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The Effect of Constitutional Provisions on Education Policy and Outcomes*

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Abstract

Education services in the United States are determined predominantly by non-market institutions, the rules of which are defined by state constitutions. This paper empirically examines the effect of changes in constitutional provisions on education outcomes in the United States. To show causal effects, we exploit discontinuities in the procedure for adopting constitutional amendments to compare outcomes when an amendment passed with those when an amendment failed. Our results show that adoption of an amendment results in higher per-pupil expenditure, higher teacher salaries, smaller class size, and improvements in reading and math test scores. We examine the underlying mechanism driving these results by studying the actions of the legislature and the courts after an amendment is passed. We find that, on average, the legislature responds with a one-year lag in enacting education policies satisfying the minimum standards imposed by the amendment, and there is no increase in the number of education cases reaching appellate courts. Using school finance reforms, we also show that in situations where the legislature fails to enact education policies, courts intervene to enforce constitutional standards to improve outcomes. This enforcement mechanism is more impactful in states that have higher constitutional minimum standards. Taken together, the causal effects on education outcomes and the patterns in legislative bill enactments and court cases provide a novel test of the hypothesis that a strong constitutional provision improves the bargaining position of citizens vis-à-vis that of elected leaders. If citizens do not receive education services as mandated in the constitution, they can seek remedy in court.

JEL Classifications: D02, H75, I24, P48

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1 Introduction

Education services in the United States are determined predominantly by non-market institutions, and the rules of these institutions are determined by state constitutions. Constitutions are incomplete contracts between citizens and their elected leaders. They do not define what policies elected leaders should choose in various contingencies. Instead, they define the powers of various branches of the government and the rules that constrain or regulate these powers.[1]

Constitutions contain a set of principles and provisions that provide a framework for the legislative and executive bodies of government to make policy decisions; they also provide benchmarks for the judiciary to assess whether the legislative and executive bodies are performing their duty. In addition to providing directive principles, constitutions define minimum standards that must be met by the state and are enforceable in court. Courts are the last resort for citizens: if the citizens do not receive government services as described in the constitution, they can seek remedy in court.

Several countries around the world recognize education as a fundamental right in their constitutions (Heymann, Raub, and Cassola (2014)). The U.S. Constitution is silent on the subject of education, and the Supreme Court has upheld that there is no fundamental right to education under the U.S. Constitution.[2] While this right is omitted from the U.S. Constitution, every state constitution includes language that mandates the establishment of a public education system. The extent to which each constitution provides for educational resources and protects commitments varies by state. Some state constitutions include clauses that stipulate only that the state provide public education, while other states have taken more significant measures to ensure the provision of a high-quality public education system (Ratner (1984), Thro (1993)).

This paper empirically examines the causal effect of changes in education clauses of state constitutions on educational outcomes in the United States and identifies the underlying mechanism driving this relationship. To examine this effect, we use several primary sources to construct a novel dataset on detailed histories of educational amendments to state constitutions between 1990 and 2018. For each constitutional amendment proposed through ballot measures, we collected information on whether the proposed amendment passed via the ballot measure, the percentage of votes cast in favor of the amendment, and details regarding the constitutional changes. Informa-

[1] See *"Incomplete Contracts and Political Economy"* by Gerard Roland in Aghion, Dewatripont, Legros, and Zingales (2015)

[2] *San Antonio Independent School District v. Rodriguez, U.S. (1973)*

tion on public school districts' financial characteristics, student demographics, and high school dropout rates were collected from Department of Education's Common Core of Data (CCD). We supplement these data with county-level demographic and economic characteristics from the National Historical Geographic Information System (NHGIS). Data on student learning achievement outcomes were collected from the Stanford Education Data Archive (SEDA).

The main empirical challenge in estimating the causal effects of constitutional provisions is that the choice of proposing an amendment may itself be determined by education outcomes. For example, in our analysis of proposed education amendments on the ballot between 1990 and 2018, we find that the estimated probability of proposing an amendment is lower when the proportion of high school dropouts in 1990 is higher. In other words, states that are more likely to propose amendments to their education clauses are ones where education outcomes are better. This result indicates that the econometric problem of reverse causality is a valid concern. To establish the causal effect of changes in constitutional provisions on educational outcomes, we need exogenous variation in the adoption of amendments.

To obtain such a variation, we exploit discontinuities in the institutional features of the amendment procedures. There are two steps in an amendment procedure. The first is to initiate a proposal to amend the constitutional clause. A proposal can be initiated either through a legislative referral or through a citizen-initiative (Dinan (2018)). The legislature-generated amendment process begins with the legislature passing an act proposing a change in the constitution. The proposed amendment must be approved by both chambers of the legislature (except in Nebraska, which is unicameral). In the case of a citizen-initiated amendment, a sufficient number of signatures is required to approve the proposal through a petition.

The second step of the amendment procedure is to put the approved proposal on the ballot in an election year for popular vote. If the referendum gets the required threshold of votes, the proposed constitutional amendment is adopted. If the referendum does not get a majority vote, it fails. This threshold rule in determining the outcome of the proposed amendment allows us to use a sharp regression discontinuity design to study causal effects. We also use a difference-in-differences regression model with lags and leads to examine the dynamic effects of the constitutional amendments.

Our results show that constitutional amendments that aim to raise the minimum standards for education services lead to improvements in education inputs and better student outcomes. There is a significant increase in per-pupil expenditure and teacher

salary two years after the amendment is adopted, and the effect persists. These effects on education expenditure inputs hold even when we restrict the analysis to non-finance amendments. In terms of education outcomes, we find a significant increase in Grade 4 and Grade 5 reading scores after an amendment is passed. There is an increase in Grade 8 reading scores as well, but the magnitude of change is smaller. There is an increase in Grade 4 and Grade 5 math scores, but the effect is smaller compared to reading scores. We do not find any change in high school dropout rates.

We propose a mechanism for determining why the strengthening of education clauses in state constitutions leads to better outcomes. The underlying mechanism is that a strong constitutional provision improves the bargaining position of citizens vis-à-vis that of elected leaders. If the citizens do not receive education services as described in the constitution, they can go to court to enforce the minimum constitutional standards. The mere presence of a threat that citizens can litigate and win against the state government should result in the enactment of policies that meet constitutional standards.

To shed light on the mechanism, we construct a novel dataset on legislative bills and appellate court cases. We find that when an amendment is passed, the legislature responds by enacting a significantly higher number of education policies. Consistent with this hypothesis, there is no change in the number of education court cases reaching appellate courts after an amendment is passed. In addition, using school finance reforms as a case study, we provide evidence that in situations where the legislature did fail to provide education services through equitable school financing, courts intervened to enforce constitutional standards to improve outcomes. This enforcement mechanism worked better in states that had higher constitutional minimum standards.

The rest of the paper is organized as follows. Section 2 outlines our contribution to the literature. Section 3 provides details of the institutional background on constitutions and the procedures for amendments. Section 4 outlines our identification strategy, describes the data, and provides empirical results. Section 5 describes the procedure used to construct our novel dataset on legislative bills and court cases, which is used to provide evidence for the underlying mechanism. Section 6 concludes.

2 Relation to the Literature

To the best of our knowledge, this is the first paper that examines the causal effect of constitutional provisions on educational outcomes and establishes the underlying mechanism driving the causality.

Our paper contributes to several strands of literature. We contribute to the literature that examines the relationship between constitutional provisions and economic outcomes. Early work in this field, with a substantial contribution of James M. Buchanan (Buchanan (1987, 1990, 1991)), focused mostly on developing a theoretical framework and is summarized by Voigt (1997). With the work of Torsten Persson and Guido Tabellini, there was an emergence of empirical work examining this relationship. A book Persson and Tabellini (2005) and series of following papers (Persson and Tabellini, 2002a, 2004a,b; Giavazzi and Tabellini, 2005; Persson, Roland, Tabellini et al., 2007; Blume and Voigt, 2013, among others) investigated the impact of constitutional rules on a range of economic outcomes. The outcomes studied have largely been confined to macroeconomic indicators such as economic growth, productivity, and fiscal policy indicators.[3] In particular, there is a growing body of work that examines the effects of democracy on growth (Persson and Tabellini (2007, 2009); Acemoglu, Naidu, Restrepo, and Robinson (2019)).[4] This literature has typically focused on the effects of differences in political systems or forms of government adopted by constitutions on various outcomes. In contrast, we examine differences in the directive provided by constitutional provisions to the legislature within a given political system.

Most of the empirical literature examining relationship between constitutions and economic outcomes relies on cross country variation. In the context of education, Edwards and Marin (2015) and Heymann et al. (2014) examine the relationship between constitutional provisions and outcomes using cross-country data, but they do not establish causality. Heymann et al. (2014) document that as of 2011, among 191 constitutions around the world, 81% of constitutions protected primary education universally and 53% designated it as free. About 37% of the constitutions protected secondary education, and 35% protected higher education or explicitly protected specific groups. Those countries that constitutionally guaranteed primary and secondary education had significantly higher net school enrollment. Using data from 61 countries, Edwards and Marin (2015) find that there is no evidence that including the right to education in the constitution has been associated with higher test scores. They document that the quality of education is correlated with socioeconomic, structural, and policy variables, such as expenditure per student, teacher-pupil ratio, and families' background.

[3]There is some empirical work that examines the effect of social constitutional rights on development outcomes. Minkler and Prakash (2017) find a strong negative association between social rights and poverty while Ben-Bassat and Dahan (2008) find a robust effect of constitutional right to social security on public policy.

[4]See Voigt (2011) for an extensive review.

As pointed out by Acemoglu (2005); Blume, Müller, Voigt, and Wolf (2009); Rockey (2012) the estimates from such cross-country analysis lacks causal interpretation as it is difficult to find exogenous variation in constitutional rules.

Our main contribution to this empirical literature is to show causal effects of constitutional provisions on economic outcomes (education) and, more importantly, to provide evidence for the mechanism through which this effect arises. In this regard, our paper is related to Akee, Jorgensen, and Sunde (2015), who exploit differences in the party of US president at the time American Indian tribes adopted a written constitution for the first time to study long-run economic development. In examining impact of changes in form of government or electoral rules on fiscal outcomes, there are some recent papers that use natural experiments at the municipality level to show causal effects (Ade (2014) in Germany; Hinnerich and Pettersson-Lidbom (2014) in Sweden; Köppl-Turyna and Pitlik (2018) in Austria; and Kantorowicz (2017); Kantorowicz and Köppl-Turyna (2019) in Poland).

Our paper also contributes to the literature that has examined the relationship between strength of the constitution and court-mandated school finance reforms in the United States. We show that the language in education clauses of state constitutions can predict the outcomes in state supreme court cases related to school finance. Moreover, our results show that stronger constitutional provisions increase the probability that the funding system will be struck down on the basis of failing the constitutional standard. Our results are consistent with findings of Roch and Howard (2008) but are in contrast to studies that find no association between court decisions and strength of the constitution as measured by indices based on Ratner classification (Swenson (1999); Lundberg (1999); Edwards and Ahern (2004); and Hutt, Klasik, and Tang (2020))

Finally, our results provide the source of variation for studies that use court-mandated school finance reforms as an instrument for the level of spending to examine the effects of spending on educational outcomes (Card and Payne (2002); Jackson, Persico, and Johnson (2015); Sims (2011); Lafortune, Rothstein, and Schanzenbach (2018)). These papers argue that court-mandated school reforms that took place in different states at different times are plausibly exogenous and hence can be used as an instrument for establishing the level of spending. Our paper documents the source of variation in the outcomes of these court cases – the provisions used in education clauses in state constitutions.

3 Education Clauses in State Constitutions

While the U.S. Constitution is silent about education, every state constitution includes language to establish provisions for public education. The extent to which each constitution provides for educational resources and protects commitments varies by state.

