The Impact of Charter School Laws Strength on School Closures

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With 6,500 schools to date, charter schools are a growing force in the education system. They are incredibly controversial, however, with studies measuring their impact on student academic outcomes inconclusive. Charter schools closing rates are an important factor in determining success that has not been studied in detail yet. School closing or charter school success can depend on the laws governing them. Each state governs its charter schools with its own laws; these laws can range from being more relaxed, giving high flexibility to the school, to strict, with the state closely monitoring each school. Not only do states with laws that have strict polices have less school closures, stricter laws also increases the average years a charter school is open.

Keywords: School Choice; Charter Schools; Government Policy; School Closures

JEL Code: I2, I28, I21, I22

1 Introduction:

Charter schools are independent public schools that are government-funded and privately run. The first charter school was founded in 1991 in Minnesota, and these schools now exist in 43 states as well as the District of Columbia. From 2003 to 2013 the percentage of public schools that are charters grew from 3.1 to 6.6.[1] This massive growth in the number of charter schools across the country has been accompanied by a heated debate. Opponents argue that charter schools take resources away from non-charter public schools without improving students' scores. Proponents advocate for flexibility of the charter school's operation, which they argue results in test score improvement. Until recently, existing economics literature has been inconclusive about the aggregate effect charter schools have on student achievement. Recent evidence, however, has been successful comparing charter school effectiveness within a city. It has shown that charter school success is associated with the No Excuses model that includes high expectations, longer school days, and frequent teacher feedback.[2][3] While these studies have helped explain the different quality of schools within a state, questions remains as to why charter school effectiveness varies so much across states.

Variation in laws governing charter schools can help explain different school quality across states. Studies have looked at how charter school laws impact student outcomes. Research has not been done, however, into how charter school laws impact charter school closure rates, an important and novel outcome measure. One of the merits of charter schools is that they are held to greater accountability than traditional public schools. Revoking a charter can easily and swiftly close a poor performing school. Proponents of charter schools argue that closures are due to increased competition and accountability. While this may be true in some cases, they are overlooking other reasons that charter schools are closed, such as mismanagement and financial problems. A strict

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[1] "Fast Facts: Charter School," NCES, www.nces.ed.gov/fastfacts/display.asp?id=30,
[2] Will Dobby and Roland G. Fryer Jr. "Getting beneath the veil of effective schools: Evidence from New York City," *American Economic Journal: Applied Economics* 5.4 (2013): 28-60.
[3] Joshua D. Angrist, Parag A. Pathak, and Christopher R. Walters. "Explaining charter school effectiveness." *American Economic Journal: Applied Economics* 5.4 (2013): 1-27.

policy could perhaps weed out those unfit applications and a state would thereafter experience less charter school closings.

I researched how various law components impact a state's percentage of charter schools that close, as well as the average years a charter school is open in that state. One interesting statistic discovered is that states that keep a charter school's teachers under the district's collective bargaining agreement have 3 percent less closures than states that allow charter teachers to negotiate as a separate entity or independently. These schools are also open on average 1 year longer. Similarly, states that have stricter funding guidelines have 5 percent less closures than states that allow fiscal autonomy. A strict law on teacher hiring continues to impact the success of a charter school a year later. If a state's law requires charter schools to follow most public school rules, the state's charter schools are open on average a year longer. Another interesting element of the study looks at which types of school closures are being impacted by law strength. For instance, the strictest authorization and teacher hiring laws decrease number of closings for financial reasons.

2 Background:

The most effective evaluation of policy variation is at the state level because the decisions that foster a strict or relaxed charter school environment occur in state law. Graph one illustrates how strength of laws has remained relatively constant over time. The five main policies are authorizers, school cap, regulation wavier, funding and hiring teachers. The average strictness of each law component has had variation over time (Graph 2).

Charter authorizers are an entity or body that oversees and authorizes charter schools. The most common authorizers are the state and local school board, but some states allow independent authorizers, including the mayor, universities, and a charter school board. Table 1 displays an example of the variety of authorizers allowed in different states. Indiana allows many entities, including many independent authorizers, to authorize a charter school. In 2011, they added two more authorizers, private universities and the Indiana Charter School Board. In contrast, Maryland's only charter authorizer is the district school board.

A prominent law limits the number of charter schools per state and per district through a charter school cap. For example, Illinois has a strict and well-defined charter school cap, only allowing for 120 charter schools in the state, with a maximum of 70 in the city of Chicago. On the other end of the spectrum, Indiana has no cap, only a law vaguely limiting virtual school growth.

Another important law governs how charter schools hire teachers. A state can requires its charter school teachers to remain under their collective bargaining agreement or a state can allow charter school teachers to negotiate as a separate unit or independently. Teachers under the district collective bargaining agreement have to be in the teacher union. Allowing charter schools to negotiate with its teachers separately gives charter schools the freedom to require different qualifications for teachers and give teachers different hours and salary.

The fourth main law component separates charter schools from other public schools by autonomy. Charter schools can receive a blanket waiver from rules and regulations. Some states give this wavier automatically, some allow charter schools to request it, and some mandate charter schools follow most of the same rules and regulations as traditional public school.

Lastly, funding laws vary by state. The most relaxed laws gives the charter school operator full freedom of public funds while still allocating the same amount to charters as they would to traditional public schools. Other states, such as Maryland, give the district the discretion to allocate and monitor funds to charter schools. Ohio increased the strictness of their funding law recently, increasing the categories for reporting expenses from 4 to 100.[4]

There have been 2,209 charter school closures since 2000. A charter school may close voluntarily, through non-renewal, or through revocation. Proponents view this as an advantage of charter schools. They argue underperforming schools are closed easily, creating getter accountability. The problem with this argument is that closures for academic reasons are only a small portion of charter school closures. In 2011, only 19 percent of charter schools were closed for academic reasons. Graph 1 illustrates the proportion of charter schools that close for various reasons. The two main reasons are

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[4] "Charter School Laws Across the State: 2015," *The Center for Education Reform*.

financial, making up 40 percent of closures, and mismanagement, 24 percent. Schools close for financial reasons because of insufficient funds or lack of enrollment. The lack of budget management or lack of planning can create these financial problems. Schools close from mismanagement due to wrongful actions of the charter school's administrators. A troubling example is the Ohio management company White Hat. They opened 32 schools in Ohio, using falsified documents. They then proceeded to steal funds from the schools that they had started.[5] Academic school closures consist of schools that fail to meet state performance standards. Almost 5 percent of charter schools are closed because of their failure to find a facility. District obstacles close 6 percent of charter schools. These obstacles have nothing to do with academic performances. They are mostly budget issues or lack of community support for the charter school.

