The Differential Effect of the No Child Left Behind Act (NCLB) on States' Contributions to Education Funding in States with Binding School District Tax and Expenditure Limitations

Michael S. Hayes

Assistant Professor
Department of Public Policy and Administration
Rutgers University-Camden
401 Cooper Street Room 208
Camden, NJ 08102
732-858-4533
michael.hayes012@gmail.com

Abstract

I examine the effects of state-imposed binding school district tax and expenditure limitations (TELs) on states' shares of total education funding after the passage of the No Child Left Behind Act (NCLB). Binding TELs restrict school districts' abilities to raise additional revenue and increase expenditures. Using a state-level panel dataset from 1992 to 2009, I find states that imposed binding school district TELs have at least 4.3 percentage point higher state shares of total education funding relative to states without binding school district TELs after the passage of NCLB. This suggests state governments intervened by increasing funding assistance to school districts. NCLB was a fiscal shock to state governments' finances and this shock was an unintended consequence of the interaction between binding school district TELs and an underfunded federal mandate. As a result, there was an expansion in the role and influence of states in the provision of public education after the passage of NCLB.

INTRODUCTION

In the last two decades, federal and state governments have increased their influence on U.S. school districts' fiscal decisions. State governments indirectly influence school districts by imposing binding tax and expenditure limitations (TELs), which constrain school districts' abilities to increase revenues and expenditures. Empirical evidence suggests that binding TELs decrease the share of revenue that local governments contribute to government spending.[1]

Meanwhile, the federal government has recently taken a larger role in shaping the provision of education, most notably with the passage of the No Child Left Behind Act of 2001 (NCLB). NCLB imposed costly mandates on school districts and state governments, which included increasing the number of "highly qualified teachers"[2] and the creation of new student assessments.[3] State governments and school districts faced significant penalties for non-compliance, including the loss of Title I funding and possible principal and staff replacements.[4] However, the federal government did not provide adequate funding for these mandates, which shifted the financial burden of complying with NCLB mandates to state governments and school districts.[5] Dee, Jacob, and Schwartz find NCLB increased per-pupil education expenditures by

---

[1] Daniel R. Mullins and Philip G. Joyce, "Tax and Expenditure Limitations and State and Local Fiscal Structure: An Empirical Assessment," *Public Budgeting and Finance* 16, no. 1 (1996); Ronald J. Shadbegian, "Did the Property Tax Revolt Affect Local Public Education? Evidence from Panel Data," *Public Finance Review* 31, no. 1 (2003); William F. Blankenau and Mark Skidmore, "School Finance Litigation, Tax and Expenditure Limitations, and Education Spending " *Contemporary Economic Policy* 22, no. 1 (2004).

[2] Under NCLB, a highly qualified teacher is fully certified, holds a bachelor's degree, and shows competence in subject knowledge and teaching skills. All Title I classrooms must have a highly qualified teacher by the 2002-2003 school year.

[3] Margaret E. Goertz, "Implementing the No Child Left Behind Act: Challenges for the States," *Peabody Journal of Education* 80, no. 2 (2005); Patrick J. McGuinn, "The National Schoolmarn: No Child Left Behind and the New Educational Federalism," *Publius* 35, no. 1 (2005). Thomas S. Dee, Brian Jacob, and Nathaniel L. Schwartz, "The Effects of NCLB on School Resources and Practices," *Educational Evaluation and Policy Analysis* 35, no.2 (2013).

[4] Under NCLB, Title I schools who fail to meet adequate yearly progress (AYP) for two straight years must enter into Program Improvement, which is a five year process of steadily increasing consequences that ends with school restructuring (e.g. staff replacement and state takeover).

[5] Dee, Jacob, and Schwartz (2013)

$548, primarily from state and local resources.[6] The financial burden of NCLB was significant, as the Government Accountability Office estimated that the development of new student assessments alone would cost upwards of $7 billion.[7]

I use a difference-in-differences approach to examine the differences in states' shares of total education funding between states that had binding school district TELs and states that did not, both before and after the passage of NCLB. The main results suggest that states with binding school district TELs experienced at least a 4.3 percentage-point greater increase in their shares of total education funding than states without binding school district TELs after the passage of NCLB. This result suggests that states with binding school district TELs contributed a significantly higher amount of funding towards NCLB requirements.

The current paper contributes to the literature on TELs and intergovernmental fiscal relations by providing evidence that binding school district TELs restricted school districts' abilities to increase their funding after the passage of NCLB. As a result, state governments increased their education funding assistance to school districts in efforts to comply with NCLB mandates. In addition, this research demonstrates the potential unintended consequences of the interaction between underfunded federal mandates and state-imposed constraints on local governments' fiscal autonomy.

This paper is organized into six sections. Section 2 reviews the relevant literature. Section 3 describes the dataset used in this paper and provides the theoretical framework. Sections 4 and 5 present the empirical methodology of the study and the main results, respectively. Section 6 concludes with a discussion of the results and suggestions for future research.

---

[6] Dee, Jacob, and Schwartz (2013).
[7] "Title I: Characteristics of Tests Will Influence Expenses; Information Sharing May Help State Realize Efficiencies ", ed. U.S. General Accountability Office (Washington, DC: Author, 2003).

PREVIOUS STUDIES

This study sits at the intersection of three literatures: the financial burden of NCLB, intergovernmental tax competition, and tax and expenditure limitations (TELs). First, recent studies have suggested that state and local governments bore a nontrivial portion of NCLB's financial burden.[8] Second, the literature on intergovernmental tax competition suggests a jurisdiction will change its own tax rate in response to a change in the tax rate of a nearby jurisdiction; these changes will affect the total amount of revenue collected by both governments. Third, the TEL literature suggests that TELs restrict school districts' abilities to generate revenue. The relevant studies from each literature are reviewed below.

The financial implications of NCLB

The passage of NCLB forced state governments and school districts to make two major investments. First, state governments and school districts were required to design and implement annual assessments of students' math and reading achievement by the 2005-06 school year.[9] Second, schools had to hire an increased number of "highly qualified teachers". See Goertz[10], and McGuinn[11] for a review of the key features and implementation costs of NCLB.

Designing and implementing the student assessments alone was expensive for states and school districts, as they received little funding from the federal government. Prior to the enactment of NCLB, 25 states had developed consequential accountability policies, which required annual reports of student assessments for each school and enforced consequences for

---

[8] Dee, Jacob, and Schwartz (2013).
[9] All grades between 3rd and 8th must assess student math and reading skills every year starting in the 2005-2006 school year, including English Language Learner (ELL) students and students with special needs.
[10] Goertz (2005)
[11] McGuinn (2005)

low-performing schools.[12] The Government Accountability Office estimated the remaining states would have to design and implement up to 11 new student tests at an estimated total cost of $7 billion.[13] However, the federal government authorized only $2.34 billion to fund states in designing and implementing these new student assessments.[14]

Dee, Jacob, and Schwartz provide the strongest evidence that NCLB was an underfunded federal mandate.[15] The authors find NCLB increased federal education revenues by $100 per-pupil, while state and local education revenues increased by $448 per-pupil. This finding is consistent with a 2003 survey that found that almost 90 percent of superintendents and principals characterized NCLB as an underfunded mandate.[16]

Both state governments and school districts were incentivized to increase education expenditures, as they faced consequences for failing to comply with NCLB's requirements. For example, state governments risked losing federal Title-I funding if classrooms were not staffed by highly qualified teachers.[17] Similarly, school districts that failed to make adequate yearly progress (AYP)[18] had to develop costly improvement plans, which required schools to provide

---

[12] Eric A. Hanushek and Margaret E. Raymond, "Does School Accountability Lead to Improved Student Performance," *Journal of Policy Analysis and Management* 24(2005).
[13] "Title I: Characteristics of Tests Will Influence Expenses; Information Sharing May Help State Realize Efficiencies ".
[14] U.S. General Accountability Office, "Title I: Characteristics of tests will influence expenses; information sharing may help state realize efficiencies". GAO-03-389. Washington, DC: Author (2003).
[15] Dee, Jacob, and Schwartz (2013)
[16] Lynn Olson, "In ESEA wake, school data flowing forth," *Education Week*, December 10, 2003. Retrieved from http://www.edweek.org/ew/articles/2003/12/10/15nclb.h23.html
[17] Title-I Funding is a federal formula grant to state governments and Local Educational Agencies (LEAs). A proportion of all Title I Funding goes to the state government in the form of the Education Finance Incentive Grant (EFIG). The funding level is influenced by state's effort to provide financial support for education and the degree that education expenditures are equalized across (LEAs) in the state. See http://www2.ed.gov/policy/elsec/leg/esea02/pg1.html for more information about Title I funding in the NCLB legislation. The Department of Education defines a highly qualified teacher as a teacher with a bachelor's degree, state license or certification, and proof of knowledge to teach the subject they teach. See http://www2.ed.gov/nclb/methods/teachers/hqtflexibility.html
[18] Under the NCLB, AYP is a state defined measurement of how well schools are educating their students. States set their own standards, but the standards must meet minimum federal standards, which include that the state student assessments were factored into the rating. See Education Week (2011) for more information about AYP.

tutoring services for students and career development opportunities for teachers.[19] States and school districts shared these costs. School districts that consistently failed to meet AYP were at risk of the state restructuring the school, including the replacement of school administrators and other staff members.