Some state constitutions include clauses stipulating only that states provide public education. For example, regarding public education, the current Vermont Constitution simply states, *"A competent number of schools ought to be maintained in each town unless the general assembly permits other provisions for the convenient instruction of youth."*

Other states have taken greater measures to include additional language that secures the provision of high quality public education by guaranteeing funding, restricting sectarian control, including provisions for protected student classes, providing education throughout specific child age ranges, setting explicit minimum school term lengths, and ensuring access and funding for public institutions of higher education. Florida's current education clause is considered one of the strongest (Dallman and Nath (2020)). It states that *"education of children is a fundamental value of the people"* and requires adequate provisions to be made by law for a *"uniform, efficient, safe, secure and high quality system of free public schools."* Its strength lies in the recognition of children's right to education and its requirement of *high quality* education.[5]

The legislative language or specific wording used to prescribe educational provisions can have significant implications for public schools. In Section 4, we examine how changes in the constitutional language affects educational outcomes. Before we examine this relationship, we first document how the education clauses in state constitutions were adopted and how they have evolved over time.

3.1 History of Education Clauses in State Constitutions

The first state to write a state constitution was New Hampshire. The Constitution of New Hampshire was adopted on January 5, 1776, and it did not include any provisions for public education. Eight other states adopted a state constitution in 1776, and out of these, only two included an education clause in their constitution: Pennsylvania and North Carolina. The other constituent states of 1776 introduced an education clause much later. South Carolina introduced provisions for public education as late as 1868. Over time, as other states joined the federal union of states, most of them

[5]Art. IX, §1, Fla. Const.

included provisions for public education in their original state constitutions.[6] Figure 1 provides a timeline for when each state first adopted constitutional provisions for public education.

Since the timing of adopting an education clause differs widely across states, one can expect that the language and the provisions would vary substantially across the "early adopters" and the "late adopters." This is because the preferences of policy makers and citizens regarding education are likely to change over a period of 200 years. This raises the following question: How different were the provisions for education in the original constitutions across these states?

Table 1 examines the constitutional language adopted by various states. The states are classified according to the time at which the education clause was introduced in their state constitution. The "early adopters" are states in which constitutions were adopted and education clauses were introduced between 1775 and 1825. There were fifteen such states, as can be seen from Figure 1. The "middle years" consist of 22 states that introduced an education clause between 1826 and 1875. The "late adopters" are states with education provisions adopted after 1876.

Panel [a] of Table 1 lists the states that adopted the particular language described in column (1) in their *original* constitutional education clause. We examine whether the following terms were included in the education clauses: (1) "Uniform," (2) "thorough"/"efficient," (3) "equal rights," (4) "paramount"/"primary" duty of the state, and (5) "quality education."[7]

None of the "early adopters" introduced any of the abovementioned language. The states in "middle years" were more likely to introduce a "uniform" system of education. Three of the "late adopters" used stronger language of "thorough and efficient," and Washington adopted the strongest language by mandating "equal" rights and declaring education a "paramount" duty of the state. This finding suggests that states that more recently introduced constitutional educational clauses put greater emphasis on education and were more likely to adopt stronger provisions.

[6]Based on historical documents obtained from Wallis (2015), we identify the years in which each state first introduced an education clause in its constitution.

[7]We examine these particular terms because Thro (1993) uses them to define a constitution's strength.

3.2 Amending Education Clauses in State Constitutions

State constitutions can be amended to evolve with changing social norms and citizens' preferences. Many of the early adopters mentioned above have amended their constitutions over time to include stronger education provisions. For example, over time, Indiana (an early adopter) amended its education clause to include language that provides *equal access* to a general and *uniform* system of common schools. Panel [b] of Table 1 provides details for the language in current state constitutions for the early, middle, and late adopters.

There are two ways to initiate an amendment or repeal sections of a state constitution: through legislative referral or through a citizen-initiative. The legislature-initiated amendment process begins when the legislature passes an act proposing a change in the constitution. The proposed amendment must be approved by both chambers of the legislature.[8] Some states require a simple majority, while others require a super-majority.[9] Once approved, the amendment is put to a popular vote on the ballot.[10] The threshold of votes required for passing an amendment varies across states. All states currently allow legislatures to propose amendments.

In the case of a citizen-initiated amendment, once a sufficient number of signatures has been collected through a petition, the proposal is put to popular vote as a ballot measure. Currently, only 18 states permit citizens to initiate constitutional amendments, including Florida, Illinois, and Massachusetts (Dinan (2018)).

In addition to legislature-initiated and citizen-initiated methods, the 1968 Florida constitution was the first in the country to authorize an independent commission to directly refer amendments to the electorate for a vote. This commission, called the Constitution Revision Commission (CRC), is established every 20 years by Florida's constitutional mandate.[11]

Education clauses in state constitutions have been amended several times over the past century. We collected and verified data from official sources on proposed amendments that reached the ballot between 1990 and 2018. The reason for choosing this period is because data on education inputs and education outcomes are more readily

[8] Except in Nebraska, which is unicameral and requires three-fifths legislative approval.

[9] According to Dinan (2018), 9 states require three-fifths super-majority in one session; 16 states require two-thirds super-majority in one session; and 4 states require two-thirds legislative approval in at least one house and approval in two sessions.

[10] Delaware does not require voter approval for constitutional amendments.

[11] Florida is currently the only state in the country where a proposed amendment can be put on the ballot based on the recommendations of an independent commission (Dinan (2018)).

available. We focus on proposed amendments that, if adopted, would raise the minimum standard for providing education services in the state. We identify 74 such proposed amendments and classify them into two broad categories: (a) ones that improve education services through funding/expenditure requirements or through mandates that ensure equal access, and (b) ones that have a specific policy prescription, such as school choice, reduced class size, teacher pay-for-performance, and so on. Table 2 shows the number of proposed amendments of each type.

3.3 Predicting the Probability of Proposing an Amendment

We now examine the extent to which variation in the political environment, the strength of teachers' unions, and the demographic composition of states can predict the probability of a state proposing an amendment to the education clause. Our sample consists of the proposals described in Table 2.

For measures of the political environment, we collect election results for state legislative elections during each legislative term in the period of our analysis. We aggregate the results from each election to compute the share of seats won by Democrats and the share of seats won by Republicans in both houses of the legislature. We create three alignment dummies (collectively referred to as $Legis_{st}$): (1) whether there is a Democratic majority in both the state House and the state Senate, (2) whether there is a Republican majority in both houses, and (3) whether the houses of the legislature are split. Our reference category is (3). We also include an indicator variable for whether the governor is a Democrat (Gov_{st}).

Our measure of the strength of teachers' unions (TU_s) is obtained from Valletta and Freeman (1988). The aspect of teachers' union activity that is relevant for our analysis is collective bargaining rights, including the scope of bargaining (i.e., if rights include wage determination). We define the variable "strong teacher bargaining rights" as a dummy that takes value 1 if the state had strong bargaining rights and included wages as a subject of bargaining at the beginning of the time period. The demographic composition of states (X_s) is obtained from the National Historical Geographic Information System (NHGIS).

We now estimate the coefficients of the following regression model:

$$Prob(ProposingAmendment)_{st} = \alpha + \beta_1 Legis_{st} + \beta_2 Gov_{st} + \theta TU_s + \gamma X_s + D_t$$

where $Prob(ProposingAmendment)_{st}$ is the probability that state s proposes an amendment to the education clause of the state constitution in year t. D_t is a vector of year fixed effects. We cluster the standard errors at state level.

Table 3 provides the results for the above specification. Column (1) reports the coefficients for the estimated probability of proposing any type of amendment to the education clause. On an average, a state is likely to propose an amendment to their education clause once every 21 years. Column (2) reports the coefficients for proposed amendments that aim to provide equal access to education services. These include amendments that establish education as a fundamental value to citizens and ones that include anti-discrimination provisions. Column (3) reports results for proposed funding-related amendments, and column (4) reports the correlates for the probability of proposing an amendment that includes specific policy prescriptions.[12]

The results show that the strength of teachers' unions, the party of the governor, and the majority party at the legislature do not explain variation in the probability of proposing an amendment. The socio-economic composition of the state population also does not predict the likelihood of the state adopting any type of amendment. However, column (3) shows that the probability of proposing a funding amendment is lower when the proportion of high school dropouts is higher. In other words, states that are more likely to propose amendments to their education clauses are ones where education outcomes are better. This suggests that proposing an amendment is endogenous and it makes establishing a causal effect of amendments on education outcomes a challenging task. In the next section, we develop a methodology that will explicitly address this endogeneity issue.

4 Constitutional Standards and Educational Outcomes

In this section, we empirically examine how the changes in constitutional provisions over time have affected education inputs and outcomes. We begin by providing an overview of the data constructed for this exercise. We discuss the main empirical challenge in estimating causal effects and how we address it. We then document the effects of constitutional amendments on per-pupil expenditure, teacher salary, high school graduation rates, and achievement outcomes.

[12]The specific policy prescriptions included are ones that are outlined in panel [b] of Table 2.

4.1 Data Sources

Data used to examine the effect of changes in constitutional provisions on educational outcomes from 1990 to 2018 were collected from several sources and merged at the school district level. Data on detailed histories of educational amendments to state constitutions were collected and cross–validated using several primary sources: the Council of State Governments, information on state ballot measure election results, and published legislative documents from state agencies, law universities, and other non-profit legal research organizations. For each constitutional amendment proposed through a ballot measure, information was collected regarding whether the proposed amendment passed via ballot measures, the percentage of votes cast in favor of the amendment, and the constitutional changes proposed.

Information on public school districts' financial characteristics and student demographics was collected from the Common Core of Data (CCD) which is the U.S. Department of Education's (USDE) primary database on public educational institutions. It is updated annually to represent the census of all public elementary and secondary schools operated under the USDE. We collect detailed information on school and staff demographics, as well as school district revenues, expenditures, and high school dropout outcomes. We use the dropout rate for grades 9-12, as that is the most consistent variable available across years and allows us to construct a time series.

Data on student learning achievement outcomes were collected from the Stanford Education Data Archive (SEDA), which is publicly available from the Educational Opportunity Project at Stanford University. SEDA contains measures of average academic achievement as measured by state standardized test scores nationally administered in grades 3-8 in mathematics and reading language arts from school years 2008-09 to 2017-18. To harmonize student achievement scores across state standardized tests, SEDA uses heteroskedastic ordered probit models to estimate state-grade-subject-year specific achievement cutscores, links the estimated cutscores to the National Assessment of Educational Progress (NAEP) scale, and standardizes the cutscores on a cohort scale. For each district-grade-subject-year (and subgroup), average student achievement is estimated and scaled to its respective cutscore (Fahle, Chavez, Kalogrides, Shear, Reardon, and Ho (2021)). For our analysis, we use measures of average cohort-standardized scaled achievement scores for all students at the school district level and demographic covariates.

To control for county-level demographic and economic characteristics, we obtained data from the National Historical Geographic Information System (NHGIS). We use

census data from 1990-2010, with 1990 census characteristics as "initial" controls in some of our empirical analysis. The local education area (LEA) characteristics, such as student demographics and teacher characteristics, are obtained from the CCD and merged into the NHGIS using county-LEA cross-walks.

4.2 Empirical Identification Strategy

The main empirical challenge in examining the effect of changes in constitutional provisions on education outcomes is that the choice of proposing an amendment may depend on education outcomes. Table 3 shows that the probability of proposing an amendment depends on the proportion of high school dropouts. Hence, to establish a causal effect, we need exogenous variation in the adoption of constitutional amendments.

We exploit discontinuities in institutional features of amendment procedures to obtain exogenous variation in the adoption of constitutional amendments. As mentioned in Section 3, once an amendment is proposed and passed in both houses of the legislature (or gets the necessary number of petition signatures via popular referendum),[13] it goes on the ballot and citizens directly vote on the referendum.[14] If the referendum gets the required threshold of votes ($\bar{\tau}$), the proposed constitutional amendment is adopted. If the referendum does not get the necessary votes, the amendment fails. Hence, the assignment into the "treatment" group (i.e., amendment is adopted) is defined according to the following rule based on discontinuity in vote shares:

$$D_{st} = \begin{cases} 1 & \text{if share of votes For the amendment} \geq \bar{\tau} \\ 0 & \text{if share of votes For the amendment} < \bar{\tau} \end{cases}$$

In most states, the threshold $\bar{\tau}$ for adopting an amendment is a simple majority of 50%. However, in few states, the threshold is a super-majority.[15] In the time period of our study, there are only three instances where a super-majority of 60% is required to approve a ballot measure through referendum.

[13] Except Nebraska, which is unicameral and requires three-fifths legislative approval.