3 Literature Review:

There have been many studies looking at charter schools' impact on student achievement. The results have been mixed, as displayed in Table 2. The two most common research methods are lottery systems and student fixed effects; both limit either the sampling of schools or students. A lottery system design studies only oversubscribed schools, which tend to be the older and academically superior schools.[6] Student fixed effects measures only students who switch from traditional public schools to charter schools. One concern of this method is that students' past gain trajectories are not necessarily predictive of future gains.[7] For example, a student who chooses to transfer tends to have lower scores the year before they transfer, because perhaps lower scores are a reason behind transferring.[8] There also may be a systematic difference between transfer

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[5] "Ohio Supreme Court justices deliver blistering attack on charter schools, White Hat Management," *Akron Beacon Journal*, September 15, 2015.

[6] Devora Davis and Margaret Raymond. "Choices for studying choice: Assessing charter school effectiveness using two quasi-experimental methods,"*Economics of Education Review*, 31 no.2 (2012): 225-236.

[7] Ron Zimmer, Brain Gill, Kevin Booker, Stephane Laverutu and John Witte. "Examining charter student achievement effects across seven states," *Economics of Education Review*, 31 no. 2 (2012): 213-224.

[8] Caroline Hoxby and Sonail Murarka."Charter Schools in New York City: Who enrolls and how they affect their students' achievement," *National Bureau of Economic Research*. (2007)

students and students who have always been educated in the charter system. This creates problems when generalizing studies to the whole charter student body.[9]

There has been disparity of results within research methods as well, in part because of the desire to compare studies across different locations. Results are either unable to be replicated in another area or when researching more than one area, studies rarely control for the policy implications that impact a charter school's success. The literature agrees that differentiation between state's charter laws are not caused by the quality of the school, but by the state's ideology. Holyoke et al. found that states with more Democrats in their legislatures tended to have stricter charter laws. It was also discovered that low high-school graduation rates and low SAT scores were not correlated to how states designed and implemented charter school laws.[10] Another study similarly found that growth in charter schools was driven more by political dynamics than by any measurable educational needs among students.[11] This lead us to simply believe that largely Democratic states would have stricter laws because of their political stance rather than the performance of their charter schools.

The question still remains: which laws result in successful charter schools? Wong in 2013 studied the empirical relationship between charter laws and charter performance. She categorized state legislation into three buckets: permissibility, autonomy, and accountability. She measured the state's charter laws relationship with school closings and NAEP performance. Interestingly, autonomy has positive correlation with both the number of charter schools and student outcomes, while accountability had negative correlations with number of schools and student outcomes. While this study provides valuable information about the relationship it does not have a casual interpretation.[12]

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[9] Ron Zimmer, Brain Gill, Kevin Booker, Stephane Laverutu and John Witte. "Examining charter student achievement effects across seven states," *Economics of Education Review*, 31 no. 2 (2012): 213-224.

[10] Thomas Holyoke et al. "Policy dynamics and the evolution of state charter school laws," Policy Sci, 42 (2009): 33.

[11] Yang Zhang. "What Drives Charter School Diffusion at the Local Level: Educational Needs or Political and Institutional Forces," *Policy Studies Journal*, 36 (2008): 571–591.

[12] Audrye Wong "State Charter Law and Charter School Outcomes," *Michigan Journal of Public Affairs*, 11 (2014):103-124.

Similarly, Watral studied potential causal relationships between charter laws and student achievement. She used Center for Education Reform's rankings for her measure of law strength and the outcome variable is the Northwest Evaluation Association (NWEA) database, which has achievement tests comparable from state to state. To avoid multicollinearity, however, she only includes one of her three variables: multiple authorizers, autonomy, and third party approval. This suggests that states that have multiple authorizers tend to also have similar laws for charter autonomy and third party approval. The only significant result from her model was that guaranteed funding for a charter (financial autonomy) positively impacted student achievement.[13]

Deven et al. looked at the relationship between authorizer type and student achievement among charter schools, using a 10-year panel dataset from Minnesota. Minnesota permits four distinct types of authorizers—local school boards, postsecondary institutions, nonprofit organizations, and the Minnesota Department of Education. They find that there is no statistically significant relationship between charter school authorizing type and mean levels of student achievement. However, results suggest that schools authorized by nonprofit organizations exhibit substantially more variability in achievement than schools authorized by local school boards.[14]

I add to these studies in two ways, by looking at all states with a wide variety of law components and measuring a different outcome measure: school closures. First, I added to the charter law literature by looking at a variety of specific law components. Testing if each component creates successful charter schools using all states across time. Second, I use school closings, an important and novel outcome measure. Since charter schools have started, there have been more than 2,000 closures. A large percentage compared to the 6,000 charter schools that exist today.[15]

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[13]Caroline Watral "Differences that Make a Difference: An Examination of the Relationship between Charter Law 'Strength' and Student Achievement," Presentation at the Annual Meeting of the American Educational Research Association, Chicago, IL, April 9-13, 2007.

[14] Deven Carlson, Lesley Lavery, and John F. Witte. "Charter school authorizers and student achievement," *Economics of Education Review* 31.2 (2012): 254-267.

[15] "State-by-state list of the failed charter schools since 2000," *Center for Media and Democracy* (2013).

There is a dangerous lack of understanding as to the factors influencing school closures. The most common reasons charter schools close are financial and mismanagement, not academic, as many often assume.[16] School closures are an important measure of charter school success because of the impact on both students and the state taxpayer. Studies on the outcomes of non-charter public school closures have found that students displaced by school closures experience adverse effects on both their test scores and attendance records. Although this effect is mitigated over time, especially if the student is transferred to a better school, this impact on students, even temporarily, is important to avoid[17]. The taxpayer is also burdened by charter school closures. The closing of six St. Louis charter schools cost $250,000, while the state of Florida spent $70 million on charter schools that later closed, recouping only $133,000.[18] My paper also studies the reasons why charter schools close, attempting to link the closure reason to a law component. To my knowledge my paper is the first to look at the reasons behind charter school closures and how the strictness of the charter law impacts school closures.

