph correspond to southern and non-southern states, respectively. While Fig. 1 is based on the model that uses the collective bargaining index to measure teacher union power, Fig. 2 is based on the model that uses the percentage of teachers covered by collective bargaining agreements as a measure of teacher union power.

The results in Table 5 and the Fig. 1 show that southern states with split political party control (Ranney Index = 0.5) are more likely to adopt stronger accountability policies with an increase in the collective bargaining power of teachers' unions. In other words, when neither party has political control in southern states, higher teacher union power is associated with the adoption of stronger accountability policies. Table 5 and Fig. 1 show similar results for southern states with high Democratic Party control (Ranney Index = 0.65). In southern states with high Republican Party control (Ranney Index = 0.35), teachers' unions do not play much of a role. Unlike southern states, the collective bargaining power of teachers' unions is associated with the adoption of weaker accountability policies in high Democratic Party controlled non-southern states. In non-southern states with split and high Republican Party controls, the collective bargaining power of teachers' unions is not

⁵ Also known as pick-a-point slope estimates (Dawson and Richter 2006).

Table 5 Marginal effects (dy/dx) of the strength of teachers’ unions on the adoption of stringent accountability policies by states

Different combinations of Ranney Index [@] and region of states	Collective bargaining index	Percent under collective bargaining
Non-south and high republican party control	−0.029 (0.190)	−0.029 (0.048)
South and high republican party control	−0.018 (0.384)	−0.139* (0.062)
Non-south and split party control	−0.331 (0.209)	−0.063 (0.048)
South and split party control	0.502** (0.196)	−0.077* (0.035)
Non-south and high democratic party control	−0.634* (0.273)	−0.098 (0.068)
South and high democratic party control	1.022*** (0.314)	−0.015 (0.040)

Delta method standard errors in parentheses; @ Ranney Index: (0.35 = High Republican Party Control; 0.5 = Split Party Control; 0.65 = High Democratic Party Control)

*** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$; $^{\wedge}p < 0.1$

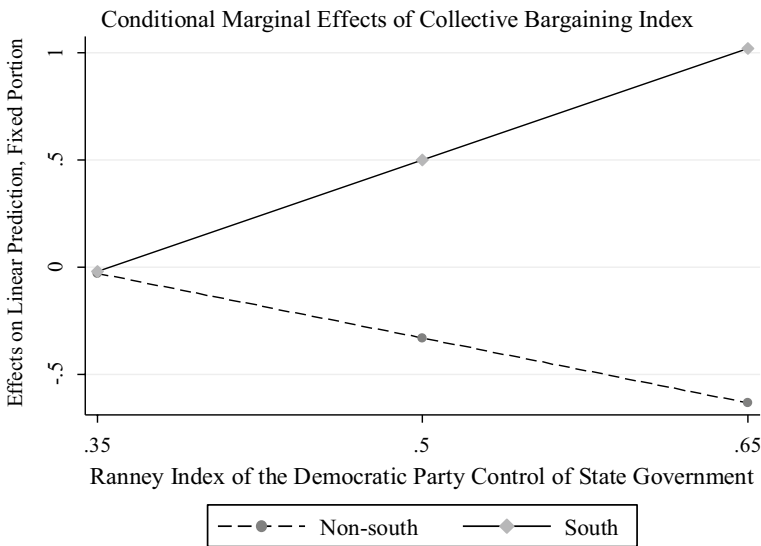


Fig. 1 Marginal effects of the strength of teachers unions at combinations of moderating variables (multi-level full interactive model in Table 4: collective bargaining index)

associated with the adoption of stronger accountability policies. Overall, the full interactive model using collective bargaining index as a measure of the power of teachers’ unions provided stronger and clearer relationships than the models using the percent of teachers covered by collective bargaining agreements. The marginal analyses of the full interactive model with the latter measure in Table 5 and Fig. 2 show that southern states with either high Republican Party control or those with split party control are more likely to adopt weaker accountability policies as the percent of teachers covered under collective bargaining agreements increases. These results together suggest that in case of the measure of collective bargaining