[14] Delaware does not require voter approval for constitutional amendments. The legislature has authority to amend it without a referendum.

[15] Illinois requires 60% supermajority vote of those voting on the question. In Florida, since 2006, a referred (or initiated) amendment requires a supermajority vote of 60 percent of those voting on the question to pass on the ballot. Since 2016, for a referred or initiated amendment to win in Colorado, it must win a supermajority vote of 55 percent of those voting on the question. In New Hampshire, a proposed amendment must be approved by two-thirds of those voting. Note that New Hampshire does not allow for citizen-initiated referendums, only legislature-initiated referendums.

The treatment status is a deterministic and discontinuous function of vote shares on the ballot, making a sharp regression discontinuity (RD) design a suitable model to examine the effects of constitutional amendments. Following Lee and Lemieux (2010), we allow the conditional expectation function to differ on both sides of the cut-off point by including interaction terms between the binary treatment indicator D and deviation of the assignment variable A from the corresponding threshold $\bar{\tau}$:

$$Y = \alpha_l + \theta D + \beta_l(A - \bar{\tau}) + \beta_{r-l} D(A - \bar{\tau}) + \epsilon \tag{1}$$

where Y is the outcome variable of interest and $\bar{\tau}$ is the cut-off point. An important identification assumption in the regression discontinuity design is that the distribution of the assignment variable is continuous. Figure 3 plots a histogram of the assignment variable with 10 and 20 bins. The figure shows that there is no bin-to-bin discontinuity in the density around the vote threshold (50%), validating the assumption that there is no manipulation of assignment variable. Since there are only three proposed amendments during our time period where a super-majority was required for an amendment passing, we exclude these from our RD analysis and focus on the 50% simple majority cut-off.

Note that there are only 10 amendments within five percent range below the cut-off and 10 amendments within five percent range above the cutoff. In addition, for some outcome variables, the data is not available for the entire period of our study (for example, the data for test scores are available from 2009 to 2019). This would further reduce the number of observations around the cut-off if these amendments fall outside the window of time period for which the data is available. Hence, in such situations, the RD estimates may not have statistical power to detect a local average treatment effect.

In addition to using regression discontinuity to examine static effects, we use an event study (ES) design to examine the dynamic effects of the constitutional amendments. This methodology takes into account all amendments, not just the the ones around the cut-off. The treatment effects are allowed to vary over time non-parametrically and the specification takes the following form:

$$Y_{lst} = I_s + I_t + \sum_{k=-K}^{-2} \beta_k C_{s,t}^k + \sum_{k=0}^{L} \beta_k C_{s,t}^k + E_{t \in \{-K,L\}} + \gamma X_{lst} + \epsilon_{lst} \tag{2}$$

where Y_{lst} is the outcome variable of interest in local education agency l, state s, and time period t; I_s is a vector of state fixed effects; and I_t is a vector of year fixed effects;

C_{st} is an indicator term that takes value 1 for all years after voting in states where an amendment to the constitution was successfully passed and is zero otherwise. The number of lags and leads ($k \in (-K, L), k \neq -1$) depends on the number of years the data is available for the outcome variable. We do not "bin" or "trim" the distant relative periods but present results for estimates within a 10 year window around the time the at which the amendment passed on the ballot. We include a fixed effect for end years of the time period for which the data is available and this is denoted by $E_{t\in\{-K,L\}}$. Finally, X_{lst} is a vector of controls that includes an indicator variable for whether there is a Democratic majority or a Republican majority in the House and the Senate of the state legislature; an indicator for the governor's party; the proportion of population living in an urban area; the proportion of Black, American Indian, Asian and Hispanic populations; and the proportion of population between the ages of 18 to 61. We cluster our standard errors by state, the level at which constitutional provisions are defined. Our standard errors therefore account for the possibility that outcomes may be correlated across l within a state.

The main identifying assumption in this model is that variation in constitutional amendments is uncorrelated with the error term ϵ_{lst} for all lags and leads, conditional on the two-way fixed effects and other controls, so that the unweighted average of other states (never-treated) acts as a valid counterfactual for each state.[16]

4.3 Results

We begin by examining the effect of adopting a constitutional amendment on education inputs. Table 4 shows the results of the regression discontinuity model as depicted by equation 1. Despite having a small number of treatment and control observations around the threshold, we find significant effects on education inputs. The first column shows a significant and positive effect on per-pupil total expenditure and column (2) shows a significant decrease in class size – an estimated fall of one student per teacher.

Table 5 presents the results of the same specification for components of expenditure.

[16]There is an active and growing econometrics literature that examines potential bias that may arise in situations where there is differential timing of policy implementation and the treatment effects are heterogenous over time (Athey and Imbens (2021); Borusyak and Jaravel (2017); Callaway and Sant'Anna (2020); De Chaisemartin and d'Haultfoeuille (2020); Goodman-Bacon (2018); and Sun and Abraham (2020)). In the context of an event study design, Sun and Abraham (2020) propose an alternative estimator called Interaction-weighted estimator. Results of this alternative estimation are available upon request.

Columns (2) and (3) show that there is a significant increase in log per-pupil capital expenditures and log teacher salaries, respectively. The magnitude of the increase of these components is smaller compared with the increase in log per-pupil total expenditure. Although there are fewer school districts that report per-pupil support staff salary, we find a significant increase in this expenditure component as well.

Figure 4 presents graphical representations of each regression discontinuity (RD) estimate, showing the average of each measure as a function of distance from the treatment threshold. The plots show linear regressions on each side of the threshold and 90% confidence intervals. These graphs for expenditures corroborate the tables, showing significant treatment effects.

Figure 5 plots the coefficients from the estimation of equation 2 with components of expenditure as outcome variables. Unlike the plots for RD estimates, which compare only those amendments with vote margins around the threshold, the ES estimates are based on all proposed amendments in our analysis. The results show that there is a significant increase in per-pupil expenditure and teacher salary in year 3 after the amendment is adopted. This effect persists. There is an increase in per-pupil capital outlays as well, but the estimates are not statistically significant. Figure 6 checks for robustness of this result. Each line graph plots estimates when we take out one state at a time from the analysis. The graphs show that the results are not driven by any one state - the estimates are robust when we take out one state at a time.

To ensure that these results are not mechanically driven by amendments related to education finance, we restrict our analysis to non-finance amendments. Figure 7 plots the effect of non-finance amendments on log per-pupil total expenditure and log per-pupil teacher salary. The effects remain the same: there is a significant increase in both these expenditures two years after an amendment is passed, and the effect persists. In contrast to the result from including all amendments, we see that the increase in teacher salaries in years four and five is of a lower magnitude after non-finance amendments are adopted.

We now examine the effect of adopting a constitutional amendment on education outcomes. The data for high school dropouts are available only between 1997 and 2009, and data for test scores are available from 2009 to 2019. Given the limited number of years, the number of proposed amendments close to the threshold on either side is not high enough to estimate RD coefficients. Indeed, as we can see from Figure 8, there are only three values of the running variable with observations within 10% window around the cut-off value. Despite limited statistical power, the RD estimate shows a significant

positive effect of passing an amendment on grade 8 reading and grade 8 math.

Figure 9 plots the coefficients from the estimation of equation 2 for achievement outcomes. The estimated coefficients takes into account all amendments that passed or failed, not just ones around the cut-off. There is a significant increase in reading scores for grades 4, 5, and 8 after an amendment is adopted. The magnitude of increase is much higher for grades 4 and 5 compared to grade 8. Compared to reading scores, the increase in math scores for grades 4 and 5 comes with a lag and the effect is also less persistent. There is no statistically significant change in grade 8 math scores after an amendment is passed. Figure 10 shows that these results are robust and that they are not driven by any one given state.

Overall, the results of this section show that following an adoption of constitutional amendments, there are improvements in education inputs and better student outcomes.

5 Evidence for Mechanism

Constitutions contain provisions that provide a framework for the legislative and executive bodies of government to make policy decisions and benchmarks for the judiciary to assess whether the legislative and executive bodies are performing their duty. Constitutions define minimum standards that must be met by the state and are enforceable in court.

The underlying mechanism for why strengthening education clauses in state constitutions leads to better outcomes is that a strong constitutional provision improves the bargaining position of citizens vis-à-vis that of their elected leaders. If citizens do not receive education services as described in the constitution, they can go to court to enforce the minimum constitutional standards. The mere presence of a threat that citizens can litigate and win against the state government should keep the legislators accountable. If the legislature fails to meet constitutional standards, citizens can seek remedy from the judicial system to enforce them.

In this section, we provide evidence for this mechanism. The main hypothesis is that when the state constitution is amended to raise the minimum requirements, the legislature should adopt policies to meet these new standards. There are two possible outcomes:

1. If the legislature responds, we should not see any increase in the number of court cases;

2. If the legislature fails to improve the policies, we should expect courts to intervene to implement minimum constitutional mandates.

Section 5.1 examines patterns in enacted legislative bills and education cases in appellate courts to shed light on (1). Section 5.2 provides a case study from school finance reforms to illustrate (2) above.

5.1 Effects of Constitutional Amendments on Legislative Changes and Appellate Court Cases

5.1.1 Creating a Database on Legislative Bills and Court Cases

To analyze the underlying mechanism, we need information on all legislative bills introduced and all appellate education court cases over the period of our study. We focus on appellate court cases for two main reasons. First, the rulings of such cases have a big impact on policy at the state level. For example, a large part of the court-mandated school finance reform was driven by outcomes of state supreme court decisions (Card and Payne (2002)). The second reason is that historical court case documents for each district and lower courts across the United States are not easily accessible, even through repositories such as LexisNexis. Constructing a comprehensive national dataset on such cases is outside the scope of this study.

We construct our dataset using individual files on legislative bills and appellate court cases from LexisNexis. The court case repository in LexisNexis provides a complete set of cases that reached state courts of appeals or state supreme courts.[17] The first step in constructing the dataset was to identify education-related court cases and legislative bills. We used LexisNexis categorized education-related court cases and legislative bills. The general character of these keywords resulted in a large set of collected court cases and legislative bills. A brief inspection revealed that not all of them are *relevant* to educational policy addressed through legislative action or cases related to education.[18]

[17] Our data consist of all court cases and legislative bills available in LexisNexis. There is a possibility that LexisNexis does not contain the universe of state court cases, as some states may not provide it. For legislative bills, we downloaded all bills between 2006 and 2019 from the National Conference of State Legislatures (NCSL) to cross-validate the data. We found some bills in the NCSL that were not in LexisNexis. We are working with LexisNexis to ensure we have the universe of data for legislative bills.

[18] For example, a court case related to an accident involving a girl walking to school was picked up in our initial keyword search because it contained the word *school* in it. The case was about damages

We removed such irrelevant court cases and legislative bills using machine learning tools. Manually going over all bills and court cases was not feasible, as our initial step identified about 48,900 appellate court cases and 721,500 legislative bills.[19] Instead, we used a subsample of the court cases and legislative bills to create a "training data". We read all the court case and legislative bill texts in the "training data" to manually identify whether they were relevant. The results of this exercise were used to train the machine learning model to predict the relevance of the remaining bills and court cases.

In addition to using the training data to predict the relevance of a case or a bill, we use similar text processing tools, described in Appendix I, to classify each bill or case into various education topics. For each topic, we independently fit a model using the manually tagged data and predict the outcome for each non-classified document. As a result, we obtain the probability that each bill falls within a particular topic. We carry out this exercise for each of the 77 classifications for legislative bills and 31 categories for court cases.

We also extract additional information about each relevant bill and court case. We identify whether the legislative bill was enacted, the date on which it was enacted and details of the provisions of the bill. For court cases, we identify the constitutional law, state statutes, or education codes under which a court case is filed. For each legislative bill, we identify whether it refers to the state constitution, and if it does, we extract information of the articles and section numbers cited.

5.1.2 Summary Statistics: Patterns in Legislative Bills and Court Cases

Table 6 outlines the composition of education court cases in appellate courts over the period 1970-2020. About three-quarters of all education cases are employment related and consist of compensation, contracts, or unions. Finance and accountability are the two next biggest issues addressed in courts; they make up 7.5% and 6.9% of cases respectively. Discrimination cases account for only 0.8% of all education cases reaching appellate courts.