4 Data:

I interpreted the laws of 40 states' (including Washington DC). Seven states were left out because they do not have charter laws. The remaining 4 states left out have charter laws but either do not have any charter schools or only have one.

The two outcome measures, school closings and average years open, were complied from two sources National Alliance for Public Charter School (NAPCS) and Center for Media and Democracy (CMD). Data for average years open was from the NAPCS, available from years 2006 to 2013.[19] Data on school closures was obtained from

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[16] Charter School Laws Across the State" *The Center for Education Reform*. (2001-2014)
[17] John Enberg, Brian Gill, Gema Zamarro and Ron Zimmer.. "losing Schools in a Shrinking District: Do Student Outcomes Depend on Which Schools are Closed," *Journal of Urban Economics* 71.2 (2012): 189-203.
[18] Gary Fineout, Terry Spencer and Christina Veiga. "Florida gave about $70 million to charter schools that later closed; state recouped little," *Associated Press- Miami Herald*. December 13, 2015.
[19] NACPS, (December 2016)

CMD's state-by-state list of charter school closures.[20] The number of charter school closings in every state, from years 2001 until 2013, was obtained by sorting this list by state and year. Using NACPS data for total number of charter schools by state and year, the charter school closure rate was obtained.[21] There are on average 170 total school closures per year. States' average school closure rate is shown in graph 4. There is no trend in the states' average rate of school closures.

The Center for Education Reform (CER) in 2011, also reported a school level list on charter closings. Their list includes an explanation of why the charter school closed. The six categories of reasons are financial, mismanagement, district, facility, academic, and other or unknown.[22] The prevalence of each reason in 2011 is shown in graph 3. Financial and mismanagement are the most prevalent reasons for school closures. Graph 5 displays the trend in each of the reason. Financial and mismanagement are consistently the most prevalent.

For the law components measurement, I used state laws score reported in a CER reports from 2001, 2003, 2004, 2006, 2008, 2010-2014. I identified five law components and gave them equal weights: teacher hiring, authorizers, funding, regulation wavier, and school cap. CER changed the way they reported and scaled the law components in 2010. But with consultation from the CER, I determined the components they consistently measured. The law components from each state are scaled from 0 to 5, 0 being strict and 5 being relaxed. Graph one shows that the law strength remains constant over time. But strength of individual components is not constant (Graph 2). The mean measure of strength for the law components is 2.6. CER is admittedly a pro-charter organization. By using only their interpretation of the law being relaxed or strict, I was able to remove the potential bias.[23]

NAPCS also provided data from 2001 to 2014 on control variables, students eligible for free or reduced price lunch (proxy for charter students poverty level), and

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[20] NCES Common Core of Data Public Elementary/Secondary School Universe Survey for school years 2000 to 2013.
[21] NACPS (December 2016)
[22] "The State of Charter Schools: What We Know – and What We Do Not – About Performance and Accountability," *The Center for Education Reform.* (2011)
[23] "Charter School Laws Across the State," *The Center for Education Reform*. (2001-2014)

races of charter students. These controls were included because some states require or gives preference to charter schools that serve student of low socioeconomic status or minorities.

5 Empirical Models:

I used a fixed effects model in order to limit unobservable characteristics of the different states and different years. Robust standard errors were also included because of potential multicollinearity.

Regression Equation 1:

$$Y_{st} = \beta_0+\beta_1 W_{st}+ \beta_2 A_{st} + \beta_3 TH_{st} + \beta_4 SC_{st} +\beta_5 F_{st} + \alpha X_{st} + \sigma_s+ \delta_t+ \varepsilon_{st}$$

I regress the two outcomes measures, percentage of schools that close and average years open. Controlling for all law components and control variables. The coefficients of interest are $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5$. β_1 is the impact of the law W, giving charter schools a wavier from regulations, on school closures and average years a charter school is open. β_2 measures the impact of a more relaxed authorizer law (A) on school closures and average years open. β_3 is the impact of a more relaxed law regarding teacher hiring (TH) on school closures and average years open. β_4 quantifies the effect of having a looser charter school cap (SC) on the outcomes measures. And β_5 tests the impact of the state's charter funding laws (F) on both school closures and average years open. I control for X_{st} , the charter school characteristics, which are the percent of charter students that are black and the percent of charter students eligible for a free lunch. I use these controls because of legislation in some states that require or give priority to charter schools targeting such groups. Other unobserved measures are controlled for in the state and year fixed effects.

A potential problem with the model can occur if law components are correlated, as Wartal discussed in her paper.[24] Table 5 shows the correlation matrix between the law

[24]Caroline Watral. "Differences that Make a Difference: An Examination of the Relationship between Charter Law 'Strength' and Student Achievement," Presentation at the Annual Meeting of the American Educational Research Association, Chicago, IL, (2007).

components. Some have relatively high correlations, so in order to test my model's robustness, I also measures the impact of an individual law component, without controlling for the others.

Regression Equation 2: $Y_{st} = \beta_0 + \beta_1 L_{st} + X_{st}\alpha + \sigma_s + \delta_t + \varepsilon_{st}$

The coefficient of interest is β_1, which measures the impact of each separate law component on the outcomes measures.

In addition to initial effects, I added two lag models, one year and five year. This captures the results if the law takes longer to have an effect on the school closures and years open.