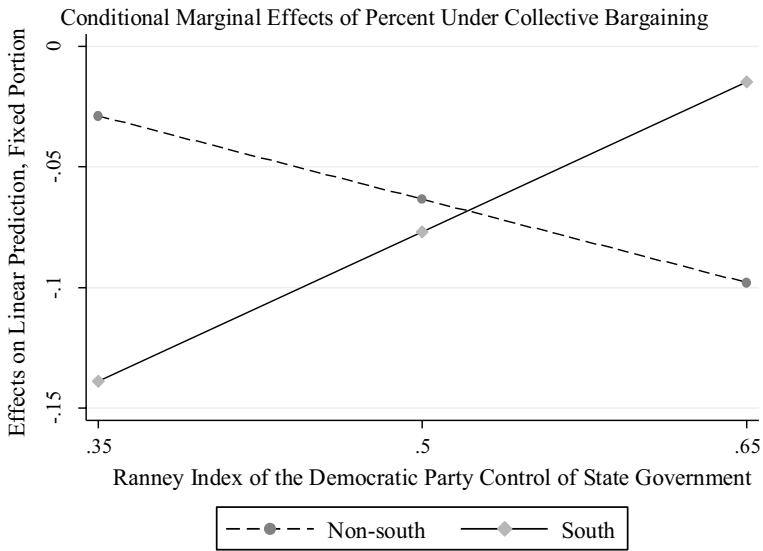


Fig. 2 Marginal effects of the strength of teachers unions at combinations of moderating variables (multi-level full interactive model in Table 4: percent covered under collective bargaining)

power of teachers' unions, except for non-southern states under high Democratic Party control, teachers' unions either embrace stronger accountability policies with an increase in their power, or they do not have much of an effect. Furthermore, the extent of the negative association of teachers' unions in non-southern states under high Democratic Party control is significantly lower than the comparable positive effect in southern states under high Democratic Party control. However, in case of the percent of teachers covered under collective bargaining agreements measure, southern states with either high Republican Party control or those with split party control are more likely to adopt weaker accountability policies as the power of teachers' unions increases. In summary, the two graphs show that the power of teachers' unions is increasingly (or decreasingly in non-southern states) associated with the adoption of stronger accountability policies as the political control of states shifts from high Republican to high Democratic in southern states.

In terms of the relational marginal effects of collective bargaining index of teachers' unions, Table 6 presents the statistical significance of differences in the marginal slopes in Table 5 after making Bonferroni adjusted standard errors (Dawson and Richter 2006). Table 6 does not provide similar results for the percent of teachers covered under a collective bargaining agreement because none of the relational marginal effects attained statistical significance. Among non-southern states, higher Democratic Party control is associated with the adoption of weaker accountability policies in comparison to high Republican and split party control. This finding is linked to Fig. 1 in that the negative slope when the Ranney Index takes a value of .65 in non-southern states is significantly different from the negative slopes when the Ranney Index takes values .5 and .35 in similar non-southern states. Southern states however, do not show similar relationships. A comparison of marginal effects across

Table 6 Statistical significance of the differences in marginal effects in Table 5 with Bonferroni adjusted standard errors

Comparing the marginal effects of teachers' unions [@]	Collective bargaining index
Split party control in non-south—Republican party control in non-south	−0.302 [^] (0.109)
High democratic control in non-south—Republican party control in non-south	−0.605 [^] (0.218)
High democratic control in non-south—Split party control in non-south	−0.302 [^] (0.109)
High democratic control in south—Split party control in non-south	1.353 ^{**} (0.397)
High democratic control in non-south—Split party control in south	−1.135 [*] (0.370)
High democratic control in south—High democratic control in non-south	1.656 ^{**} (0.429)

Standard errors in parentheses; @ Ranney Index: (0.35 = high republican party control; 0.5 = split party control; 0.65 = high democratic party control)

*** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$; [^] $p < 0.1$

regions reveals that high Democratic Party controlled southern states are more likely to adopt stronger accountability policies than non-southern states under high Democratic and split party controls. Southern states under split party control are also more likely to adopt stronger accountability policies than non-southern states under high Democratic Party control.