Figure 11 plots the time series of appellate court cases aggregated across states. On an average, there are 200 cases annually in state courts of appeals and 71 in state

sought by the girl's parents from the driver of the bus. This clearly had nothing to do with education policy or education law.

[19] These initial numbers were not the unique number of cases and bills. LexisNexis considers the same bills as separate bill texts as amendments are made, and the same court cases are considered as separate cases as they progress to higher levels of the court.

supreme courts. The number of cases increased sharply between 1970 and 1980 and then declined over the next two decades. There is a subsequent upward trend starting in the early 2000s. The number of supreme court cases also sharply increased between 1970 and 1980. Unlike the appellate court cases, state supreme court cases have persistently declined since the 1980s.

These time-series patterns of cases for both courts of appeals and supreme courts are driven by employment-related cases. The 1970s saw a significant number of school finance cases reaching the supreme court, and this number fell over time. The frequency of other types of cases has remained largely constant over time in both courts of appeals and supreme courts.

Table 7 provides frequency distribution over types of education issues in legislative bills enacted between 1997 and 2018. School governance and teacher policies each make up about 20% of all bills enacted. The high frequency categories composing the remaining 60% of bills include finance, accountability, school choice, early childhood education, and school safety. Career readiness, assessments, curriculum, and academic issues together cover only 5.6% of all bills. Bills related to implementation of federal policies such as No Child Left Behind (NCLB) or the Every Student Succeeds Act (ESSA), are 0.5% of all legislative bills.

Figure 12 plots the time series for legislative bills enacted. The total number of bills enacted has been declining slightly over time and there is a large variation in alternating years. This variation is because state legislative cycles are biennial.

5.1.3 Empirical Strategy to Test Hypothesis

When constitutions are amended to raise states' minimum requirements, the legislatures should enact policies to meet these new standards. Our hypothesis is that if the legislature does respond, we should not see any increase in the number of court cases.

To test this hypothesis, we investigate changes in legislative activity and appellate court cases before and after an amendment passes. Specifically, to ensure that results are not driven by changes induced by factors other than the amendment, we compare these changes to situations in which the amendment failed on the ballot. We use a difference-in-differences regression model similar to equation 2:

$$Y_{lst} = I_s + I_t + \sum_{k=-K}^{-2} \beta_k C_{s,t}^k + \sum_{k=0}^{L} \beta_k C_{s,t}^k + E_{t\in\{-K,L\}} + \gamma X_{lst} + \epsilon_{lst} \tag{3}$$

where Y_{st} is the number of bills enacted or the number of appellate court cases in state

s and time period t. I_s is a vector of state fixed effects and I_t is a vector of year fixed effects. C_{st} is an indicator term that takes value 1 for all years after an amendment to the constitution was successfully passed, $E_{t\in\{-i,i\}}$ is an indicator variable for end years. Finally, X_{st} is a vector of controls that includes an indicator variable for whether there is a Democratic majority or a Republican majority in the House and the Senate of the state legislature; an indicator for governor's party; proportion of the population in urban areas; proportion of the population that is Black, American Indian, Asian and Hispanic; and proportion of the population ages 18 to 61.

5.1.4 Results

Figure 13 plots the estimates for β_k when C_{st} term takes value 1 for all years after an amendment was successfully passed in state s. One year after the amendment was passed, we see a significant increase in the number of bills enacted. This effect decreases over time. We do not find any change in appellate court cases after an amendment was passed. These results are consistent with our hypothesis: if the legislature responds to changes in constitutional standards, there is no need for citizens to seek remedy in court.

Figure 14 provides estimates for the coefficients in equation 3 by restricting the types of amendments, bills, and cases to one category at a time. Panel [a] shows the effect of amendments related to finance on number of finance bills enacted and number of education finance cases. There is an increase in finance bills enacted but no change in finance related court cases. The variation across states in legislative response to finance amendments is larger compared with variations observed on average.

Panel [b] examines the effect of early childhood (EC) amendments on EC bills enacted and EC court cases. Two years after an amendment passes, there is a significant increase in the number of EC bills enacted. The number of enacted bills decreases thereafter. This is expected because, unlike finance bills, once a specific education policy is enacted, there is no need to reintroduce such policies in subsequent years. Panel [c] shows the effect of school choice (SC) amendments on SC bills enacted and SC court cases. In contrast to finance and EC bills, there is no clear pattern for school choice bills enacted.

5.2 Case Study: School Finance Reform

The results so far show that after an amendment is passed, on average, the legislature responds to enact policies and that education court cases do not increase. We now provide a case study to show that in situations in which the legislature fails to improve the policies, the courts intervene to implement minimum constitutional mandates.

School finance reform is an example of a scenario in which the legislative responses in most states across the US were slow to address inequity in funding across school districts. Citizens in most states sought remedy for inequities in funding, and many of these cases reached the state supreme courts.[20] In some of these states, the supreme courts ordered changes in finance systems, and these reforms, when implemented, resulted in better outcomes. In other states, the state supreme courts ruled that inequities in funding across school districts did not violate their state constitutions. In this section, we show that the strength of the constitutional provisions across states plays a role in determining the outcomes of these court cases.

State supreme court cases and school finance systems. Historically, most school spending in the United States has been financed by local property taxes. During the 1930s, a wave of school finance reforms led many states to modify their aid formulas to take account of the property tax bases in different districts. However, these reforms were not sufficient to offset the rising inequality in spending across districts (Card and Payne (2002)). This led to an increase in demands for equalization, resulting in school finance litigation across states. Many of these cases challenged the constitutionality of the school financing system on the basis of "equity" and argued that it violated a provision of the state constitution guaranteeing a basic level of education for all children.

In recent years, there has been an increase in litigation that challenges the "adequacy" of the school finance system. While the equity cases put emphasis on equal distribution of resources, the adequacy cases focus on quality of education. The argument is that equal funding across schools and school districts does not ensure that funds will be used efficiently toward the goal of academic achievement and equal opportunity for all students, whether they are from advantaged or disadvantaged backgrounds.

We analyze the relationship between constitutional language strength and state supreme court decisions, using information collected from detailed state-level judicial proceedings since 1970. We focus on court cases in which the plaintiff(s) raised claims that the state failed to provide for equal and/or adequate public education as prescribed

[20] Four states did not have any supreme court cases on equalization of funding: Hawaii, Mississippi, Nevada, and Utah.

by the state's constitutional mandate. Our dataset is composed of 176 state supreme court decisions compiled from case law histories, using *American Law Reports* as the primary source. *American Law Reports* are periodical publications that provide detailed state or federal judiciary histories based upon law topic indexes. These histories were cross-referenced with school finance legislative histories previously compiled by Card and Payne (2002); Jackson et al. (2015); and Lafortune et al. (2018).

Table 8 shows the distribution of state supreme court cases related to school finance across states between 1970 and 2018. The distribution of the total number of cases across states is given in column 1. Column 2 provides the number of cases challenging adequacy of the school finance system, and column 3 provides the number of cases challenging equity.

In the context of school finance reforms, our objective is to estimate the parameters of the following regression model:

$$y_{st} = \alpha + \beta ConstitutionStandard_{st} + \gamma X_s + \epsilon_{st} \tag{4}$$

where y_{st} is the outcome variable of interest. We examine two outcomes: the number of school finance cases and whether the state court ordered equalization of funding across school districts. In the model, *ConstitutionStandard* is a measure of minimum standards set in the education clause of the constitution in state s at time t. This measure is time-varying because an amendment can raise the minimum standards, as discussed in previous sections. Hence, we measure the constitutional standard at the time of the court case. Finally, X_s denotes state-level characteristics. In order to carry out the analysis, we need to quantify the language used in education clauses to measure constitutional standard.

Defining constitutional standard. We create three indicators based on provisions in the education clauses of state constitutions. Each indicator takes value $\in \{0, 1\}$.

1. Duty of state: takes value 1 if the constitution imposes an obligation on the state legislature or provides that duty to provide education services is "primary" or "paramount."

2. Equal access or rights: takes value 1 if the education clause includes language mandating equal access to education services or provides that education is "fundamental."

3. Quality standards or specific policies: takes value 1 if the constitutional provision mandates that the system of public schools meet a certain minimum standard of quality or if any specific policy prescription is included in the education clause.

To illustrate how these indicator variables are defined, consider the case of Illinois:

1. Duty of state takes value 1 because the third paragraph of Article X, Section 1 of the Illinois Constitution states that "State has the primary responsibility for financing the system of public education;"

2. Equal access or rights takes value 1 because the first paragraph of Article X, Section 1 of the Illinois Constitution states that "A fundamental goal of the people... is the educational development of all persons...;"

3. Quality standards or specific policies takes value 1 because the second paragraph of Article X, Section 1 of the Illinois Constitution states that "The State shall provide for an efficient system of high quality public educational institutions.."

Results: Constitutional language and number of Supreme Court cases. Table 9 shows the estimation results for the regression model depicted by equation 4. Column (1) presents the results for a regression of total number of court cases on the three measures of constitutional standards and demographic variables. Higher minimum constitutional standards do not seem to be correlated with the number of cases. However, in column (2), we see that there is a significant negative correlation between "duty of state" and the number of equity cases that reach the supreme court. This negative correlation could potentially be explained by two factors. First, states that mandate higher standards as 'duty of state' may already have better school finance systems in place, so there is no basis for challenging the equity of the system. Second, it may be that the system had inequities and they were challenged in court, but the cases never reached the supreme court because the state settled out of court in anticipation of a ruling against the system. These two reasons are observationally equivalent in the above specification, but both are consistent with the hypothesis that *if* states fail to meet constitutional standards, then citizens can use the judicial system to enforce such standards. Column (3) of Table 9 shows the results for the specification in which the dependent variable is the number of adequacy cases. None of the three indicators are significantly correlated with this outcome.

Results: Constitutional language and supreme court rulings. We now examine whether the language in the education clauses of state constitutions can predict court case rulings on matters related to public school finance systems. The results of state supreme court cases fall into two main categories: cases in which the public school funding system survived the challenge, and cases in which the system was found unconstitutional and courts ordered equalization of funding. We define the outcome as whether the court ordered the public school funding system to change on the basis of failure to satisfy the standard set by the state constitution. On average, between 1970

and 2018, 25% of the cases resulted in this outcome.

Table 10 provides results for this analysis. The regression specification in column (2) controls for number of court cases, and column (3) controls for both number of cases and type of cases. The results show that conditional on equal access and quality standards, in states where the constitution imposes an obligation on the state legislature to provide education services ("Duty of the State"), court case rulings are significantly more likely to find inequities in school finance system to be unconstitutional.

Our results are in contrast to studies that find no association between court decisions and strength of the constitution (Swenson (1999); Lundberg (1999); Edwards and Ahern (2004); and Hutt et al. (2020)). These studies measure the strength of constitutions based on a four tier classifications proposed by Grubb (1974), formalized by Ratner (1984), and popularized by Thro (Thro (1989, 1993); Dinan (2006); Hutt et al. (2020)). Unlike our measure that creates an indicator variable for three different dimensions of strength of the constitution, the four-tier classification combines various dimensions into one index.

In order to compare the results of our measure with the measure used in legal literature, we repeat our analysis using an alternative definition of constitutional minimum standards based on the four-tier classification of Thro (1993). The constitutional strength index takes four values:

1: Merely mandate a system of free public schools.

2: Mandate that the system of public schools meet a certain minimum standard of quality, such as “thorough and efficient”.

3: Distinguished from the categories 1 and 2 above by both a “stronger and more specific education mandate” and “purposive preambles”.

4: Impose the greatest obligation on the state legislature; provide that education is “fundamental,” “primary,” or “paramount”.

Table 11 presents estimates for the regression with this alternative definition for the strength of the constitution. The results show that there is no statistically significant association between the Thro categories and the court case outcomes. This is consistent with the literature that uses such four-tier classifications to examine this relationship and finds no association.