Regression Equation 3:

$$Y_{st} = \beta_0 + \beta_1 BW_{s(t-1)} + \beta_2 A_{s(t-1)} + \beta_3 TH_{s(t-1)} + \beta_4 SC_{s(t-1)} + \beta_5 F_{s(t-1)} + \alpha X_{st} + \sigma_s + \delta_t + \varepsilon_{st}$$

Regression Equation 4:

$$Y_{st} = \beta_0 + \beta_1 BW_{s(t-5)} + \beta_2 A_{s(t-5)} + \beta_3 TH_{s(t-5)} + \beta_4 SC_{s(t-5)} + \beta_5 F_{s(t-5)} + \alpha X_{st} + \sigma_s + \delta_t + \varepsilon_{st}$$

Regression Equation 5: $Y_{st} = \alpha L_{s(t-1)} + X_{st}\beta + \sigma_s + \delta_t + \varepsilon_{st}$

Regression Equation 6: $Y_{st} = \alpha L_{s(t-5)} + X_{st}\beta + \sigma_s + \delta_t + \varepsilon_{st}$

To further expand on my results I test a more specific measure of school closures: reasons for school closures. The six reasons are financial, mismanagement, district, facility, academic, and other or unknown. The outcome measure is the raw number of schools closed due to each reason.

Regression Equation 7:

$$R_{st} = \beta_0 + \beta_1 BW_{st} + \beta_2 A_{st} + \beta_3 TH_{st} + \beta_4 SC_{st} + \beta_5 F_{st} + \alpha X_{st} + \sigma_s + \delta_t + \varepsilon_{st}$$

Regression Equation 8:

$$R_{st} = \beta_0 + \beta_1 BW_{s(t-1)} + \beta_2 A_{s(t-1)} + \beta_3 TH_{s(t-1)} + \beta_4 SC_{s(t-1)} + \beta_5 F_{s(t-1)} + \alpha X_{st} + \sigma_s + \delta_t + \varepsilon_{st}$$

With these new outcome variables, I also include a one year lagged model. I did not include five year lag because there were only a few years of observation. I also regressed without controlling for the other law components, but the values were unchanged.

Another potential problem for my model is endogeneity or reverse causality concerns. This would be a concern if the state government's laws because depend on concerns for charter school outcomes, such as closings. The logic follows that if charter schools are doing badly, states would make laws stricter, leading to more closures. As I will discuss later, my results found the opposite, as laws get stricter there are less school closures. Additionally other literature provides evidence against these concerns. Research argues that a state's charter laws reflect the state's government ideology rather then school's performance.[25] I tested this conclusion using data on the majority political party of the state's legislative houses.[26] Table 6 shows this results, overall the state's political party does not have a statistically significant impact on charter laws. Although, if state's party is more republican, the state charter laws are more likely to be flexible. My results are consistent with the previous literate, that republican legislatures having more relaxed charter laws because of their ideology. And although it is not statistically significant, the p value is fairly low, at 0.18.

6 Results:

The strength of charter laws does impact charter schools. In table 7, I measure the strength of the charter law, which is the sum of all law components. When a charter law is one point stricter the school closure rate decreases by 0.2 percent. Table 8 summarizes the main results, examining the impact that each law component has on the school

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[25] Thomas Holyoke et al. "Policy dynamics and the evolution of state charter school laws," Policy Sci, 42 (2009): 33.
Yahong Zhang, Kaifeng Yang. "What Drives Charter School Diffusion at the Local Level: Educational Needs or Political and Institutional Forces," *Policy Studies Journal*, 36 (2008): 571–591.

[26] "Party Composition Data," *National Conference of State Legislators (NCLS)* 2000-2014.

closure rate and the average years open. Table 8 also includes results for the one and five year lags of law components.[27]

States that keep a charter school's teachers under the district's collective bargaining agreement have 3 percent less closures than states that allow charter teachers to negotiate as a separate entity or independently. If charter laws on teacher hiring are stricter the average years a school is open increases by .184 year. For example, comparing a teacher hiring law score of 5, allowing charter schools to hire teachers outside of the district CBA, to a law score of 0, mandating all charter schools hire teacher that negotiated in the district's CBA, the average years a charter school is open increases by almost one year. This effect of this stricter law continues in the following year, with an increase of about one year.

Similarly, a stricter law on charter funding, keeping charter schools more accountable, decreases school closings by 0.8 percent. For example, states like Maryland, where funds pass through state and district (1.3 score), have on average 2% less charter schools closings versus states with laws like Indiana where funds pass through district but are allocated equally (3.3).

Regression equation 3, five-year law lag, have similar results. There are less school closures five years after a stricter law. States that do not exempt charter schools from regulations (0) have charter schools that are open on average almost one year longer than states that automatically give an exemption wavier from all regulations (5).[28]

A stricter law on charter funding five-year prior decreases the average year a school is open by 0.159 years. Also if there is a strict cap imposed, five years later there will be an increase in school closure rates. These results contradict my hypothesis and other results. But when the funding law five-year lag is regressed without other law components, the result loses its significance.

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[27]The observation number decreasing for school closing because we are eliminating, in the one year lag, 2001 school closures, and in the five year lag 2001-2005. The average years open observation count is not affected because data isn't available until 2006. Average years open has an extra year of observations, 2013, explaining the 40 differences in the five-year lag observation count.

[28] Automatic Exemption wavier (5) doesn't include exemption from civil rights regulations

Next, I tested the same model using only individual law components. This was done to test the robustness of the results, given the possible mutlicollinearity. I found mostly the same results whether or not I controlled for the all law components. Stricter laws decrease school closures, shown in tables 9 to 14. With or without controls for other law components, results show stricter funding laws decrease school closure rate by 0.8 percent. States that require charter teachers to be in the district CBA, have lower closure rates and school that are open on average one year long. And again, stricter teacher hiring laws increases the average years open in the next year as well.

The five-year lag results are also the same, when there is no automatic wavier there is an increase average years open by 0.6 years. There is one result that does not stay consistent when controlling or not controlling for the other law components. Controlling for other law components, stricter funding law decreases average years open. Removing other law components makes the results not statistically significant.

Next I regressed the law components impact on the amount of schools closed for a specific reason. This gives better insight into how a stricter law component is changing a flaw of charter school system. The results for the same year impacts are in table 15 and the one-year lagged results in table 16. Having stricter authorizer and teacher hiring policies decrease the number of schools closed for financial reasons. States that mandate charter teacher remain under the district's CBA, have an average of 0.5 less schools close from financial problem (compared with states that have free teacher hiring policies). Given that on average only 4 schools close per state every year, 0.5 is a significant proportion. Authorizer laws also have a huge impact on financial school closures. The states with strictest authorizer polices have one less school close for financial reasons. Interestingly, states that give automatic waivers from rules and regulations have a smaller amount of school closures for financial reason. In addition, those states have less school shut down by the district.