To meet NCLB standards, school systems increased teacher compensation and hired more teachers with graduate degrees. Dee, Jacob, and Schwartz found a $5,000 increase in teachers' average annual compensation and a 14% increase in the number of teachers holding a master's degree after the passage of NCLB.[20] The largest increases occurred in states without pre-existing school accountability policy.

Higher levels of education expenditures have been associated with both the passage of NCLB and state enacted school accountability policies adopted prior to NCLB. States that adopted accountability policies prior to NCLB spent more on education than states without accountability policies.[21] More recently, Dee, Jacob, and Schwartz found that the passage of NCLB increased total education expenditures by $548 per pupil.[22] The federal government only funded a small portion of this increase. The current study contributes to the NCLB literature by extending the analysis of Dee, Jacob, and Schwartz to consider whether state governments intervened to assist school districts, particularly those constrained by binding school district TELs, in meeting the fiscal burden caused by the passage of NCLB.

Intergovernmental Tax Competition

---

[19] Goertz (2005)
[20] Dee, Jacob, and Schwartz (2013)
[21] Jane Hannaway, Shannon McKay, and Yasser Nakib, "Reform and Resource Allocation: National Trends and State Policies," *Developments in School Finance 1999-2000: Fiscal Proceedings from Annual State Data Conference July 1999 and July 2000* (2002); Jane Hannaway and Maggie Stanislawski, "Responding to Reform: Florida School Expenditures in the 1990s," (CALDER Researchers, 2005).
[22] Dee, Jacob, and Schwartz (2013)

The financial burden of NCLB may have affected both state and local fiscal decision-making by increasing competition over tax revenue. The current paper investigates horizontal tax competition, which occurs across independent governments.[23] Competition over property tax revenue between counties, cities, and school districts is an example of horizontal tax competition, as no one local government has authority over another.[24]

Two recent studies have investigated the magnitude of horizontal tax competition between local governments. Using Florida property-tax data, Wu and Hendrick found that a ten percentage point increase in a school district's property tax rate resulted in a 1.7 to 4.6 percentage point increase in municipal governments' property tax rates.[25] This evidence suggests that competing local governments change their tax rates in response to other governments' tax rate changes. Johnston et al. found that Kansas' county and municipality governments increased their own property tax rates in response to school districts lowering their property tax rates after Kansas adopted a school funding equalization policy in the mid-1990s.[26] The passage of this equalization policy allowed school districts to lower their property tax rates, and these decreases allowed county and municipalities to collect more property tax revenue.

These two studies suggest that intergovernmental tax competition creates spillover effects. Johnston et al. revealed a positive spillover effect because the decrease in school districts' property tax rates benefited county governments and municipalities. The present paper contributes to this literature by examining a possible negative spillover effect created by the

---

[23] John D. Wilson, "Theories of Tax Competition," *National Tax Journal* 52, no. 2 (1999).
[24] In some cases, non-independent school districts create a hybrid of both horizontal and vertical competition because they depend on the county or municipalities for revenue (e.g., Maryland school districts are dependent on county governments).
[25] Yonghong Wu and Rebecca Hendrick, "Horizontal and Vertical Competition in Florida Local Governments," *Public Finance Review* 37, no. 3 (2009).
[26] Jocelyn M. Johnston et al., "The Impact of Local School Property Tax Reductions on City and County Revenue Decisions: A Natural Experiment in Kansas," *Public Finance and Management* 11, no. 2 (2011).

interaction of tax competition and the passage of NCLB. State governments and school districts had to increase tax revenue to meet the mandates of NCLB. Counties and municipalities likely increased their own tax rates in response to higher state tax rates. As a result, higher county and municipality tax rates would have negatively impacted states' tax revenue collections.

Tax and Expenditure Limitations

A tax and expenditure limitation (TEL) is a law that restricts governments' abilities to increase the amount of revenue generated and/or funds spent in their jurisdictions. TELs are imposed on various types of governments: state governments, municipalities and county governments, and school districts. Joyce and Mullins distinguished between the various types of TELs.[27] Some TELs limit a government's ability to change the property tax rate. In addition, there are general revenue or expenditure limitations that restrict a government from increasing general revenues or expenditures above a certain amount.[28] Another type of TEL restricts government officials from increasing the assessment values of properties.

The distinction between non-binding and binding TELs is important, as a non-binding TEL is less likely to restrict a government's ability to increase revenue or expenditures. Examples of non-binding TELs include limits on property tax rates and limits on increases in the assessment values of properties. For example, a government constrained by a limit on its property tax rate can still increase revenues by increasing the assessment value of properties in its jurisdiction. These TELs can be binding only if there is both a property tax limit and limits on increasing the assessment value of properties. Limits on general revenue or expenditures are both

---

[27] Philip G. Joyce and Daniel R. Mullins, "The Changing Fiscal Structure of the State and Local Public Sector: The Impact of Tax and Expenditure Limitations," *Public Administration Review* 51, no. 3 (1991).

[28] In most cases, an expenditure or revenue ceiling is set, or the growth of revenues or expenditures are indexed by the level of population, inflation, or personal income.

examples of binding TELs, as they explicitly restrict the amount of revenue collected or money spent by a government.

The current paper's definition of a binding TEL is consistent with the definition provided by Joyce and Mullins. A TEL must meet one of two criteria to be considered a binding TEL. First, a binding TEL can be a limit on general revenue or a limit on general expenditures. Second, a binding TEL can be the combination of a limit on the property tax rate and a limit on increasing the assessment value of properties.

Voters support the enactment of TELs with the goal to decrease government waste and inefficiencies (Mullins and Wallin 2004). Voters perceive the enactment of a TEL as a "win-win" situation since they expect to receive lower tax burdens, while also keeping the same level of government services (Mullins and Wallin 2004). Numerous studies examine reasons for voter support of TELs in particular states.[29] Using panel data, Alm and Skidmore find that income growth is a major determinate of voter support for TELs.[30] Specifically, they find that a ten percentage point increase in state income corresponds to a ten percentage point increase in the probability of TEL passage.[31] This finding explains the differences in timing of TEL adoptions across states. For example, California experienced substantial economic growth prior to passing Proposition 13 in 1978.[32]

---

[29] Helen Ladd and Julie B. Wilson, "Who supports tax limitations: Evidence from Massachusetts's Proposition 2 ½," *Journal of Policy Analysis and Management* 2, no.2 (1983); Paul N. Courant, Edward Gramlich, and Daniel L. Rubinfeld, "Why Voters Support Tax Limitation Amendments: The Michigan Case, *"National Tax Journal* 33, no.1 (1980). Robert M. Stein, Keith E. Hamm, and Patricia K. Freeman, "An analysis of support for tax limitation referenda," *Public Choice* 40, no.1 (1983).

[30] James Alm and Mark Skidmore, "Why do Tax and Expenditure Limitations Pass in State Elections?," *Public Finance Review* 27, no.5 (1999).

[31] Ibid, p. 501

[32] Ibid, p. 501.

Three studies have examined the relationship between state-imposed TELs on local governments and states' shares of total education expenditures.[33] Mullins and Joyce was the first study to use panel data and controlled for state fixed effects when examining the relationship between binding local TELs and states' education funding. They found that states' education funding was higher in states with binding local TELs. Similarly, using panel data from 1966 to 1992, Shadbegian found that binding local TELs were associated with a decrease in local governments' shares of education expenditures, while state governments increased their shares of total education funding. Lastly, Blankenau and Skidmore examined the interaction of education finance reform and local TELs on states' shares of education funding. They found the effect of education finance reform on state education funding depended on whether the state had a binding local TEL.