Court mandated policy reforms and education outcomes. So far, we have shown that stronger minimum standards in state constitutions increase the probability

of the school finance system being found unconstitutional. As a result, this would lead to court-mandated legislative reforms. Did these court-mandated policy changes have any impact on education inputs and outcomes? Jackson et al. (2015) use variation in timing of court-mandated reforms and resulting funding formula changes as exogenous shifters of school spending across school districts to study this question. They compare outcomes of cohorts that were differentially exposed to these school finance reforms. They find that court-mandated spending increases were associated with improvements in school inputs such as increases in teacher salaries, reductions in student-to-teacher ratios, and longer school years. They further show that these increases in inputs resulted in better outcomes: more years of schooling, higher wages, and reduction in annual incidence of poverty.

Summary. This section provides empirical evidence for the underlying mechanism driving the effect of constitutional amendments on education outcomes. When an amendment is passed, the legislature responds by enacting education policies that meet the new standards. The number of education issues addressed in the newly enacted policies is significantly higher. Consistent with our hypothesis, there is no change in education cases after an amendment is passed. In addition, using school finance reforms as a case study, we provide evidence that in situations when the legislature fails to provide education services through equitable school financing, courts intervene to enforce constitutional standards to improve outcomes. This enforcement mechanism is more impactful in states that had higher constitutional minimum standards.

6 Concluding Remarks

Constitutional provisions play an important role in determining education policy and student outcomes in the United States. In this paper, we exploit discontinuities in the procedure for adopting constitutional amendments to show that strengthening minimum education standards results in higher education inputs and better education outcomes. Our results show that strengthening education clauses results in higher per-pupil spending, an increase in teacher salaries, smaller class size, and improvement in reading and math test scores.

We propose a mechanism for why strengthening education clauses in state constitutions leads to better outcomes. The underlying mechanism is that a strong constitutional provision improves the bargaining position of citizens vis-à-vis that of their elected leaders. If the citizens do not receive education services as described in the con-

stitution, they can go to court to enforce the minimum constitutional standards. The mere presence of a threat that citizens can litigate and win against the state government should result in enactment of policies that meet constitutional standards.

We construct a novel dataset on legislative bills and court cases to shed light on the mechanism. We find that when an amendment is passed, on average, the legislature responds by enacting education policies that meet the new standards. Consistent with this hypothesis, there is no increase in education appellate court cases after an amendment is passed. In addition, using school finance reforms as a case study, we provide evidence that in situations when the legislature did fail to provide education services through equitable school financing, courts intervened to enforce constitutional standards. This enforcement mechanism worked better in states that had higher constitutional minimum standards.

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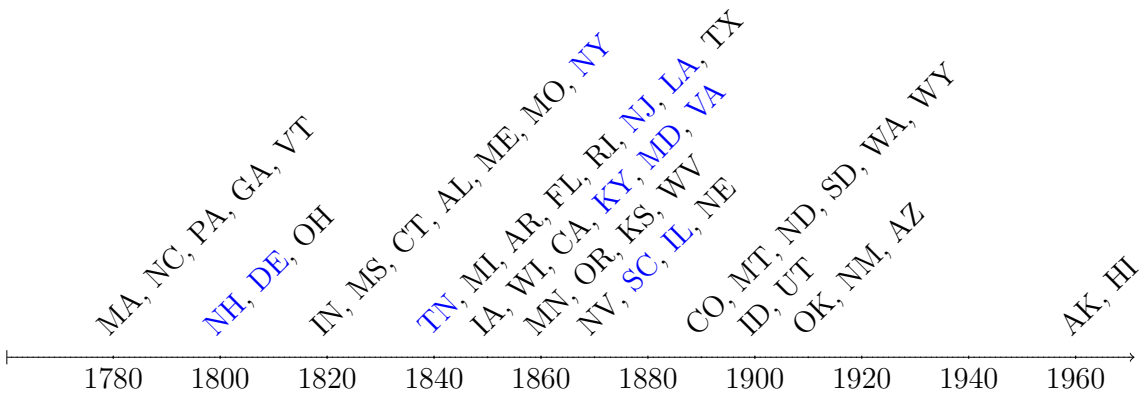
Figure 1: Timeline for Introducing Constitutional Provisions for Public Education



Source: Authors' calculations based on data from Wallis (2015).
Note: The states that introduced an education clause as an amendment to their original constitution are highlighted in blue.

Table 1: Timing of Adoption of Education Clause and Strength of Provisions

Language in Constitutional Education Clause	**State Classification According to Timing of Adopting Constitutional Education Clause**		
	Early Adopters (1775-1825)	Middle Years (1826-1875)	Late Adopters (After 1876)
(1)	(2)	(3)	(4)
[a] Education clause first introduced			
Uniform		Minnesota, Nevada, Oregon, Carolina, Wisconsin	Idaho, Montana, New Mexico, North Dakota, South Dakota, Washington, Wyoming
Thorough/Efficient		West Virginia	Colorado, Idaho, Wyoming
Equal Rights		New Jersey	Washington
Paramount/Primary Duty			Washington
Quality Education			
[b] Education clause in current state constitution			
Uniform	Indiana, North Carolina	Florida, Minnesota, Nevada, Oregon, Wisconsin	Arizona, Colorado, Idaho, New Mexico, North Dakota, South Dakota, Washington, Wyoming
Thorough/Efficient	Delaware, Ohio, Pennsylvania	Arkansas, Florida, Illinois, Kentucky, Maryland, Minnesota, New Jersey, Texas, West Virginia	Colorado, Idaho, South Dakota, Wyoming
Equal Rights	Indiana	Florida, Illinois, Louisiana, Michigan, New Jersey	Montana, Washington
Paramount/Primary Duty		Florida	Washington
Quality Education		Florida, Illinois, Virginia	

Table 2: Proposed Amendments That Raise Minimum Standards, 1990-2018

[a] **Improving education services**

Classification	Frequency
Funding	22
Equal Access	12
Right to Education	3
Funding - Equitable Allocation of Funds	3
Expenditure Requirements	3
Education First - Paramount Issue	2
Improving quality of education	1
Establish adequate and efficient system of education	1

[b] **Specific education policy**

Classification	Frequency
School Choice	8
Early Childhood Education	5
English Language Requirements	4
Teacher pay for performance	3
State Takeover of Failing Schools	2
Reduce Class Size	2
Accountability	1
Compulsory Attendance	1
Parental Rights	1
Total	**74**

Figure 2: Time Series of Proposed Amendments That Raise Minimum Standards

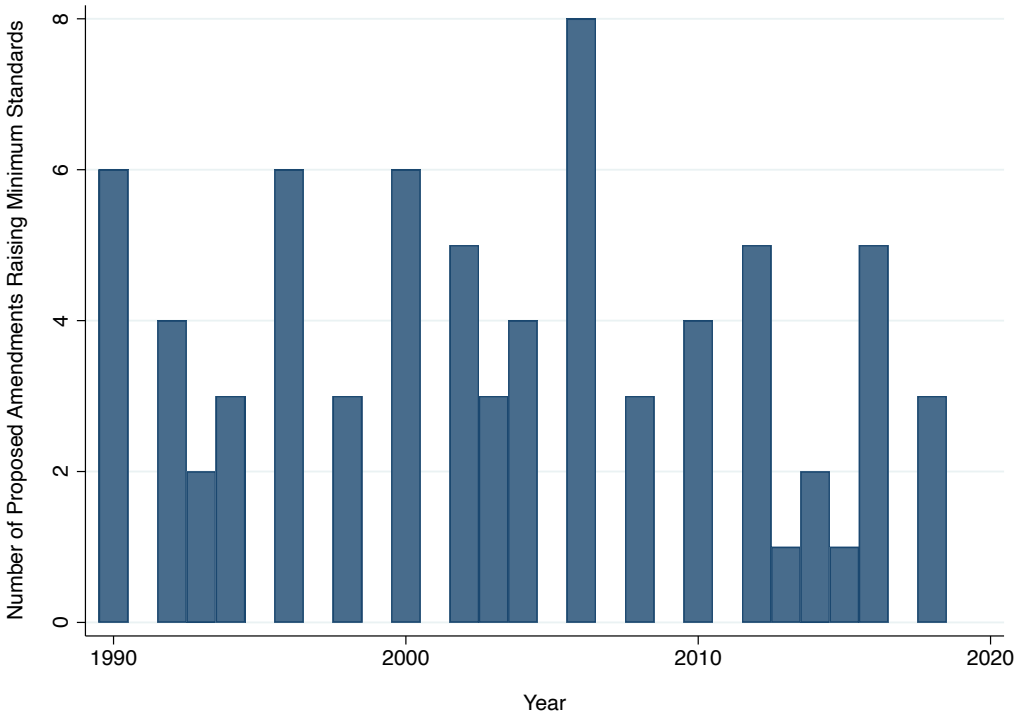


Table 3: What Predicts the Probability of Proposing an Amendment?

Dependent variable: Probability of Proposing a Constitutional Amendment				
	Any Proposed Amendment	Equal Access	Funding	Specific Policy
	(1)	(2)	(3)	(4)
Strong Teacher Bargaining Rights	-0.016	-0.006	-0.004	0.013
	(0.027)	(0.007)	(0.016)	(0.016)
State Democrat Majority: Senate and House	0.002	-0.007	0.003	0.003
	(0.019)	(0.010)	(0.012)	(0.015)
State Republican Majority: Senate and House	-0.006	-0.007	-0.005	0.016
	(0.020)	(0.010)	(0.009)	(0.014)
Democrat Governor	0.003	-0.006	0.015	-0.005
	(0.015)	(0.007)	(0.009)	(0.011)
Proportion of Population Minority	0.073	-0.004	0.031	-0.020
	(0.066)	(0.017)	(0.029)	(0.034)
Proportion of High School Drop Outs	-0.807	0.034	-0.782*	0.602
	(0.638)	(0.160)	(0.406)	(0.399)
Proportion Below Poverty Line	0.263	0.004	0.259	-0.294
	(0.255)	(0.076)	(0.171)	(0.186)
Observations	1450	1450	1450	1450
Adjusted R^2	0.026	0.008	0.014	0.018
Mean Annual Per HH Benefits	0.046	0.012	0.019	0.972
SD Annual Per HH Benefits	0.209	0.108	0.135	0.164

* p<0.10, ** p<0.05, *** p<0.01. Robust standard errors in parentheses, clustered at state level. All specifications include year fixed effects. The time period of analysis is 1990-2018. 'Teachers Bargaining Rights' refers to contract negotiation provisions; it is a dummy variable taking value 1 if the state had strong bargaining rights and included wages as a subject of bargaining at the beginning of the time period of study.

Figure 3: Distribution of Assignment Variable

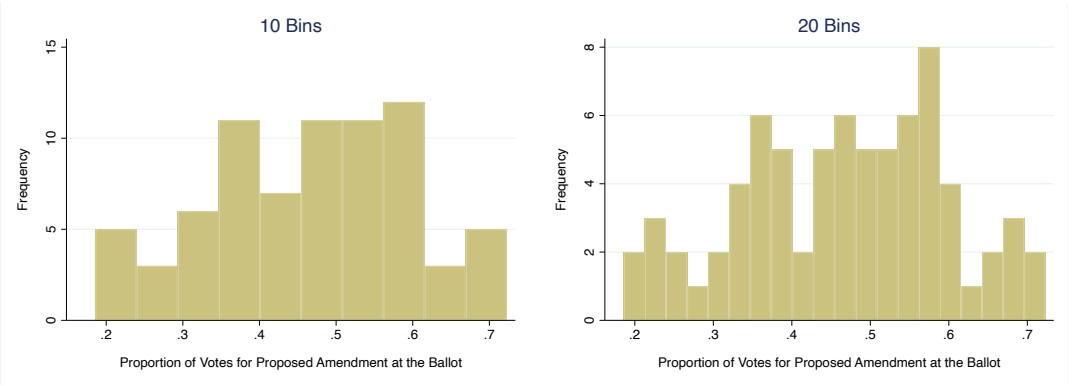


Table 4: Effect of Constitutional Amendments on Education Inputs

	Per-Pupil Expenditure (USD)	Student Teacher Ratio
	(1)	(2)
RD Estimate	4930.12***	-0.70***
	(682.52)	(0.11)
Observations	7404	14748

* p<0.10, ** p<0.05, *** p<0.01.