7 Conclusion:

Different law components target different ways of regulating charter school. Authorizers and the number of schools allowed target the authorization process. Limiting authorization to only local school board further screens schools applying for a charter. The local school board has best sense of the district's needs and how the charter school

will be accepted into the neighbor. Only allowing the local school board to authorize significantly decreases school closures due to financial reasons, which include lack of enrollment or inadequate funding.

School cap is the only law component that as it gets stricter there are more school closures. Imposing either a district or state cap adds additional measures to the renewal or application process. It creates more competition for the charter. And allows districts to set caps school based on their analysis of the needs of the district. My results indict that there are more school closures when a cap is imposed five years prior. Most states have charter school renewal processes, in which every five years or so, charter schools have to go through the authorization process again. This lagged result might be capturing this lagged process. The results on closure reason could also help explain this result. A relaxed school cap decreases the number of school closed by the district and for financial problem. A law permitting a school cap does not specifically increase accountability measures. The school cap is the only law component not successful in creating a more sustainable charter school system.

Automatically giving charter schools a wavier from rules and regulation decreases the average years schools are open five years later. By not giving this automatic wavier, states are doing a better job of monitoring charter schools.

Teacher hiring and funding laws capture the degree of autonomy allowed in budget decision. When charter schools can hire teachers not under the state collective bargaining agreement, they can pay them less. This leads to a decrease in charter teacher's experience and an increase in teacher turnover. When the teacher gains experience, they will move to a traditional public school for more money.[29] If a state changes its law to require charter school teachers to operate under the district's collective bargaining agreement, 3 percent less of its charter schools close. States giving less fiscal autonomy in charter schools also decreases school closures by 2 percent. There is contradicting results, on funding five-year lag. But the significance goes away when you

[29] Eugenia Toma and Ron Zimmer. "Two decades of charter schools: Expectations, reality, and the future," *Economics of Education Review*, 31 no.2 (2012): 209-212.

don't control for all law components. So perhaps this results steams from multicollinearity, given the funding is highly correlated with three of the four other laws.

Charter law strength does indeed impact the charter schools in the state. Stricter laws can increase school quality through laws that are successful in building better standards through the authorization and accountability processes.

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9 Appendix:

Table 1: IN and MD Charter Policies

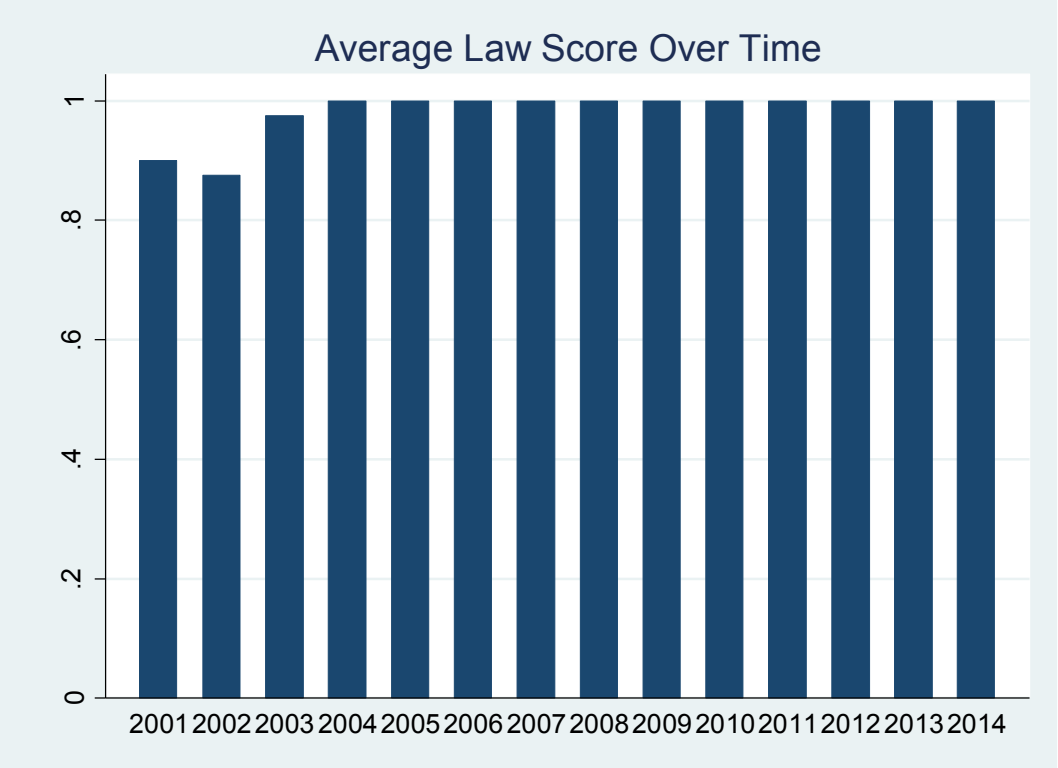
Policy	Maryland	Indiana
Types of chartering authorities	Local School Boards	State and Local School Boards, public universities, nonprofit colleges, mayor of Indianapolis, and Indiana Charter School Board
Number of Schools Allowed	No state cap, districts have caps	No cap
Teacher Freedom	Teachers remain under the district's CBA	Teachers may negotiate as a separate unit or independently
Autonomy	Must request wavier from state and district rules and regulations	Blanket wavier from State and District from most rules and regulations
Funding	Funds pass through district, but State law states funds must be equal	Funds pass through state and district. Receive same funding through formula
Source: Charter School Laws Across the State: 2015," The Center for Education Reform.		