The present study contributes to the literature on TELs in two ways. First, it provides a more precise measure of the effect of binding school district TELs by estimating the effect of a school district TEL while controlling for all other TELs imposed on other governments in the state. The econometric model in this paper controls for TELs on state governments, county governments, municipality government and schools, while previous studies only controlled for a state and local government TEL. The tax competition literature suggests it is important to control for county and municipality TELs to factor in the strategic tax competition occurring among the various governments before and after the passage of NCLB.

Second, the present study uses an updated panel dataset, which includes observations on states from 1992 to 2009. This time period contains three major events in education finance: the enactment of school accountability policies prior to the passage of NCLB, court-ordered

---

[33] For example, see Mullins and Joyce (1996); Shadbegian (2003); Blankenau and Skidmore (2004).

education finance reforms, and the passage of NCLB.[34] By observing the years after the passage of NCLB, this paper provides the first examination of the interaction between an underfunded federal mandate and state and local TELs on state governments' shares of education funding.

DATA AND THEORY

I use panel data on 49 states for the 19 years between the 1991-92 and 2008-09 school years to test the effects of binding school district TELs on states' shares of total K-12 education funding after NCLB. Hawaii's Department of Education is the sole school district in the state, so it is not included in the sample.[35] The pre-NCLB era includes 11 years of observations between the 1991-92 and 2001-02 school years. The NCLB era includes eight years of observations between the 2002-03 and 2008-09 school years. The remainder of this section describes the dependent, independent, and control variables.

Dependent Variable

The Public Education Finances Report, which is publicly available through the U.S. Census Bureau, publishes the amount of funding that federal, state, and local governments contribute towards education in each state.[36] The dependent variable, *STATESHARE*, is a continuous measure of states' shares of total education funding. This variable was constructed by dividing the amount that the state government contributed towards education expenditures within a state by the combined amount that federal, state, and local governments contributed towards education expenditures within a state.

Independent Variables

---

[34] Blankenau and Skidmore (2004) control for education finance reform, but their dataset does not include the years after 1993 when many states' courts ordered for education finance reform.

[35] However, the results are robust to including data on Hawaii.

[36] The first publication year of this report was 1992. See website: http://www.census.gov/govs/school/

There is an expected positive relationship between the presence of binding school district TELs and states' shares of total education funding. Binding school district TELs restrict school districts from easily increasing revenue or increasing expenditures. Holding all things constant, a state government's share of education funding will be higher in states that imposed binding TELs on their school districts relative to states that did not.

The Mullins and Wallin collection of state-imposed TELs for all states identifies each type of TEL and the year each was enacted.[37] This list also indicates if the state imposes a binding TEL on the state government, county governments, municipality governments, or school districts. Using this list, I construct *SD_TEL,* which is a dummy variable that equals one if the state imposed a binding school district TEL in a particular year, and zero otherwise. As a robustness check, I also present results using an alternative coding of TELs used in Mullins et al.[38]

There is likely a positive relationship between the passage of NCLB and states' shares of total education funding, as state governments and school districts have to meet stronger school accountability standards after NCLB.[39] These higher standards require additional investments for various items including, but not limited to, increased student testing, increased number of highly qualified teachers, supplemental services (e.g., outside student tutoring), and school improvement plans.

---

[37] See Tables 1 and 4 in Daniel R. Mullins and Bruce A. Wallin, "Tax and Expenditure Limitations: Introduction and Overview," *Public Budgeting and Finance* 24, no. 4 (2004). These tables have been updated over time, see Daniel R. Mullins, "Fiscal limitations on local choice: the imposition and effects of local government tax and expenditure limitations." In *State and Local Fiscal Policy: Thinking Outside of the Box*? , edited by Sally Wallace. Cheltenham, Northampton, MA: Edward Elgar, 2009.

[38] See Daniel R. Mullins., Michael Hayes and Chad Smith, "The Role of Local Revenue and Expenditure Limitations in Shaping the Composition of Debt and its Implications for Efficiency, and Intergenerational and Intergovernmental Equity in Local Public Finance", Proceedings of the 105th Annual Conference on Taxation, (Washington, D.C.: National Tax Association, 2012). Please contact authors for alternative coding of TEL states.

[39] Goertz (2005)

Both school districts and state governments have several incentives to meet these higher standards. First, state governments could lose Title I funding if they do not comply with NCLB's mandates.[40] Previous studies suggest high compliance rates, as state governments, on average, implemented 36.1 of 38 parts of the NCLB law.[41] Second, school district officials comply due to the threat of losing their administrative positions during state takeovers. State takeovers are rare, but have occurred. For example, four and 26 schools have been taken over by the state government in Maryland and Louisiana, respectively.[42] School takeovers and school choice are very expensive for both school districts and state governments.[43] For example, a state takeover may require higher administrative costs to recruit and hire new school district administrators. The passage of NCLB is captured by $NCLB$, which is a dummy variable that equals one if the time period is during the implementation of the NCLB, and zero otherwise. An interaction variable, $SD\_TEL \times NCLB$, measures the differential effect of the passage of NCLB on states' shares of total education funding for states that imposes binding school district TELs relative to those states that do not.

Control Variables

State governments are able to impose binding TELs on county, municipality, and state governments in addition to school districts. Often the decision to enact a binding school district TEL is correlated with the decision to enact a binding TEL on another type of government in the

---

[40] I find no cases where the federal government penalized state government for non-compliance.
[41] Center on Education Policy, "State Implementation of supplemental education services under the No Child Left Behind Act. In *From the capital to the classroom: Year 5 of the No Child Left Behind Act*," (2007) Washington, DC: Center on Education Policy; Education Commission of the States, "NCLB Database". (2006). Retrieved from http://nclb2.ecs.org/nclbsurvey/nclb.aspx?Target=SS.
[42] Lucy M. Steiner, "School Restructuring Options Under No Child Left Behind: What Works When? State Takeovers of Individual Schools." Retrieved from http://www.centerforcsri.org/pubs/restructuring/KnowledgeIssues1StateTakeovers.pdf
[43] School choice gave parents the right to relocate their child to another school district if the current school was failing to meet its AYP.

state. Therefore, the empirical model includes three separate dummy variables that indicate whether the state imposed a binding TEL on the state government, municipal governments, and county governments.

There are two reasons to expect a negative relationship between the presence of a TEL on the state government and states' shares of total education funding. First, TELs on state governments likely restrict state governments' ability to raise revenue, which decreases their ability to provide additional funding to their school districts. Second, the passage of NCLB likely places further pressure on state governments' finances, especially states with binding school district TELs. I control for this relationship with $STATE\_TEL$, which is a dummy variable that equals one if the state imposes a TEL on the state government, and zero otherwise. In addition, the empirical model includes an interaction variable, $STATE\_TEL \times NCLB$.

Similarly, binding municipality TELs or binding county TELs likely have negative effects on states' shares of total education funding. This relationship is based on the concept of horizontal tax competition. Counties, municipalities, and school districts compete over property tax revenue and other forms of revenue, including state governments' funding aid. The passage of NCLB likely intensifies this tax competition, which might decrease states' shares of total education funding in two ways. First, research shows that state governments increase state aid to local governments that are fiscally constrained by a state imposed TEL.[44] In a zero-sum game, the additional state funding aid to municipalities or counties comes at the expense of additional state funding aid that might otherwise go to school districts.

Second, state governments' revenue collection decreases as a result of tax competition over sales tax revenue between counties, municipalities, and state governments. Binding TELs

[44] Mullins and Joyce (1996)

prevent counties and municipalities from increasing property tax rates, which incentivizes them to raise additional revenue via alternative revenue sources. In this situation, there is a reduction in sales tax revenue collected by state governments and, subsequently, the amount in state funding aid for education. This tax competition likely increases when state governments need to suddenly raise additional revenue, especially in a situation similar to the passage of NCLB.

To proxy for horizontal tax competition, the empirical model includes four control variables.[45] First, *M_TEL* is a dummy variable that equals one if the state imposes a binding TEL on municipality governments, and zero otherwise. Second, *CO_TEL* is a dummy variable that equals one if the state imposes a binding TEL on county governments, and zero otherwise.[46] Third, *M_TEL × NCLB* is an interaction variable that equals one if the state imposed a binding TEL on the municipality in the NCLB era, and zero otherwise. Lastly, *CO_TEL × NCLB* is an interaction variable that equals one if the state imposed a binding TEL on the county in the NCLB era, and zero otherwise.