Table 5: Effect of Constitutional Amendments on Expenditure Components

	Log Per-Pupil Expenditure	Log Per-pupil Capital Expenditure	Log Per-pupil Teacher Salary	Log Per-pupil Support Staff Salary
	(1)	(2)	(3)	(4)
RD Estimate	0.48***	0.29***	0.26***	0.85***
	(0.02)	(0.02)	(0.01)	(0.02)
Observations	7404	7408	6783	2326

* p<0.10, ** p<0.05, *** p<0.01.

Figure 4: RD Plots - Effect of Amendments on Education Expenditures

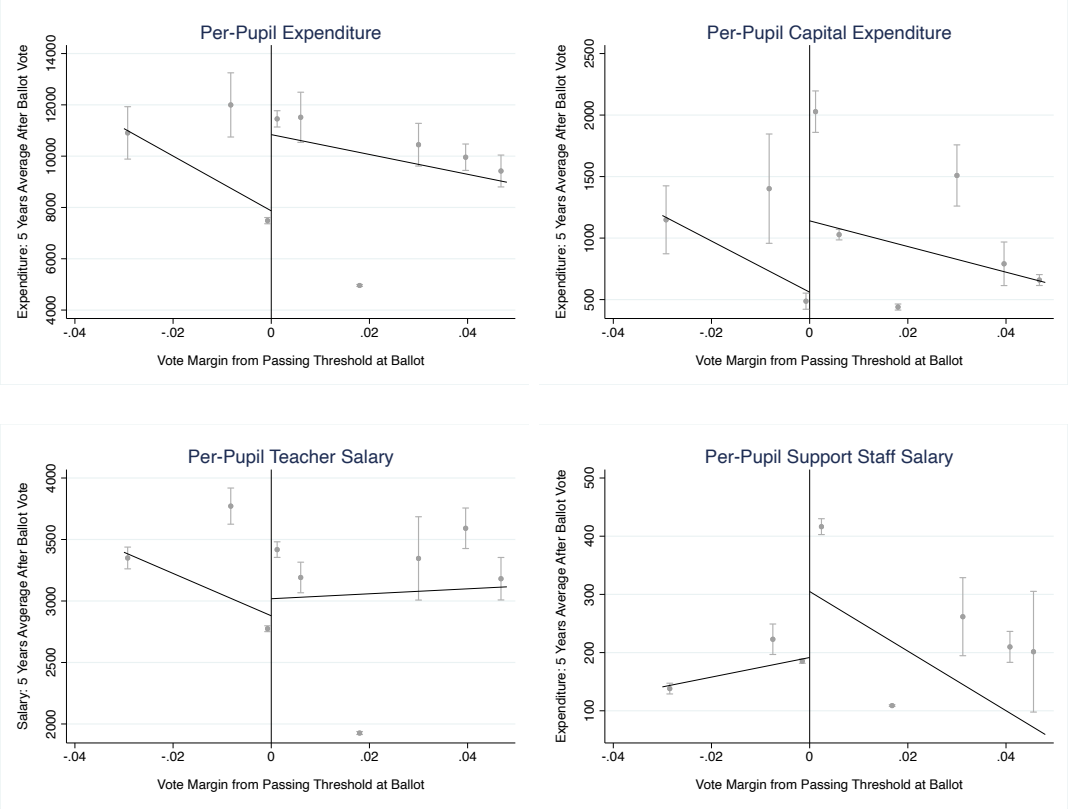


Figure 5: Effect of Amendments on Education Expenditures

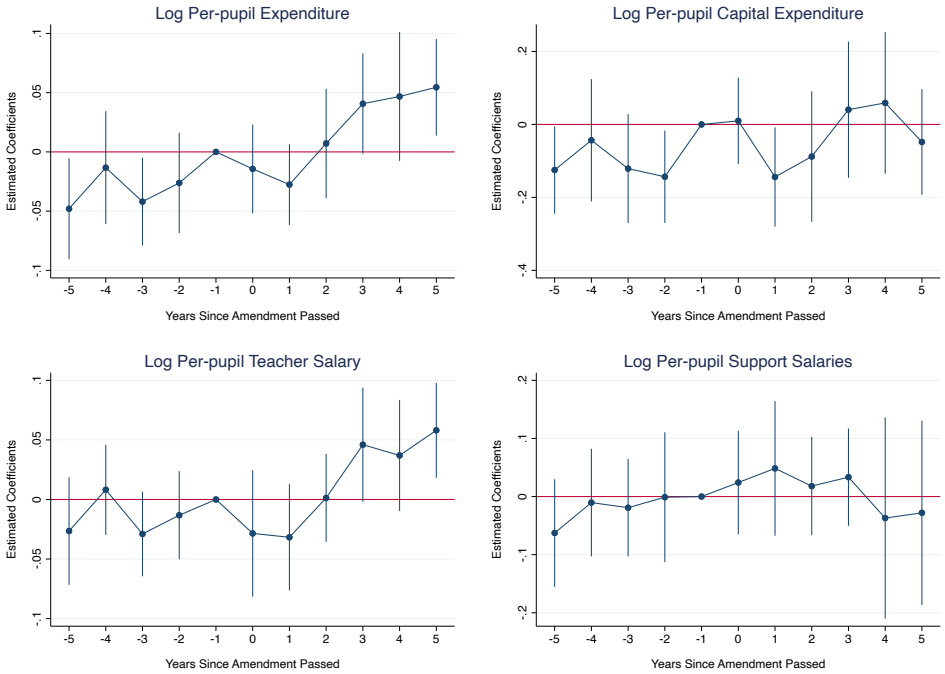


Figure 6: Robustness - Per-pupil Expenditure and Teacher Salary

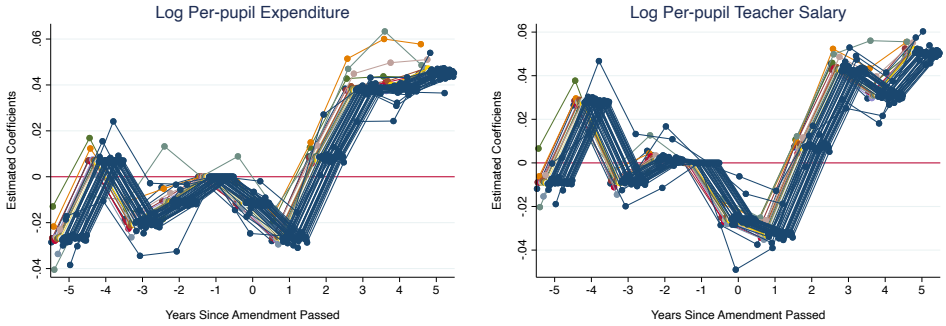


Figure 7: Effect of Non-finance Amendments on Education Expenditures

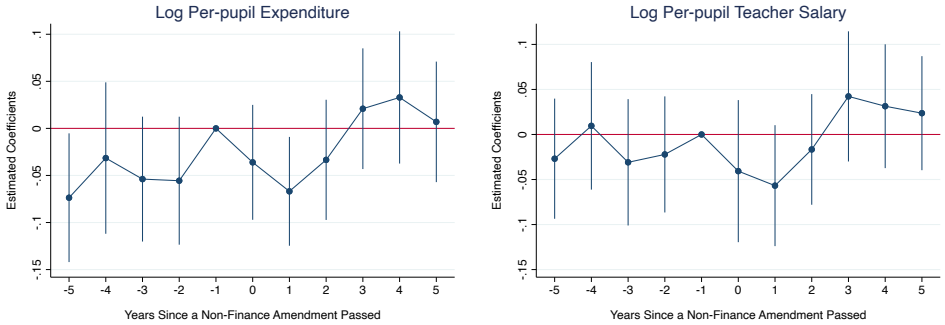


Figure 8: RD Plots - Effect of Amendments on Education Outcomes

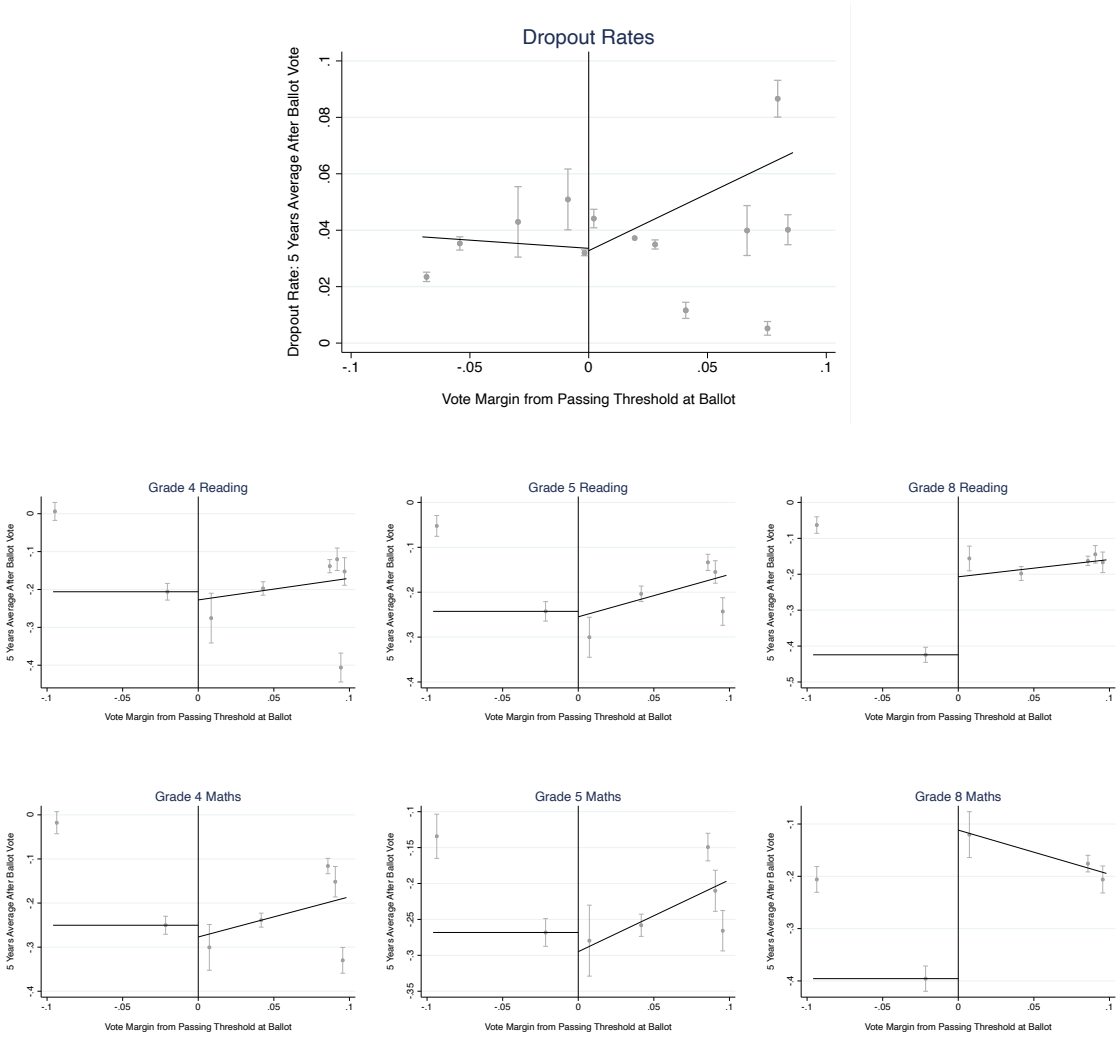


Figure 9: Effect of Amendments on Achievement Outcomes

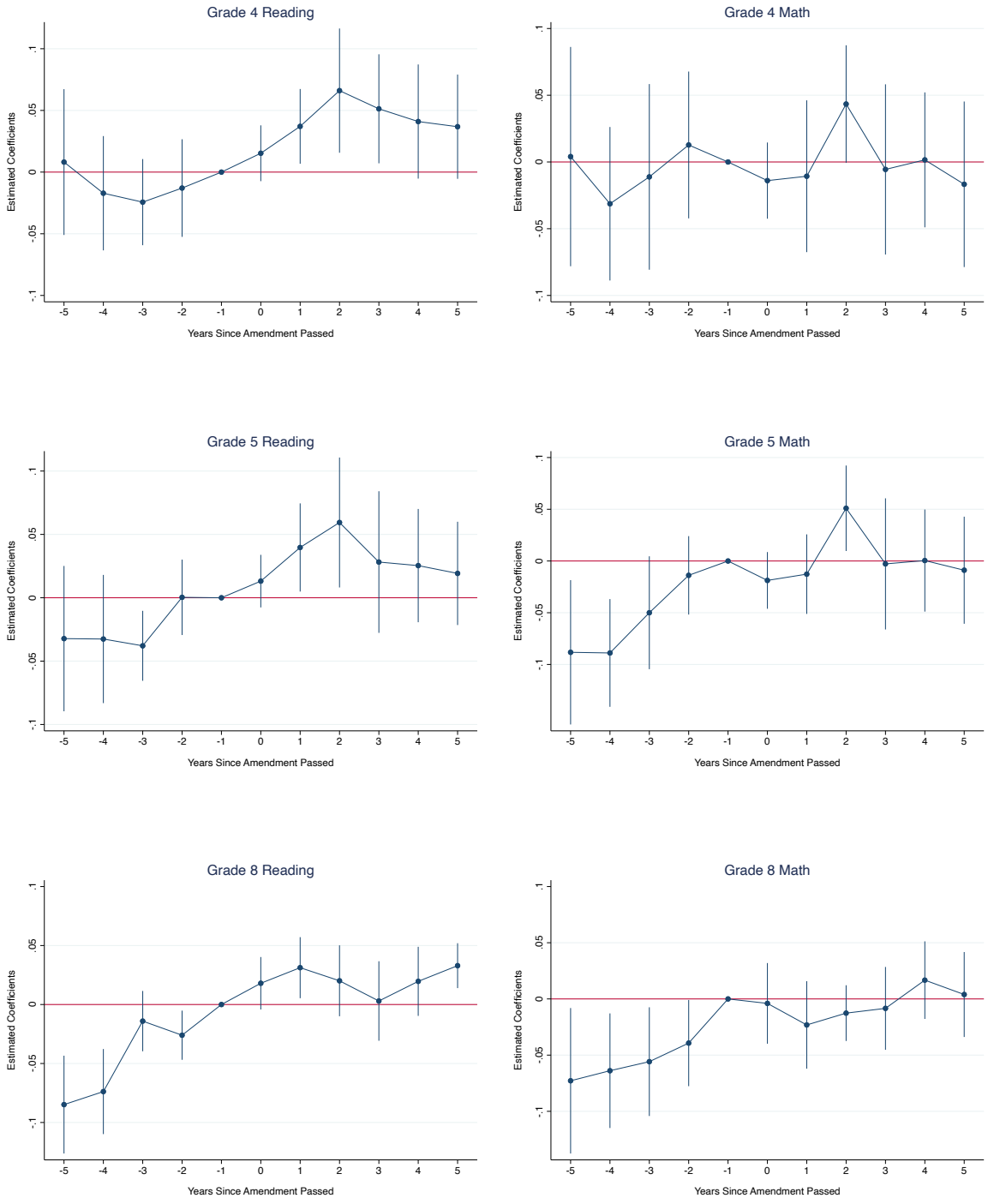


Figure 10: Robustness: Effect of Amendments on Achievement Outcomes

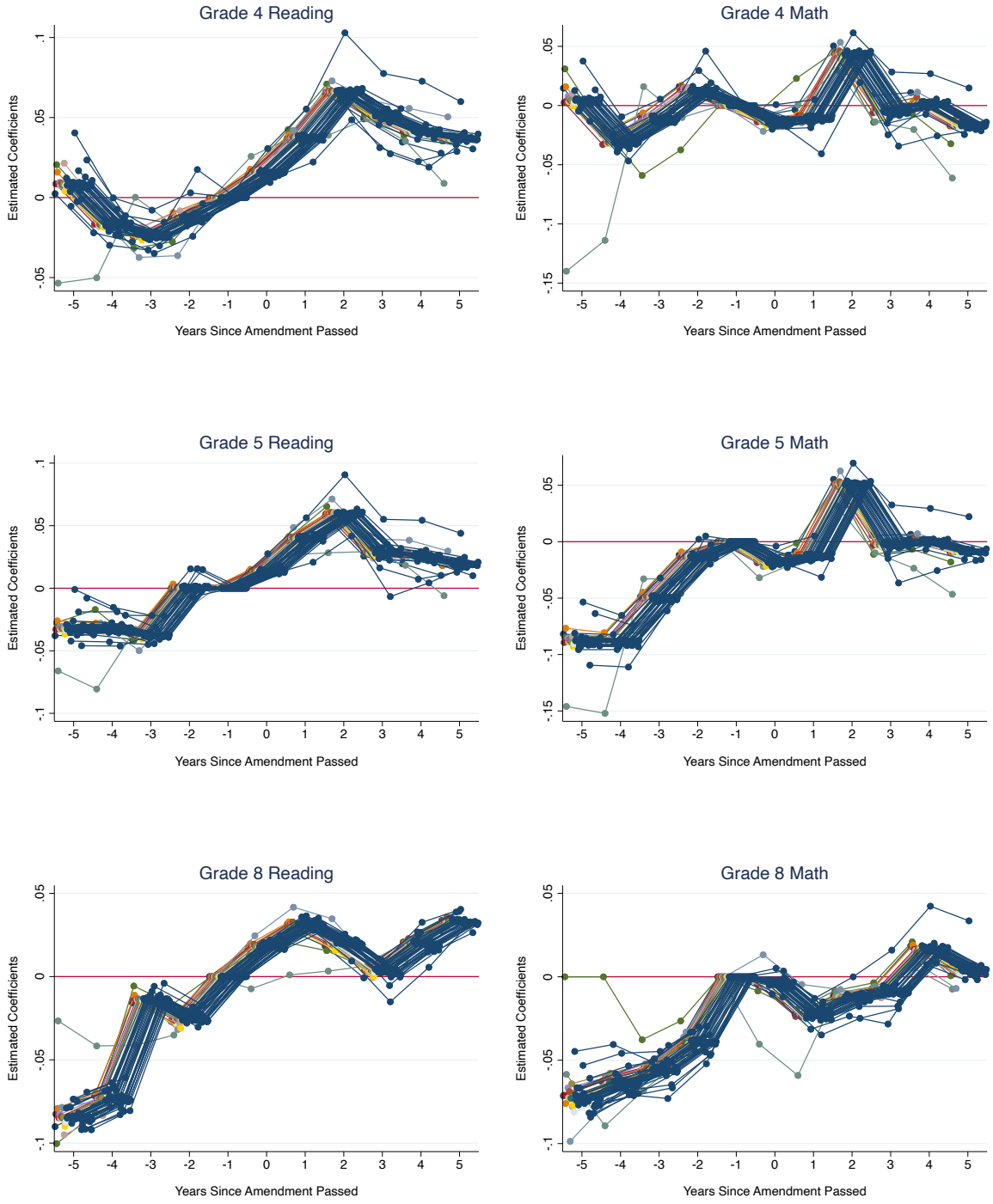


Table 6: Composition of court cases, 1970-2020

Case Type	Number of Cases	Percentage of Total
Employee, Compensation, Contract, or Unions	9,373	71.8
Finance	982	7.5
Accountability	899	6.9
School Choice and Desegregation	404	3.1