Table 2: Recent Charter School Literature			
Study	**Location**	**Research Design**	**Average Impact**
Zimmer et al. (2003)	California	Fixed Effects	No reading effect for elementary students; small negative effect in math. No math effect for secondary students; small positive effects in reading
Solomon & Goldschmidt (2004)	Arizona	Fixed Effects	Positive reading effect for elementary students (negative for secondary studetns) attending charter schools for three years compared to students attending TPSs for three years
Hoxby and Rockoff (2004)	Chicago	Random assignment based on lottery data	Positive effects in math of 6 to 7 percentage points and in reading of 5 to 6 percentage points.
Hoxby, Kang, & Murarka (2009)	New York City	Random assignment based on lottery data	Small positive effect in both math and reading.
Abdulkadiroglu, et al. (2010)	Boston	Random assignment based on lottery data along with observational analyses	Moderately large positive effects in English and large effects in math.
Gleason et al. (2010)	National Sample of Middle Schools	Random assignment based on lottery data	Null average effects for student achievement and behavioral outcomes. Did find a positive effect for low-income, low performing students, but negative effects for more advantaged students.
Wong, et al. (2014)	Los Angeles	Random assignment based on lottery data	Improved math English test scores, greater school retention, and lower rates of engaging in ≥1 very risky behaviors, but no difference in risky behaviors, such as any recent use of alcohol, tobacco, or drugs.
Source: Zimmer, R., Epple, D., Romano, R. (2015). Charter Schools: A Survey of Research on Their Characteristics and Effectiveness. *National Bureau of Economic Research.*			

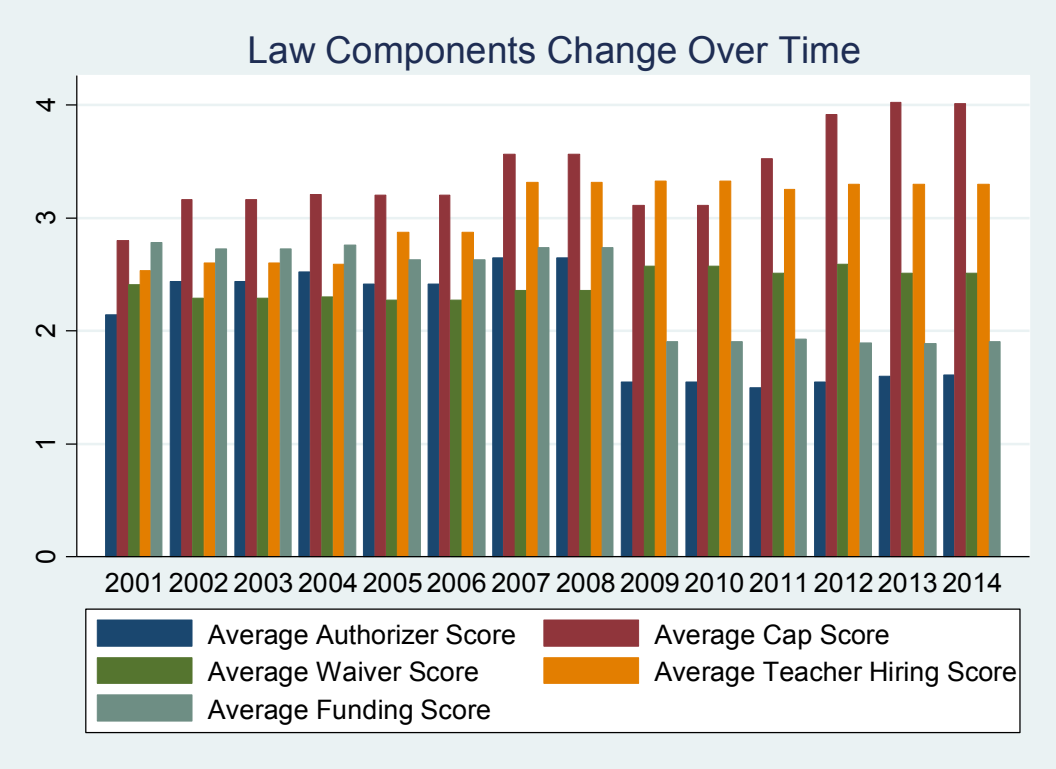
Table 3: Summary Statistics, outcomes variables

Variable	Mean	Std. Dev.	Min	Max
Average Years Charter School is Open	6.303256	2.171154	1.2	13.111
Percent of Charter Schools that Closed	0.0395023 (4%)	0.0638449	0	0.6666667
Charter Schools that Closed	4.259615	9.353057	0	93

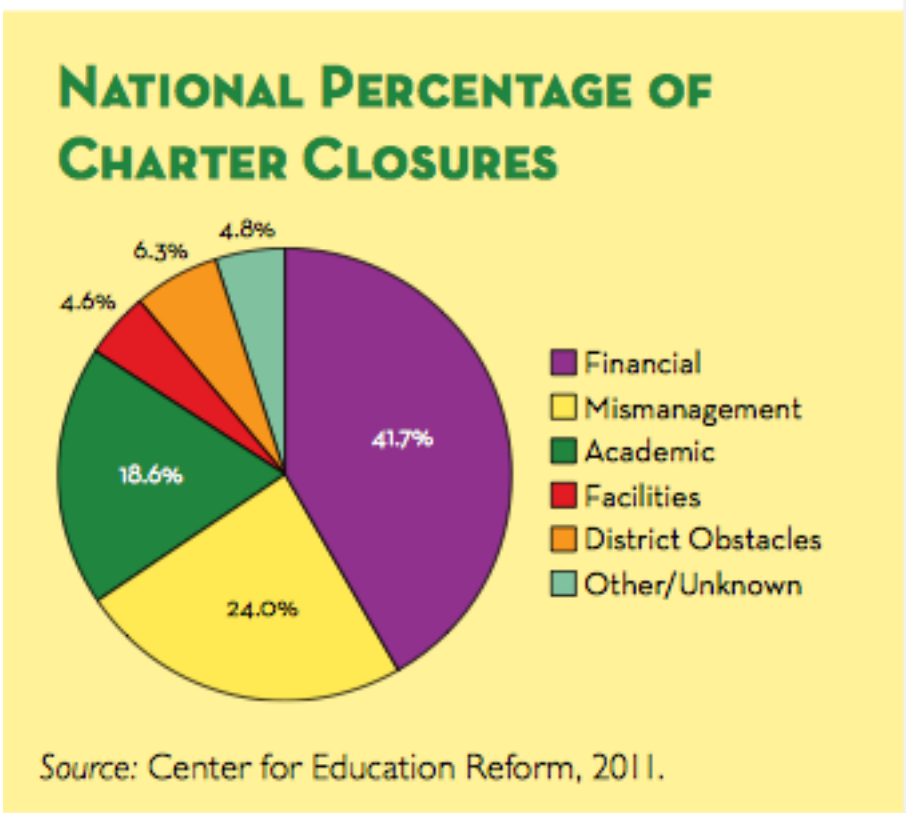
Graph 1: Overall Law Strictness Over Time