States might be affected by TELs in adjacent states, even states that do not have TELs. For example, inter-state tax competition will likely occur if neighboring states have different property tax rates, as a result of binding school district TELs. School districts that are adversely affected by inter-state tax competition will require additional state aid assistance. To control for such inter-state spillover effects, the empirical model includes *BORDER*, which is the number of adjacent states that have a binding school district TEL.

---

[45] There is mixed evidence that states that tend to adopt one type of TEL are more likely to adopt other types of TELs. For example, there is a 0.55 correlation between the binding TEL on school district indicator and the binding TEL on municipality indicator. However, there is only a 0.07 correlation between the binding TEL on school district indicator and the TEL on state government indicator.

[46] See Tables 1 and 4 in Mullins and Wallin (2004) for a complete list of binding TELs on municipality and county governments.

The political party of the state governor, court-ordered education finance reform, and the enactment of school consequential accountability policies are also relevant state policy and political changes that occurred between the 1991-92 and 2008-09 school years.[47] The United States Census Statistical Abstracts contain data on the political party of governor for each state by year.[48] The empirical model includes a variable of the political party of state governor, R_GOV, which is a dummy variable that equals one if there is a republican state governor, and zero otherwise.

In addition to political party of the governor, states differ in their education policies. Various states enact state-level education reforms. Previous research shows that education reform policies have positive effects on state government education funding.[49] There are two types of reform policies: those that have been ordered by the state supreme court and those that are implemented via state legislative action. Data on court-ordered education finance reform comes from the National Education Access Network (NEAN).[50] The NEAN provides summaries of each state's court history, including whether or not the state courts ruled that the state government's role in funding education was unconstitutional. Using this list of states' court case summaries, I created EDU_REFORM, which is a dummy variable that equals one if the state's court ruled the state government's role in education funding was unconstitutional, and zero otherwise. Data on legislative education finance reform comes from the Downes and Shah collection.[51] I updated the Downes and Shah collection with a report, Public School Finance

---

[47] See Appendix A for a complete list of relevant state policies for this paper
[48] http://www.census.gov/prod/2/gen/96statab/election.pdf
[49] See, Blankenau and Skidmore (2004)
[50] http://www.schoolfunding.info/litigation/litigation.php3
[51] Thomas A. Downes and Mona P. Shah, "The Effect of School Finance Reforms on the Level and Growth of Per-Pupil Expenditures," *Peabody Journal of Education* 81, no. 3 (2006). See, table 1 on p. 16.

Programs of the United States, undertaken by the National Center for Education Statistics.[52]

Using both of these sources, I created *LEG_REFORM*, which is a dummy variable that equals one if the state legislature enacted an education finance reform policy, and zero otherwise.

Another set of state-level education policies are school accountability policies enacted prior to the passage of NCLB. The financial shock to states from the passage of NCLB likely varied across states that had enacted accountability policies prior to the passage of NCLB, depending on the strength of such pre-existing accountability policies. For example, states with strong accountability policies were more likely to develop and invest in creating student exams prior to the passage of NCLB.

Carnoy and Loeb categorize states with prior school accountability policies by accountability strength.[53] Using this collection, the model includes four prior school accountability variables. First, the model includes *STRONG_ACCOUNT*, which is a dummy variable that equals one if the state previously had a strong school accountability policy, and zero otherwise. Three more dummy variables are created for moderate, weak, and no prior school accountability policies.[54]

States' shares of education funding are likely affected by financial changes at the federal level. The federal government's contribution to education funding affects subnational governments' contributions to education funding.[55] The empirical model controls for *FEDSHARE*, which is a continuous measure of the federal share of total education funding in a state. This variable is the share of total education funding provided by the federal government.

---

[52] See, http://nces.ed.gov/edfin/state_financing.asp

[53] See Appendix A in Martin Carnoy and Susanna Loeb, "Does External Accountability Affect Student Outcomes? A Cross-State Analysis, *Educational Evaluation and Policy Analysis* 24, no.4 (2002).

[54] The no prior school accountability indicator serves as the omitted group in the empirical model.

[55] Bradford, D. F., & Oates, W. E. (1971). Towards a Predictive Theory of Intergovernmental Grants. American Economic Review, 61(2), 440-448.

Similarly, states' shares of education funding are likely to depend on local governments' abilities to shift revenue collection from property tax revenues to non-property tax revenues, especially if TELs are imposed on property tax rates.[56] I take data from the National Public Education Financial Survey (NPEFS) to construct *N_PROP_REV*, which is the ratio of non-property tax revenue for education purposes collected by all local governments in the state to the total tax revenue collected by all local governments for education purposes.[57]

At the same, the amount that state governments contribute to education depends on the demand for education services.[58] One demand variable is the number of public school students. I take data on average daily student attendance from the NPEFS. The average daily student attendance, *ADA*, is calculated by adding the total amount of students attending school for the entire year and dividing it by the total number of school days in the year. A second demand variable is economic growth. To control for economic growth, the empirical model includes state real personal income per capita, *INCOME*, and the annual average state unemployment rate, *UNEMPLOY*.[59] A third set of demand variables are socioeconomic characteristics. I take data from various sources to control for the proportion of states' populations that are 65 years or older, *ELDERLY*, and the proportion of individuals who are white, *WHITE*.[60]

---

[56] Mullins and Joyce (1996)

[57] The National Center for Education Statistics (NCES) collects this data for this survey annually. See http://nces.ed.gov/ccd/ccddata.asp

[58] See T. E. Borcherding and R. T. Deacon, "The Demand for Services of Non-Federal Governments," American Economic Review, vol. 62 (1972): 891-901; and T. C. Bergstrom and R. P. Goodman, "Private Demands for Public Goods," American Economic Review, vol. 63 (1973): 280-296.

[59] For state personal income statistics, see the Bureau of Labor Statistics estimates this measurement annually. See the State Annual Personal Income report, http://www.bea.gov/iTable/iTable.cfm?ReqID=70&step=1. For unemployment statistics, see the Bureau of Labor Statistics, See http://www.bls.gov/schedule/archives/all_nr.htm#SRGUNE. State personal per capita was converted to 1982-1984 dollars using the CPI Index from the Bureau of Labor Statistics, ftp://ftp.bls.gov/pub/special.requests/cpi/cpiai.txt.

[60] The data sources for these two variables are the American Community Survey, U.S. Statistical Abstracts, and the Decennial Census. For the years that the Decennial Census or the American Community Survey is not available, I use the U.S. Statistical Abstracts to create Elderly and White. See, https://www.census.gov/compendia/statab/past_years.html

Descriptive Statistics

Table 1 shows descriptive statistics for all variables before and after the passage of NCLB. There are no substantial differences in the proportion of states with binding TELs in the pre-NCLB era relative to the post-NCLB era. For example, the proportion of states with binding school district TELs increases by less than three percentage points in the post-NCLB era. This increase was the result of Wisconsin, Florida, and Oklahoma enacting binding school district TELs in 1994, 1995, and 1996, respectively.[61]

Table 1 shows substantial variation in states' political and education policies before and after the passage of NCLB. In the pre-NCLB era, only 37 percent of states' courts had ruled that the state's role in education finance in the state was unconstitutional. In the post-NCLB era, this proportion increased by 14 percentage points. In addition, 27 percent of states adopted a consequential school accountability policy before the passage of NCLB. Lastly, political power shifted in the favor of the Democratic Party for many states after the passage of NCLB. The percentage of states with a republican governor decreases from 62 percent to 51 percent after the passage of NCLB.

<Table 1>

METHODOLOGY

Main Analysis

I test for the presence of a differential effect of the passage of NCLB on states' shares of total education funding between states that imposed binding school district TELs and states that did not. I estimate the following baseline regression by OLS:

---

[61] See Appendix A for complete list of state policy variables, including TELs.

(1) $STATESHARE_{st} = \beta_0 + \beta_1 \, SD\_TEL_{st} + \beta_2 \, SD\_TEL_{st} \times NCLB_t + \beta_4 \, X_{st} \times NCLB_t$
$$+ \, c_s + \tau_t + e_{st} \, ,$$

where s indexes states, t indexes years, X is a vector of the controls described in the data section,

c is a state fixed effect, τ is a year fixed effect, and e is an error term. Shown in equation (1), all

variables are interacted with the NCLB indicator variable.[62]

The empirical model includes state fixed effects that control for time-invariant

unobserved and observed heterogeneity across states. State fixed effects control for long-term

economic and political preferences of the state. For example, the state fixed effects will control

for some state resistance to the implementation of NCLB. Shelly reported that some states passed

resolutions declaring their formal opposition to NCLB.[63] Additionally, the state fixed effects

control for time-invariant heterogeneity across states in how property tax revenues contribute to

the state general fund for education. The year fixed effects control for national trends in the

economy and political preferences. Standard errors are made robust to state-level clustering,

which makes inference robust to arbitrary forms of both serial correlation within states over time

and heteroskedasticity.