Employee - Other Issues	391	3.0
Other Education Issues	288	2.2
Discipline	233	1.8
School System	206	1.6
Privacy	167	1.3
Discrimination	106	0.8
Total	13,049	100

Source: Authors' calculations based on cases in LexisNexis.

Figure 11: Time Series of Court Cases

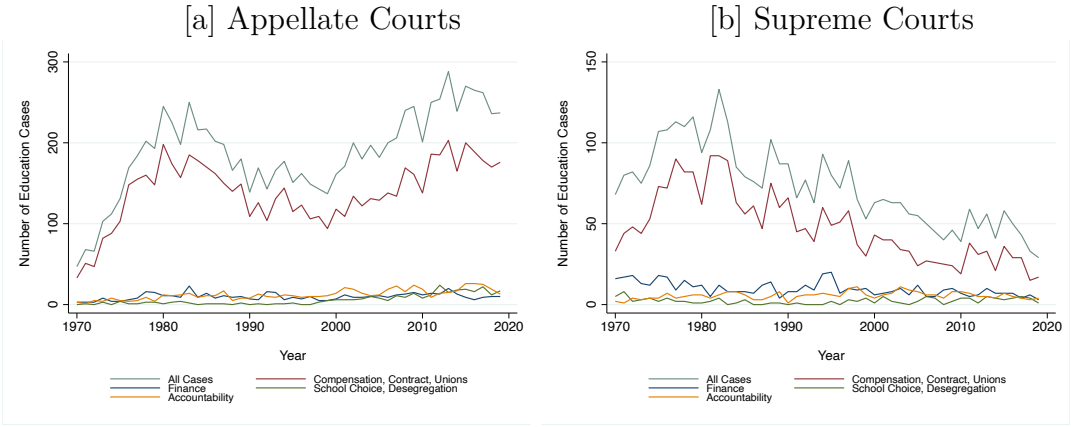
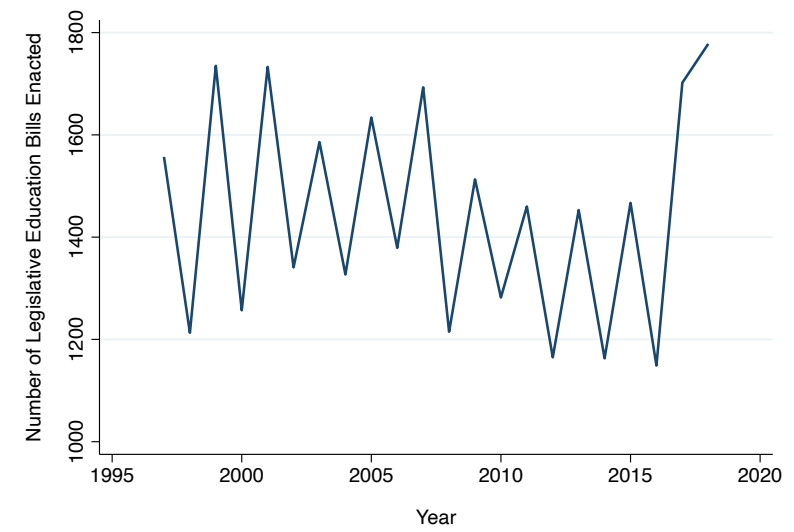


Table 7: Composition of legislative bills, 1997-2018

Bill Type	**Number of Bills**	**Percentage of Total**
Governance	7,096	20.4
Teachers	6,852	19.7
School Safety	3,278	9.4
Finance	2,575	7.4
Early Childhood	2,527	7.3
School Choice	2,083	6.0
Other Issues	1,231	3.5
Accountability	1,194	3.4
Employee Benefits or Pension	958	2.8
Student Health	829	2.4
Environment And Energy	783	2.3
Attendance	729	2.1
Career Readiness	575	1.7
Assessments	550	1.6
School Year or School Day	496	1.4
Academic Issues	495	1.4
Graduation	415	1.2
Literacy or English Learner	353	1.0
Discipline	330	0.9
Curriculum	321	0.9
Parents	189	0.5
Federal Policy Implementation	168	0.5
Transportation	158	0.5
Special Education	145	0.4
Class Size	143	0.4
Staff Retirement	120	0.3
Religion And Schools	103	0.3
Expenditures: Allocation Of Funding	96	0.3
Total	34,792	100

Source: Authors' calculations based on cases in LexisNexis.

Figure 12: Time Series of Legislative Bills Enacted



Source: Authors' calculations based on cases in LexisNexis.