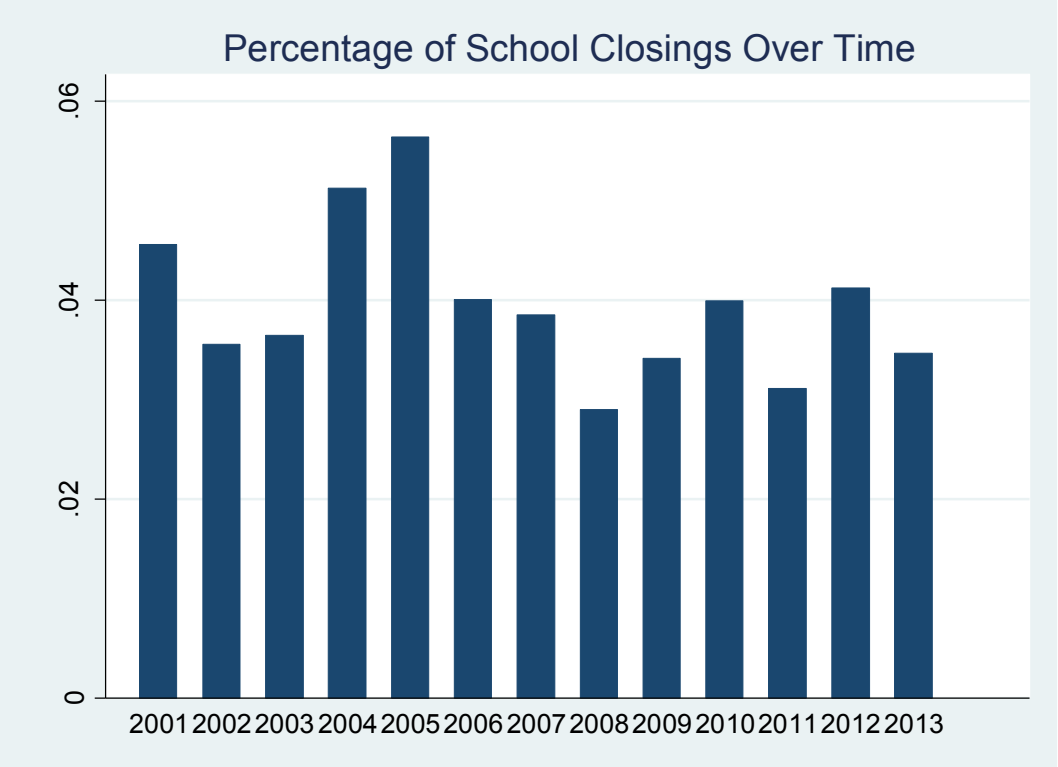
Graph 2: Component Strictness Over Time



Graph 3: Percentage of Charter Closures



Graph 4: States' Rate of School Closing Over Time



Graph 5: Average Number of Closings for Each Reason

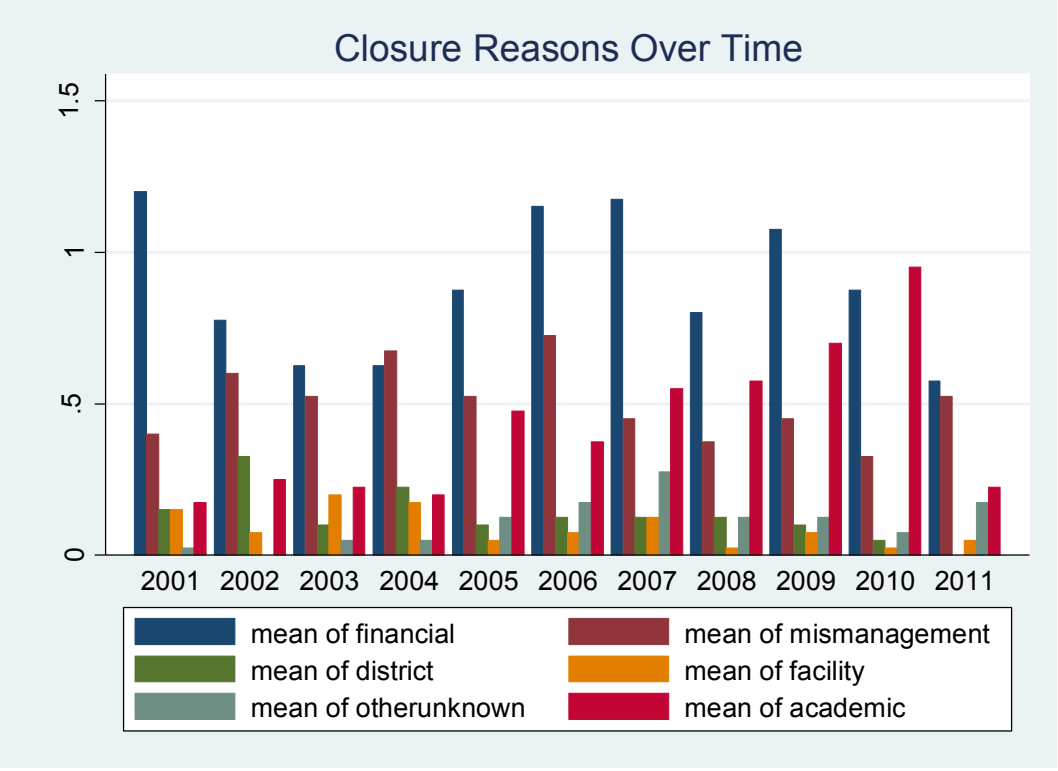


Table 4:Law Description for 5 point (Most Relaxed)