The parameter of interest is the coefficient β_2, which captures the differential effect of the

passage of NCLB in states' shares of total education funding between states that imposed

binding school district TELs and states that did not. Recall from the previous section that the

current study's main hypothesis is that the combination of the passage of NCLB and binding

---

[62] The inclusion of year dummies in the model prevents the model from including the NCLB indicator variable due to perfect collinearity. The results are robust when dropping the year dummies and adding the NCLB indicator. In addition to the theoretical justifications for interacting all variables with the NCLB indicator, a Chow Test was conducted to test the joint significance of all of the interactions in the model and it supported this model specification. The main result, however, is robust to not including the $X_{st} \times NCLB_t$.

[63] Brian Shelly, "Rebels and Their Causes: State Resistance to No Child Left Behind," *The Journal of Federalism* 38, no. 3 (2008).

school district TELs placed a higher financial burden on state governments to comply with NCLB standards. Therefore, β_2 is hypothesized to be positive and statistically significant.

Whether or not β_2 can be given a causal interpretation depends primarily on two assumptions. First, that there is no pre-existing trend in state share specific to states with binding TELs prior to the 2002-03 school year. Second, that no other federal policies were enacted at the same time that only impacted states with binding TELs. I test these two assumptions by conducting the event study analysis described in the next section. Nonetheless, it is worth remembering that regardless of whether this estimate is given a causal interpretation, a contribution of the current study is an accurate description of the differences in states' shares of education between states with binding TELs on school districts and stats without binding TELs on school districts after the passage of NCLB.

Sensitivity Analyses

Two aspects of equation (1) warrant further discussion. I conduct two separate sensitivity analyses. First, the parameter of interest, β_2, may be positive due to a pre-existing trend in states' share of education funding in states with a binding TEL on school districts. To verify that there is no pre-existing trend, I estimate the following regression by OLS:

(2) $STATESHARE_{st} = \beta_0 + \beta_1\ SD\_TEL_{st} + \beta_2\ SD\_TEL_{st} \times \tau_t + \beta_4\ X_{st} \times \tau_t + c_s + \tau_t + e_{st}$,

Comparing equation (2) to equation (1), the NCLB indicator is replaced with a set of year indicators. The year interactions provide an estimate of how the effect of a binding school district TEL on states' shares of education funding varied by year. If the main result is due to the passage of NCLB, there should be a difference in the effect of binding school district TELs on states' shares of education funding in the years prior to the passage of NCLB (1992-93 to 2001-

02 school year) and the years post of the NCLB implementation (2002-03 to 2008-09 school years). This is method is known as an event study analysis in the finance literature.[64]

Second, one limitation of linear estimators is they do not restrict the predicted values of the fractional dependent variable to be between zero and one. As a result, linear estimators may provide poor estimates of the average partial effect.[65] Papke and Wooldridge recommend fractional logit or probit models. To demonstrate that the results are robust across different estimators, equation (1) is estimated with a fractional probit and logit model.

RESULTS

Table 2 reports the estimated coefficients of equation (1) for the different coding of TEL states described in the data and theory. In column 1, the coefficient for the NCLB and School District Binding TEL interaction term indicates that a state that imposed a binding TEL on a school district had a 6.9 percentage point higher share of total education funding compared to a state without a binding school district TEL after the passage of NCLB. In Column 2, the coefficient for this interaction variable is 0.043 when using the alternative coding of TELs from Mullins, Hayes, and Smith.[66] Although the coefficient of 0.043 is within a 95 percent confidence interval of 0.069, 0.043 is only about 60 percent of 0.069. Overall, 0.043 and 0.069 provide a reliable range for the increase in state shares of education funding for states with binding school district TELs relative to states without binding school district TELs after the passage of NCLB.[67]

---

[64] See Fabrizio Ferri, and David A. Maber. "Say on pay votes and CEO compensation: Evidence from the UK." *Review of Finance* 17, no. 2 (2013): 527-563.

[65] Leslie E. Papke and Jeffrey M. Wooldridge, "Econometric Methods for Fractional Response Variables with an Application to 401(K) Plan Participation Rates," *Journal of Applied Econometrics* 11(1996).

[66] Mullins, Hayes, and Smith (2014).

[67] Notice, in Columns 1 and 2, the coefficients on the binding school district TEL indicator are -0.001 and 0.100, respectively. This difference is not surprisingly, given that the coding of TEL states in Column 2 only codes states with "strong" potentially binding TELs, even if the state meets the potentially binding TEL definition provided by Joyce and Mullins (1991).

Many of the estimated coefficients on the controls are not statistically significant. This is not surprising, given the empirical model includes state fixed effects and a large number of controls. There are, however, a few exemptions. The variable that captures the intergovernmental tax competition in the NCLB era has the expected negative sign, which indicates that a binding TEL on the municipality government had a negative effect on states' shares of total education funding after the passage of NCLB. Surprisingly, only in Column 2, the effect of a state-imposed binding TEL state has an expected statistically significant, negative impact on states' shares of total education revenue after the passage of NCLB.

The results of Table 2 are consistent with previous education finance reform studies' findings. Similar to Blankenau and Skidmore, the impact of court-ordered education reform has a positive impact on states' shares of total education funding. States with court-ordered education reform have a 7.7 pecentage point higher state share of education funding relative to other states. Surprisingly, the impact of legislative education finance reform on states' shares of total education funding is not statistically different from zero. These two finding are consistent with Downes and Shaw who found that court-ordered education finance reforms have a relatively larger impact on state education funding, compared to finance reforms enacted via state legislatures.[68]

The point estimate for the number of bordering states with a binding school district TEL is 0.028, which suggests that a one state increase in the number of adjacent states with a binding school district TEL corresponds to a 2.8 percentage point increase in states' shares of total education funding. However, this coefficient is not statistically significant, and only marginally signficant in column 2. This finding suggests there is no clear relationship between state

---

[68] Thomas A. Downes and Mona P. Shah, "The Effect of School Finance Reforms on the Level and Growth of Per-Pupil Expenditures."

governments' decision on education funding and the number of adjacent states with binding TELs on school districts.

<Table 2>

Table 3 reports estimates of equation 2. From the 1992-93 to 2001-02 school years, the coefficients, ranging from negative six percentage points to positive five percentage points, are not statistically different than zero. In the first year of the implementation of NCLB (2002-03 school year), the effect of a binding school district TEL on states' shares of education funding increases by ten percentage points, which coincided with the NCLB mandate that required all Title I classrooms to be taught by highly qualified teachers. This trend continues for the next several school years as more NCLB provisions were implemented, including the requirement that all public schools' core classes be taught by highly qualified teachers and all 3rd through 8th grade students be tested in math and reading annually by the start of the 2005-06 school year.[69]

Overall, this finding provides support for the two assumptions mentioned above, and a causal interpretation of β_2 in equation (1). Specifically, the event study analysis shows that the relative increase in state share in states with binding TELs began precisely in the first year of the implementation of NCLB (2002-03 school year).

<Table 3>

Table 4 reports the estimated coefficients and average partial effects from the fractional probit and logit estimates of equation (1).[70] The estimated average partial effect of 6.9 percentage

---

[69] There are two reasons why the estimated standard errors in this model are conservative. First, the estimates are from the use of a two-tail instead of a one-tail t-test. Second, the degrees of freedom decrease substantially as the event history analysis includes year interaction variables instead of NCLB interaction variables.

[70] The average partial effect for a difference-in-difference interaction variable in a non-linear model is computed consistent with Patrick A. Puhani, "The Treatment Effect, the Cross Difference, and the Interaction Term in Nonlinear 'Difference-in-Difference' Models," in *IZA Discussion Paper No. 3478* (2008).

points from the fractional probit is identical to the linear estimate of 6.9 shown in column 2 of table 2. Not surprisingly, the average partial effect of a fractional logit model is identical to the fractional probit model. The fractional probit estimates demostrate that the main results are robust to the choice of a linear estimator.