Figure 13: Effect of Amendments on Court Cases and Bills Enacted

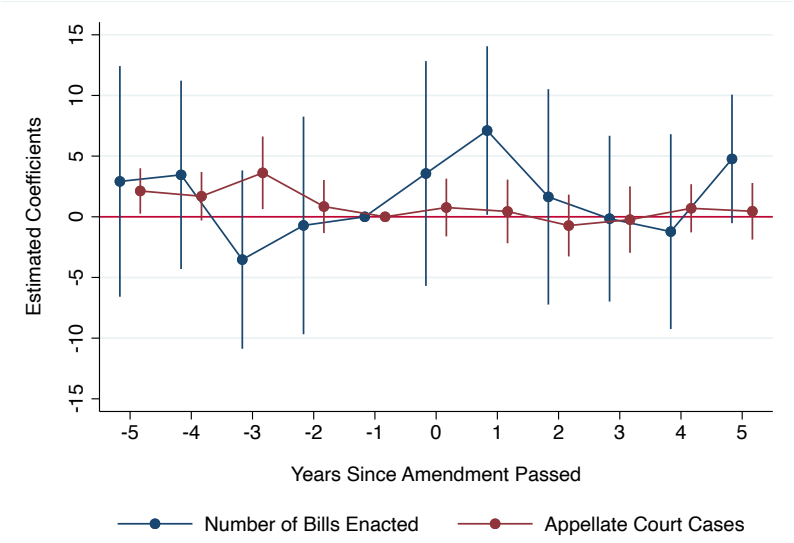


Figure 14: Effect of Amendments - By Type of Education Issue

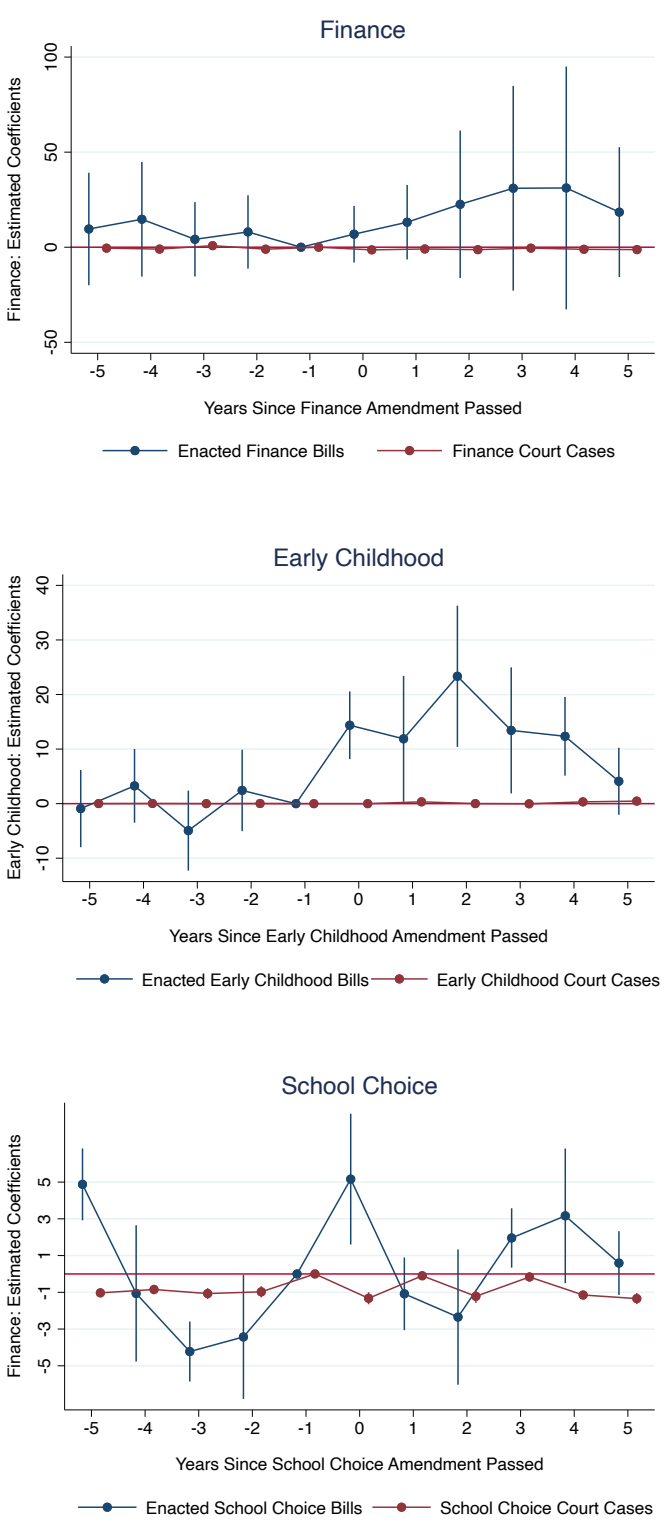


Table 8: Supreme Court Cases Regarding Public School Funding Systems, 1970-2018

State	Total Cases (1)	Challenges Adequacy (2)	Challenges Equity (3)
Alabama	4	3	3
Alaska	2	1	1
Arizona	8	3	6
Arkansas	10	7	0
California	3	0	1
Colorado	3	2	2
Connecticut	5	3	1
Delaware	1	0	0
Florida	4	1	3
Georgia	2	1	1
Hawaii	0	0	0
Idaho	5	4	3
Illinois	3	2	2
Indiana	1	1	1
Iowa	2	0	1
Kansas	12	10	5
Kentucky	2	1	2
Louisiana	1	0	1
Maine	1	1	0
Maryland	2	1	1
Massachusetts	2	2	0
Michigan	4	0	3
Minnesota	2	1	1
Mississippi	0	0	0
Missouri	1	1	1
Montana	2	0	1
Nebraska	2	2	0
Nevada	0	0	0
New Hampshire	7	7	0
New Jersey	13	7	3
New Mexico	2	1	0
New York	16	6	7
North Carolina	4	2	2
North Dakota	1	1	1
Ohio	6	5	1
Oklahoma	2	1	1
Oregon	6	3	3
Pennsylvania	2	1	1
Rhode Island	1	1	1
South Carolina	3	1	1
South Dakota	1	1	1
Tennessee	3	3	3
Texas	7	2	4
Utah	0	0	0
Vermont	2	1	2
Virginia	2	0	2
Washington	3	0	1
West Virginia	3	0	1
Wisconsin	2	2	2
Wyoming	6	4	2
Total	176	96	79

Table 9: Constitutional Standard and Number of Supreme Court Cases

Constitutional Standard	Total Cases	Total Equity Cases	Total Adequacy Cases
	(1)	(2)	(3)
Duty of State	1.97	-0.99**	1.00
	(2.50)	(0.44)	(2.21)
Equal Access	-2.76	0.41	-1.61
	(2.72)	(0.60)	(2.30)
Quality Standards	-0.39	-0.52	-0.07
	(0.81)	(0.35)	(0.68)
Observations	50	50	50
Adjusted R^2	0.000	0.053	-0.107
Mean Dependent Variable	3.52	1.58	1.92
State Characteristics	YES	YES	YES

* p<0.10, ** p<0.05, *** p<0.01. Robust standard errors in parentheses. All specifications include demographics variables: total population; share of whites, blacks, hispanics; proportion of working age population in labor force; and per capita income. The time period covered is 1970-2018.

Table 10: Constitutional Standards and Court Case Rulings

Dependent variable: Probability that court orders equalization of funding			
	(1)	(2)	(3)
Duty of State	0.25***	0.24***	0.24***
	(0.09)	(0.09)	(0.09)
Equal Access	-0.17	-0.19	-0.19
	(0.13)	(0.13)	(0.13)
Quality Standards	-0.02	-0.01	-0.01
	(0.08)	(0.08)	(0.08)
Total Cases		0.01	0.01
		(0.01)	(0.01)
Whether Challenged Adequacy			-0.02
			(0.07)
Observations	176	176	176
Mean Dependent Variable	0.25	0.25	0.25

* p<0.10, ** p<0.05, *** p<0.01. Robust standard errors in parentheses, clustered at state level. The time period covered is 1970-2018.

Table 11: Four-tier Classification of Constitutional Standards and Court Case Rulings

Dependent variable: Probability that court orders equalization of funding			
	1	2	3
Education Clause Strength (2)	0.08	0.11	0.11
	(0.08)	(0.07)	(0.07)
Education Clause Strength (3)	0.00	0.07	0.07
	(0.10)	(0.10)	(0.10)
Education Clause Strength (4)	0.19	0.28	0.27
	(0.21)	(0.22)	(0.22)
Total Cases		0.01**	0.01**
		(0.01)	(0.01)
Whether Challenged Adequacy			-0.02
			(0.07)
Observations	176	176	176
Mean Dependent Variable	0.25	0.25	0.25

* p<0.10, ** p<0.05, *** p<0.01. Robust standard errors in parentheses, clustered at state level.

The time period covered is 1970-2018. Education Clause Strength (1) is the omitted category.

Appendix I

This appendix describes the methodology used to construct the dataset on legislative bills and court cases. We first describe the training data used to inform the machine learning models. We then describe the details of text processing models used.

Training data. Two states that have had a large number of litigations related to education policy are California and Florida. As a baseline, the entire set of court cases from these two states were manually coded; in addition, a well-known set of state education finance supreme court cases compiled from Card and Payne (2002) and others were included to ensure that the training data text represented a wide range of education-related cases. To minimize any state or financial litigation-related distributional bias of the training data, this set of observations was supplemented with an additional set of randomly selected cases. In total, around 7,000 cases were used in the training data sample for education-relevant cases. A subset of 1,400 cases was also classified into topics using a general set of education-related issues. Similar procedures were adopted for legislative bills. Instead of California and Florida, a subset of around 3,600 New York bills was manually checked for relevancy. Out of these, around 1,900 bills were deemed relevant and further classified into education-related topics.

In the next step, we use this subsample to train statistical models that take in the document texts as input and predict the relevance for the remaining observations. We also classify each court case and legislative bill into topics or issues it is related to, such as school choice, teacher tenure etc. We base our analysis on the text of the original majority opinion for the court cases and bill summary and the bill text for the legislative bills. In both exercises, the raw text must be pre-processed to be fed as an input for the predictive model.

Text processing. The initial step includes removing words related to common legal terminology, common names, parenthetical or boldface text, punctuation, numbers, and English stop words. We also convert all words to lower case to abstract from linguistic capitalization rules. Then, each court case and legislative bill document is tokenized; i.e., divided into a list of words. From among these words we keep only adjectives, adverbs, nouns, and verbs, as we expect them to have the strongest impact on the document relevancy and topics. To control for the variation in words resulting from the grammatical structure of the text, we applied a lemmatization procedure to these lists of words.[21]

The legal documents naturally tend to contain word collocations. Collocation is a sequence of words that together have a different meaning than they would have if treated separately. In order to control for this subtlety, we first identify potential collocations on the whole corpus of documents by analyzing frequencies of all sequences of two consecutive words – bi-grams.[22] The most frequently occurring bi-grams have been labeled as collocations. Next, we tag words in the documents as either a part of a collocation or a single word, creating a list of one- and two-word expressions for each document. Finally, we denote the set of unique expressions among all these lists as a dictionary.

[21]Lemmatization is a process of removing inflectional endings taking into consideration the morphological analysis of the words. For some parts of the analysis, we replace lemmatization with stemming, which is a similar procedure but abstracts from word morphology.

[22]We have also investigated tri-gram collocations, but including them seemed to introduce more noise than information.

The dictionary and document-specific lists of expressions constitute the basis of our prediction exercise. We follow the *bag-of-expressions* framework. If M is the size of the dictionary, we create a set of M predictors referring to the expression $m \in \{1, \ldots, M\}$. Specifically, we apply the *term frequency–inverse document frequency* (**td-idf**) approach, which weighs in the frequency of m in a document and inverse frequency of m in the whole corpus. This is to add more weight to expressions that are frequent in each document but rare in the corpus, which would suggest high predictive power. In turn, the expressions that are frequent in a document and in the whole corpus are assigned low weights, as they do not differentiate the documents. Such a procedure brings more meaningful selection of the strongest predictors.

Prediction Methodology. Finally, the set of dependent variables includes dummies indicating relevance and topics. For each of them, we fit independently a model using the manually tagged data and predict the outcome using the sample of non-classified documents. This approach is motivated by the observation that one document may refer to multiple education policies at the same time. In the prediction exercise, we tune and fit various statistical classifiers (SVM, penalized logistic regression) and choose the best-performing model based on the cross-validation exercise. The outcome of this exercise provided an indicator variable determining relevance of the bill/case and a probability distribution over types of education topics. For each bill, we obtain a probability distribution over 77 categories; for each court case, we obtain a probability distribution over 31 categories. In our analysis, we assign each bill/case the topic category that has the highest predicted probability.