Policy Implication and Conclusion

Using an array of appropriate statistical models on a rich panel dataset of 50 states in the US over 8 years, this paper seeks to investigate whether teachers' unions influence the adoption of accountability policies by states in the context of the No Child Left Behind Act. Based on the review of the extant literature, we developed a conceptual model to empirically investigate this research question. Overall, there are three findings in this paper. First, we found some evidence that the regional and political contexts moderate the association between the power of teachers' unions and the adoption of stronger accountability policies by states.

Second, we did not find enough support for the assertion that teachers' unions almost always work in concert with the Democratic Party in blocking unfavorable accountability reforms in public education. When the accountability policies adopted by states is measured in terms of weighted tetrachoric factor scores, the collective bargaining power of teachers' unions is not associated with the adoption of accountability policies by states. Furthermore, the main effects for the more plausible measure of the collective bargaining power of teachers' unions from multi-level linear regressions of the weighted index of accountability policy show that Southern states with average Democratic Party control are more likely to adopt stronger accountability policies with an increase in the collective bargaining power of teachers' unions. Marginal analyses of the three-way interactions of multi-level linear regressions of the weighted additive index for accountability policies also tell a more nuanced and mostly different story. In southern

states under either Democratic or split party control, an increase in the collective bargaining power of teachers' unions is associated with the adoption of stronger accountability policies. Also, teachers' unions hardly play any role in the adoption of accountability policies in Republican Party controlled southern states.

Third, our findings partially support the negative view about the association of the collective bargaining power of teachers' unions with the adoption of accountability policies in non-southern states. Specifically, non-southern states under high Democratic Party control are more likely to adopt weaker accountability policies with an increase in the collective bargaining power of teachers' unions. However, the absolute size of this association is substantially lower than the support of teachers' unions for the adoption of stronger accountability policies in southern states.

However, our findings do not lend support for the dominant argument in the policy debate that teachers' unions invariably oppose education policy reforms, and that therefore their collective bargaining rights have to be curtailed. On the contrary, our findings suggest that teachers' unions in most cases of regional and political partisan combinations of states either embrace the adoption of school accountability policies, or they do not resist them. Therefore, the sweeping suggestion in the contemporary policy debate for curtailing or abandoning the collective bargaining rights of teachers' unions is not fully substantiated.

In sum, our findings lend support to the general understanding in the literature that the power of teachers' unions to influence the adoption of policies is moderated by political partisanship and the region of states. We argue that the regional and political contexts matter in the relationship of teachers' unions with the adoption of accountability policies. Our findings are consistent with the argument by some scholars that southern Democrats have traditionally been more conservative than their Republican counterparts. Therefore, it is important to separate the role of teachers' unions from political and regional contexts in the adoption of accountability policies. However, the results of the three-way interactions do not conclusively confirm the assertion that teachers' unions almost always work in concert with the Democratic Party in blocking unfavorable accountability reforms in public education. Our findings do not fully support the widely held view that teachers' unions are reform blockers, and that they are politically aligned only with the Democratic Party. These findings further imply that the current dominant prescription in the policy debate and practice for the curtailment of collective bargaining rights of the public school teachers is not be fully substantiated. Our results however show that teachers' unions could be an important ally in policymakers' efforts in reforming public education including the adoption of future accountability policies.

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Compliance with Ethical Standards

Conflict of interest The authors declare that they have no conflict of interest.

Ethical Approval This research complies with all required ethical standards.

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