<Table 4>

CONCLUSIONS

This paper tested the hypothesis that states' shares of total education funding increased more after the passage of NCLB in states with binding school district TELs than in states without binding school district TELs. The previous education finance literature demonstrated that NCLB placed a significant financial burden on state governments and school districts by requiring new investments in both teachers and student assessments. Binding school district TELs restricted school districts' abilities to collect the revenue necessary to pay for these new investments. As a result, state governments that imposed binding school district TELs intervened by increasing their education funding assistance to school districts. I provide empirical support for this claim. After the passage NCLB, states that had imposed binding school district TELs had at least 4.3 percentage point higher shares of total education funding relative to states without binding school district TELs.

This result has implications for education policy makers and intergovernmental fiscal relations. It demonstrates the unintended consequences of federal government policies that do not consider the consequences of the interaction between underfunded federal mandates and local institutional factors (e.g., binding TELs). However, the federal government is not solely to blame. States' use of TELs to restrict the fiscal autonomy of local governments was a

contributing factor to the financial burden placed on states by NCLB. An important unintended

consequence of this interaction was the expansion of state governments' role and influence in the

provision of public education. Although binding school district TELs were already leading to a

more centralized education system, this study shows that the combination of the passage of

NCLB and school district binding TELs substantially increased states' roles in the provision of

public education.

The unintended expansion of states' roles in education can be viewed as either a positive

or negative outcome. Some policymakers would argue that centralizing education finance at the

state level increased equity in public education across school districts.[71] This argument, however,

assumes that states provide a disproportionally higher amount of education assistance to low-

performing school districts. This may not have been the case, however, and should be a topic for

future research. In addition, it assumes that states provided the necessary additional revenue to

comply with NCLB's mandates. If the state government did not increase education funding

assistance to meet the extra cost, school districts, due to restrictions by a binding TEL, would

have had insufficient funding for important expenditures (e.g., increasing the number of highly

qualified teachers). Therefore, as a result of the passage of NCLB, school districts without

binding TELs may have fared better than school districts with binding TELs.

NCLB did not consider how states would fund the expenditures needed to comply with

the law. States had at least four possible mechanisms with which to increase education funding:

borrowing, raising taxes, extracting revenue from local governments' tax bases (e.g., counties

---

[71] Alternatively, there is a tradeoff between equality and efficiency. A more decentralized structure of education provision with many jurisdictions with different packages of level of education and tax prices would allow individuals to choose a jurisdiction with the best level of education at the lowest price (Tiebout, 1956). A more centralization system limits the number of options available to individuals; therefore, individuals will have to choose a less optimal package.

and municipalities), and moving funding from a non-educational to educational programs. It is possible that these actions conflicted with other priorities and goals of federal government, as well as affected state and local policy goals.

One possible solution is to design federal grants that encourage states to exempt school districts from binding TELs if school districts need to raise additional funding to meet federal mandates. Specifically, states should exempt low property wealth school districts from binding TELs for two reasons. First, a state-wide exempt would potentially increase educaiton expenditure inequalities between high and low property wealth school districts. Second, previous research suggests binding TELs restrict low property wealth jurisdictions relative more than high property wealth school jurisdictions.

Accordingly, the results of the current study suggest two areas for future research. First, it is important to know how state governments were obtaining the resources necessary to increase funding assistance to school districts. As mentioned above, there were at least four mechanisms that states could have used to raise additional state education funding. Policymakers would likely be interested if the mechanisms that states used to increase education spending had any unintended consequences. For example, federal governments should be aware whether or not an underfunded mandate may result in states taking funding away from other high-priority policies, federal or otherwise. Second, future research might evaluate how changes in state and local education finances impacted student and teacher outcomes. A change in education finances could have had an impact on teacher retention or quality across school districts with a binding TEL relative to states without a binding TEL.

Acknowledgements

TABLE 1

Variable	Pre-NCLB (1992-2002)	Post-NCLB (2003-2009)	Difference
Average State Characteristics by Time Period			
State Share of Education Funding in State	0.498	0.497	-0.001
	(0.121)	(0.114)	[0.010]
Federal Share of Education Funding in State	0.073	0.097	0.021***
	(0.027)	(0.032)	[0.001]
Local Share of Education Funding in State	0.429	0.409	-0.020*
	(0.098)	(0.121)	[0.010]
Prop. Of Local Edu. Rev. from Non-property Tax Sources	0.098	0.088	-0.009
	(0.181)	(0.146)	[0.008]
Imposed Binding School District TEL Indicator	0.555	0.583	0.028*
	-	-	[0.015]
Imposed Binding Municipality TEL Indicator	0.579	0.609	0.031*
	-	-	[0.016]
Imposed Binding County TEL Indicator	0.538	0.569	0.031*
	-	-	[0.016]
Imposed TEL on State Government Indicator	0.616	0.665	0.049
	-	-	[0.034]
# of border states with a binding school district TEL	2.42	2.50	0.082***
	(1.71)	(1.75)	[0.021]
Court-Ordered Edu Finance Reform Indicator	0.377	0.516	0.139***
	-	-	[0.038]
Legislative Education Finance Reform Indicator	0.822	0.878	0.056**
	-	-	[0.022]
Previous School Accountability Policy: Strong	0.096	0.184	0.087***
	-	-	[0.029]
Previous School Accountability Policy: Moderate	0.083	0.143	0.059**
	-	-	[0.026]
Previous School Accountability Policy: Weak	0.091	0.184	0.093***
	-	-	[0.029]
Previous School Accountability Policy: None	0.729	0.489	-0.239***
	-	-	[0.039]
Republican Governor Indicator	0.614	0.513	-0.101
	-	-	[0.085]
Real Personal Income per capita ($)	15,641.73	17,881.23	2,239.50***
	(2,465.39)	(2,615.68)	[117.98]
Percent of 65 year old or older individuals (%)	12.9	12.7	-0.211***
	(2.2)	(1.7)	[0.078]
State Annual Average Unemployment Rate (%)	5.2	5.0	-0.152
	(1.5)	(1.1)	[0.124]
Percent of White Individuals (%)	81.0	81.7	0.735
	(11.5)	(10.6)	[0.649]
Average Daily Attendance (in thousands)	851.5	929.4	77.8***
	(954.7)	(1,095.4)	[23.4]
Observations	539	343	882

Notes: All states are included expect Hawaii. Standard deviations are in parentheses and brackets include standard errors that are robust to state-level clustering

Table 2

Linear Fixed Effects on State Share of Education Funding

	(1)	(2)
Binding TEL on School District	-0.001	0.100***
	(0.051)	(0.029)
Binding TEL on School District × No Child Left Behind Indicator (NCLB)	0.069**	0.043**
	(0.027)	(0.017)
Binding TEL on Municipality	-0.033	-0.026
	(0.053)	(0.025)
Binding TEL on Municipality × NCLB	-0.063*	-0.057
	(0.032)	(0.053)
Binding TEL on County × NCLB	0.022	0.035
	(0.027)	(0.041)
TEL on State Government	0.004	0.006
	(0.015)	(0.015)
TEL on State Government × NCLB	-0.026	-0.053***
	(0.018)	(0.017)
Number of border states with a binding school district TEL	0.028	0.031*
	(0.018)	(0.017)
Number of border states with a binding school district TEL × NCLB	-0.007	-0.006
	(0.006)	(0.006)
Fed Share of Education Funding	-0.513	-0.643*
	(0.339)	(0.328)
Fed Share of Education Funding × NCLB	-0.407	-0.258
	(0.377)	(0.321)
Court-Ordered Education Reform Indicator	0.077***	0.076***
	(0.027)	(0.026)
Court-Ordered Education Reform Indicator × NCLB	0.010	0.003
	(0.018)	(0.017)
Legislative Education Finance Reform Indicator	0.012	0.017
	(0.033)	(0.033)
Legislative Education Finance Reform Indicator × NCLB	0.004	-0.002
	(0.023)	(0.020)
Prior Strong School Accountability	-0.011	-0.012
	(0.017)	(0.016)
Prior Strong School Accountability × NCLB	-0.025	-0.037*
	(0.020)	(0.019)
Prior Moderate School Accountability	0.014	0.013
	(0.021)	(0.014)
Prior Moderate School Accountability × NCLB	0.013	0.003
	(0.024)	(0.021)
Prior Weak School Accountability	0.067	0.063
	(0.046)	(0.044)
Prior Weak School Accountability × NCLB	0.011	0.030
	(0.025)	(0.027)

Table 2 (Cont.)

Linear Fixed Effects on State Share of Education Funding

	(1)	(2)
Republican Governor Indicator	-0.000	0.006
	(0.009)	(0.010)
Republican Governor Indicator × NCLB	0.018	0.015
	(0.016)	(0.015)
Log of Real Personal Income per Capita	0.326	0.349*
	(0.209)	(0.207)
Log of Real Personal Income per Capita × NCLB	-0.011	-0.010
	(0.091)	(0.077)
Log of Percent of 65 years old or older	0.109	0.160
	(0.193)	(0.188)
Log of Percent of 65 years old or older × NCLB	-0.047	-0.056
	(0.052)	(0.047)
State Annual Average Unemployment Rate	-0.001	-0.004
	(0.006)	(0.005)
State Annual Average Unemployment Rate × NCLB	-0.004	-0.001
	(0.009)	(0.008)
Prop. of Local Education Revenue from non-property tax sources	0.027	0.040
	(0.057)	(0.059)
Prop. of Local Education Revenue from non-property tax sources × NCLB	-0.036	-0.080*
	(0.041)	(0.047)
Log of Average Daily Student Attendance	0.034	0.070
	(0.096)	(0.104)
Log of Average Daily Student Attendance × NCLB	-0.007	0.004
	(0.008)	(0.009)
Percent of White Individuals	-0.001	-0.001
	(0.001)	(0.001)
Percent of White Individuals × NCLB	0.002	0.002
	(0.001)	(0.001)
Constant	-3.304	-4.154
	(2.811)	(2.831)
Observations	882	882
R-squared	0.289	0.32

Notes: Cluster-robust standard errors (state level) in parentheses, *** $p<0.01$, ** $p<0.05$, * $p<0.1$. The model includes state fixed effects and year dummies. The omitted prior accountability policy indicator is no prior school accountability indicator. The binding TEL on county government is omitted due to collinearity. Column 1 presents the results when using the coding of TEL states from the updated version of Mullins and Wallin (2004). Column 2 presents the results when using the alternative coding of TEL states from Mullins, Hayes, and Smith (2012).

<div align="center">

TABLE 3

Event Study Analysis

</div>

	State Share
Pre-NCLB Era	
Binding School District TEL	-0.058
	(0.075)
Binding School District TEL × Year 1993	-0.006
	(0.039)
Binding School District TEL × Year 1994	0.008
	(0.038)
Binding School District TEL × Year 1995	0.012
	(0.044)
Binding School District TEL × Year 1996	0.036
	(0.046)
Binding School District TEL × Year 1997	0.026
	(0.053)
Binding School District TEL × Year 1998	0.028
	(0.051)
Binding School District TEL × Year 1999	0.057
	(0.049)
Binding School District TEL × Year 2000	0.039
	(0.060)
Binding School District TEL × Year 2001	0.037
	(0.060)
Binding School District TEL × Year 2002	0.026
	(0.058)
NCLB Era	
Binding School District TEL × Year 2003	0.102*
	(0.053)
Binding School District TEL × Year 2004	0.096*
	(0.050)
Binding School District TEL × Year 2005	0.129*
	(0.067)
Binding School District TEL × Year 2006	0.136**
	(0.063)
Binding School District TEL × Year 2007	0.101
	(0.062)
Binding School District TEL × Year 2008	0.090
	(0.072)
Binding School District TEL × Year 2009	0.093
	(0.071)
Observations	882
R-squared	0.797

Notes: Cluster-robust standard errors at the state level are in parentheses, *** $p<0.01$, ** $p<0.05$, * $p<0.10$. This table does not report all coefficients in the model. The Year 1993 represents the 1992-93 school year. The 1991-92 school year is the omitted year. Table 3 presents the results when using the coding of TEL states from updated version of Mullins and Wallin (2004). The results in Table 3 are robust if I use the alternative coding of TEL states from Mullins, Hayes, and Smith (2012).

<div align="center">

TABLE 4

</div>

Fractional Logit and Probit Estimates on State Share of Education Funding

	Logit		Probit	
	Coefficients	APE	Coefficients	APE
Binding TEL on School District	0.001	0.000	0.000	0.000
	(0.198)	(0.047)	(0.124)	(0.048)
Binding TEL on School District ×	0.291**	0.069**	0.179**	0.069**
No Child Left Behind Indicator (NCLB)	(0.115)	(0.029)	(0.071)	(0.027)
Observations		882		
Pseudo R-squared	0.30		0.30	
Log likelihood	-388.72		-388.68	

Notes: Cluster-robust standard errors (state level) in parentheses, *** p<0.01, ** p<0.05, * p<0.1.
All models include state fixed effects and year dummies. This table does not report the
coefficients for all the other variables. Table 4 presents the results when using the coding of TEL
states from updated version of Mullins and Wallin (2004). The results in Table 4 are robust if I use
the alternative coding of TEL states from Mullins, Hayes, and Smith (2012).

APPENDIX A: LIST OF RELEVANT STATE POLICIES

State	Binding TEL on School District	Binding TEL on Municipality	Binding TEL on County	Binding TEL on State	School Accountability Policy	Court-ordered Education Reform	Legislative Education Reform
Alabama	No	No	No	No	Strong (1997)	Yes (1993)	Yes (1996)
Alaska	Yes[b]	Yes	No	Yes	None	No	No
Arizona	Yes	Yes	Yes	Yes	None	Yes (1994)	Yes (1980)
Arkansas	Yes	Yes	Yes	Yes	None	Yes	Yes (2005)
California	Yes	Yes	Yes	Yes	Strong (1999)	Yes	Yes (1977)
Colorado	Yes	Yes	Yes	Yes	None	No	Yes (1973)
Connecticut	No	No	No	Yes	Weak (1999)	Yes	Yes (1990)
Delaware	No	No	Yes	Yes	None	No	No
Florida	Yes (1995)	Yes (1995)	Yes (1995)	Yes	Strong (1999)	No	Yes (1973)
Georgia	No	No	No	No	None	No	Yes (1986)
Hawaii	No	No	No	Yes	None	No	No
Idaho	No	No	No	Yes	None	Yes (1998)	Yes (1978)
Illinois	Yes	Yes	No	No	Moderate (1992)	No	Yes (1980)
Indiana	Yes	Yes	Yes	Yes (2002)	Moderate (1995)	No	Yes (1994)
Iowa	Yes	Yes	Yes	Yes	None	No	Yes (1972)
Kansas	Yes	Yes	Yes	No	Weak (1995)	Yes	Yes (1973)
Kentucky	Yes	Yes	Yes	No	Strong (1995)	Yes	Yes (1991)
Louisiana	Yes	Yes	Yes	Yes	Moderate (1999)	No	Yes (1988)
Maine	Yes (2005)	Yes (2005)	Yes (2005)	Yes (2005)	None	No	Yes (1978)
Maryland	No	No	No	Yes	Strong (1999)	Yes (2005)	Yes (1987)
Massachusetts	Yes	Yes	No	Yes	Weak (1998)	Yes (1993)	Yes (1985)
Michigan	Yes	Yes	Yes	Yes	Weak (1998)	Yes (1997)	Yes (1995)
Minnesota	Yes	No	No	No	None	No	Yes (1973)
Mississippi	Yes	Yes	Yes	Yes	None	No	Yes (1998)
Missouri	Yes	Yes	Yes	Yes	None	Yes (1993)	Yes (1977)
Montana	No	Yes	Yes	Yes	None	Yes	Yes (1994)
Nebraska	Yes	Yes	Yes	No	None	No	Yes (1992)
Nevada	No	Yes	Yes	Yes	Weak (1996)	No	No
New Hampshire	No	No	No	No	None	Yes (1997)	Yes (1985)
New Jersey	Yes	Yes	Yes	Yes	None	Yes	Yes (1998)
New Mexico	Yes	Yes	Yes	No	Strong (1998)	Yes (1999)	Yes (1974)
New York	No	No	No	No	Strong (1998)	Yes (2003)	No
North Carolina	No	No	No	Yes	Strong (1996)	Yes (2004)	No
North Dakota	No	Yes	Yes	No	None	No	Yes (1974)

Ohio	Yes	Yes	Yes	Yes (2006)	None	Yes (1997)	Yes (1982)
Oklahoma	Yes (1996)	Yes (1996)	Yes (1996)	Yes	Weak (1996)	No	Yes (1987)
Oregon	Yes	Yes	Yes	Yes	Moderate (2000)	No	Yes (1992)
Pennsylvania	No	No	Yes	No	None	No	No
Rhode Island	Yes[b]	Yes	No	Yes	Weak (1997)	No	Yes (1985)
South Carolina	No	No	No	Yes	Moderate (1999)	Yes (2005)	Yes (1977)
South Dakota	No	No	No	Yes	None	No	Yes (1985)
Tennessee	No	No	No	Yes	Weak (2000)	Yes (1993)	Yes (1977)
Texas	Yes	Yes	Yes	Yes	Strong (1992)	Yes	Yes (1984)
Utah	No	No	No	Yes	None	No	Yes (1974)
Vermont	No	No	No	No	None	Yes (1997)	Yes (1987)
Virginia	No	No	No	Yes	Moderate (1998)	No	Yes (1975)
Washington	Yes	Yes	Yes	Yes (1993)	None	Yes	Yes (1981)
West Virginia	Yes	Yes	Yes	No	Strong (1997)	Yes	Yes (1991)
Wisconsin	Yes (1994)	No	No	Yes (2001)	Moderate (1993)	No	Yes (1973)
Wyoming	No	No	No	No	None	Yes	Yes (1999)

Notes: Sources: Mullins and Wallin (2004), Carnoy and Loeb (2002), National Education Access Network, Downes and Shah (2006). Year of enactment in parentheses if enacted after 1992. b AK and RI coded as having a school district binding TEL because they have school districts dependent on municipalities.

Reference List

Alm, James and Mark Skidmore. 1999. "Why do Tax and Expenditure Limitations Pass in State Elections?" *Public Finance Review* 27 (5): 481-510.

Bergstrom, Theodore C., and Robert P. Goodman. 1973. "Private Demands for Public Goods." *The American Economic Review* 63 (3): 280-296.

Blankenau, William F., and Mark Skidmore. 2004. "School Finance Litigation, Tax and Expenditure Limitations, and Education Spending " *Contemporary Economic Policy* 22 (1): 127-43.

Borcherding, Thomas E., and Robert T. Deacon. 1972. "The Demand for the Services of Non-Federal Governments." *The American Economic Review* 62 (5): 891-901

Bradford, David F., and Wallace E Oates. 1971. "Towards a Predictive Theory of Intergovernmental Grants." *The American Economic Review* 61 (2): 440-48.

Carnoy, Martin, and Susanna Loeb. 2002. "Does External Accountability Affect Student Outcomes? A Cross-State Analysis, *"Educational Evaluation and Policy Analysis* 24 (2): 305-331.

Center on Education Policy. 2007. "State Implementation of supplemental education services under the No Child Left Behind Act. In *From the capital to the classroom: Year 5 of the No Child Left Behind Act,"* Washington, DC: Center on Education Policy.

Courant, Paul N., Edward Gramlich, and Daniel L. Rubinfeld. 1980. "Why Voters Support Tax Limitation Amendments: The Michigan Case, *"National Tax Journal* 33 (1): 1-20.

Dee, Thomas S., Brian A. Jacob, and Nathaniel L. Schwartz. 2012. "The Effects of NCLB on School Resources and Practices." *Educational Evaluation and Policy Analysis* 20 (10): 1-28.

Downes, Thomas A., and Mona P. Shah. 2006. "The Effect of School Finance Reforms on the Level and Growth of Per-Pupil Expenditures," Peabody Journal of Education 81 (3): 1-38.

Education Commission of the States, "NCLB Database". 2006. Retrieved from http://nclb2.ecs.org/nclbsurvey/nclb.aspx?Target=SS.

Educational Week. 2011. "Adequate Yearly Progress", http://www.edweek.org/ew/issues/adequate-yearly-progress/

Ferri, Fabrizio, and David A. Maber. 2013. "Say on pay votes and CEO compensation: Evidence from the UK." *Review of Finance* 17 (2): 527-563.

Goertz, Margaret E. 2005. "Implementing the No Child Left Behind Act: Challenges for the States." *Peabody Journal of Education* 80 (2): 73-89.

Hannaway, Jane, Shannon McKay, and Yasser Nakib. 2002. "Reform and Resource Allocation: National Trends and State Policies." *Developments in School Finance 1999-2000: Fiscal Proceedings from Annual State Data Conference July 1999 and July 2000.*

Hannaway, Jane, and Maggie Stanislawski. 2005. "Responding to Reform: Florida School Expenditures in the 1990s." CALDER Researchers.

Hanushek, Eric A., and Margaret E. Raymond. 2005. "Does School Accountability Lead to Improved Student Performance." *Journal of Policy Analysis and Management* 24: 297-327.

Johnston, Jocelyn M., Justin Marlowe, David S. T. Matkin, and Michael S. Hayes. 2011. "The Impact of Local School Property Tax Reductions on City and County Revenue Decisions: A Natural Experiment in Kansas." *Public Finance and Management* 11 (2).

Joyce, Philip G., and Daniel R. Mullins. 1991. "The Changing Fiscal Structure of the State and Local Public Sector: The Impact of Tax and Expenditure Limitations." *Public Administration Review* 51 (3): 240-53.

Ladd, Helen and Julie B. Wilson. 1983. "Who supports tax limitations: Evidence from Massachusetts's Proposition 2 ½," Journal of Policy Analysis and Management 2 (2): 256-279.

McGuinn, Patrick J. 2005. "The National Schoolmarn: No Child Left Behind and the New Educational Federalism." *Publius* 35 (1): 41-68.

Mullins, Daniel R. 2003. "Popular Processes and the Transformation of State and Local Government Finances." In *State and Local Finances under Pressure*, edited by David L. Sjoquist. Northampton, MA: Edward Elgar.

Mullins, Daniel R., and Bruce A. Wallin. 2004. "Tax and Expenditure Limitations: Introduction and Overview." *Public Budgeting and Finance* 24 (4): 2-15.

Mullins, Daniel R., Michael S. Hayes and Chad Smith. 2014. "The Role of Local Revenue and Expenditure Limitations in Shaping the Composition of Debt and its Implications." Proceedings of the 105th Annual Conference on Taxation. Washington, D.C.: National Tax Association.

Mullins, Daniel R., and Philip G. Joyce. 1996. "Tax and Expenditure Limitations and State and Local Fiscal Structure: An Empirical Assessment." *Public Budgeting and Finance* 16 (1): 75-101.

Olson, Lynn. 2003. "In ESEA wake, school data flowing forth," Education Week, December 10, 2003. Retrieved from http://www.edweek.org/ew/articles/2003/12/10/15nclb.h23.html

Papke, Leslie E., and Jeffrey M. Wooldridge. 1996. "Econometric Methods for Fractional Response Variables with an Application to 401(K) Plan Participation Rates." *Journal of Applied Econometrics* 11: 619-632.

Puhani, Patrick A. 2008. "The Treatment Effect, the Cross Difference, and the Interaction Term in Nonlinear 'Difference-in-Difference' Models." In *IZA Discussion Paper No. 3478*.

Shadbegian, Ronald J. 1999. "The Effect of Tax and Expenditure Limitations on the Revenue Structure of Local Government, 1962-87." *National Tax Journal* 52: 221-37.

Shadbegian, Ronald J. 2003. "Did the Property Tax Revolt Affect Local Public Education? Evidence from Panel Data." *Public Finance Review* 31 (1): 91-121.

Shelly, Brian. 2008. "Rebels and Their Causes: State Resistance to No Child Left Behind." *The Journal of Federalism* 38 (3): 444-468.

Stein, Robert M., Keith E. Hamm, and Patricia K. Freeman. 1983. "An analysis of support for tax limitation referenda," *Public Choice* 40 (1): 187-194.

Steiner, Lucy M. "School Restructuring Options Under No Child Left Behind: What Works When? State Takeovers of Individual Schools." Retrieved from http://www.centerforcsri.org/pubs/restructuring/KnowledgeIssues1StateTakeovers.pdf

Tiebout, Charles M. 1956. "A Pure Theory of Local Expenditures." *Journal of Political Economy* 64 (5): 416-24.

U.S. Government Accountability Office. 2003. "Title I: Characteristics of tests will influence expenses; information sharing may help state realize efficiencies" GAO-03-389. Washington, DC: Author.

Wilson, John D. 1999. "Theories of Tax Competition." *National Tax Journal* 52 (2): 269-30.

Wu, Yonghong, and Rebecca Hendrick. 2009. "Horizontal and Vertical Competition in Florida Local Governments." *Public Finance Review* 37 (3): 289-311.