Policy	Max Score Law Description	Max Score
Authorizers	Multiple, independent authorizers including entities that include but are not limited to universities, new independent state boards, and/or mayors	5
Number of Schools Allowed	There is no cap on charter school, the number of charter schools match the overall population of the state	5
Teacher Freedom	Teachers may remain covered by the district bargaining agreement, negotiate as a separate unit with the charter school governing body, or work independently.	5
Autonomy	Automatically exempts charter schools from state and district laws and regulations. Not including fundamental laws concerning civil rights.	5
Funding	Equal funding with traditional public school and full fiscal autonomy	5

Table 5: Example of CER Scores: MD and IN

Policy	Maryland	Score	Indiana	Score
Authorizers	Local school boards	.3	State and Local School Boards, public universities, nonprofit colleges, mayor of Indianapolis, and Indiana Charter School Board	4
Number of Schools Allowed	No state cap, district caps	2	No cap, but law limiting growth virtual schools	4.5
Teacher Freedom	Teachers remain under the district's CBA	0	Teachers may negotiate as a separate unit or independently	5
Autonomy	Must request wavier from state and district rules and regulations	.5	Blanket wavier from state and district from most rules and regulations	4.5
Funding	Funds pass through district, but state law funds must be equal	1.3	Funds pass through state and district. Receive same funding through formula	3.3

Table 5: Correlation Matrix Law Components

	Authorizers	School Cap	Wavier	Teacher Hiring	Funding
Authorizers	1.0000				
School Cap	0.2522	1.0000			
Wavier	0.5793	0.2966	1.0000		
Teacher Hiring	0.4674	0.3363	0.6468	1.0000	
Funding	0.6915	0.1861	0.6378	0.5279	1.0000

Table 6: Impact of Majority Party of State Houses on Law Strength

VARIABLES	(1) All Law Components	(2) Authorizers	(3) School Cap	(4) Wavier	(5) Teacher Hiring	(6) Funding
State Legislator	0.267	0.0290	0.0609	0.0650	0.154	-0.0424
	(0.367)	(0.154)	(0.103)	(0.0947)	(0.112)	(0.0960)
State and Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	560	560	560	560	560	560
R-squared	0.090	0.398	0.147	0.040	0.192	0.300

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Note: All 40 states in years 2001 until 2014. State Legislator variable is, 0 in the majority party in both Houses is Democratic, 1 if the majority party in one House is Republican, and 2 if Republicans have majority in both legislative Houses. Outcome variable are law components. Ranked from 0-5, 0 being the strictest laws.

Table 7: Impact of All Law Components on Outcomes

VARIABLES	(1) Percent Closure	(2) Average Years Open
Charter Law	0.00246*	-0.0120
	(0.00137)	(0.0369)
State and Year Fixed Effect	Yes	Yes
Charter Controls		
Observations	503	280
R-squared	0.037	0.825

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Note: All 40 states. Regression (1) years 2001-2013; regression (2) years 2006-2014. Charter law is the combination of all law components, scored from 0 to 5. Percent closure is the percentage of charter schools in the state that closed in each given year. Average year open are the average years a charter is open for each state, in each given year.

Table 8: Impact of Law Components on School Closures and Average Years Open, controlling for the all law components

VARIABLES	(1) Charter Closure(%)	(2) Average Years Open	(3) Charter Closure(%)	(4) Average Years Open	(5) Charter Closure(%)	(6) Average Years Open
Teacher Hiring	0.00642**	-0.184***				
	(0.00250)	(0.0884)				
Authorizers	-0.00460	0.0755				
	(0.00567)	(0.0910)				
School Cap	0.00394	0.0858				
	(0.00594)	(0.0735)				
Funding	0.00844*	-0.101				
	(0.00475)	(0.114)				
Wavier	-0.00668	0.00415				
	(0.00473)	(0.135)				
Authorizers(t-1)			0.00438	0.112		
			(0.00559)	(0.0987)		
School Cap(t-1)			0.00580	0.0247		
			(0.00723)	(0.0801)		
Wavier(t-1)			-0.00416	-0.0425		
			(0.00612)	(0.149)		
Teacher Hiring(t-1)			0.00508	-0.196**		
			(0.00311)	(0.0902)		
Funding(t-1)			-0.00155	-0.0901		
			(0.00591)	(0.120)		
Authorizers(t-5)					-0.00793	-0.0131
					(0.00568)	(0.0751)
School Cap(t-5)					-0.00719**	0.0173
					(0.00284)	(0.0955)
Wavier(t-5)					0.00419	-0.156*
					(0.00607)	(0.0852)
Teaching Hiring(t-5)					-0.00411	-0.0719
					(0.00353)	(0.0688)
Funding(t-5)					0.0128	0.159*
					(0.0102)	(0.0878)
State and Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Charter Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	503	360	469	360	320	360
R-squared	0.049	0.835	0.050	0.835	0.050	0.831

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Note: All 40 states. Regression (1) years 2001-2013; regression (3) years 2002-2013; regression (5) years 2006-2012; regressions (2,4,6) years 2006-2014. Each charter law, authorizers funding, wavier, teacher hiring and school cap is scored from 0 to 5, 0 being the strictest. Law component (t-1) are from the previous year. (t-5) are law components from five years prior. Charter closing is the percentage of charter schools in the state that closed in each given year. Average year open are the average years a charter is open for each state, in each given year.

Table 9: Impact of Law Strength on Percent of a States Charter Schools that Close

VARIABLES	(1) Percent Closure	(2) Percent Closure	(3) Percent Closure	(4) Percent Closure	(5) Percent Closure
Wavier	-0.00300				
	(0.00479)				
Authorizers		0.000428			
		(0.00507)			
School Cap			0.00484		
			(0.00584)		
Funding				0.00807*	
				(0.00404)	
Teacher Hiring					0.00661***
					(0.00201)
State and Year Fixed Effects	Yes	Yes	Yes	Yes	Yes
Charter Controls	Yes	Yes	Yes	Yes	Yes
Observations	503	503	503	503	503

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Note: All 40 states from years 2001-2013. Charter law is the combination of all law components, scored from 0 to 5. Each charter law, authorizers funding, wavier, teacher hiring and school cap is scored from 0 to 5, 0 being the strictest. Percent closure is the percentage of charter schools in the state that closed in each given year.

Table 10: Impact of Law Strength on Average Years Open

VARIABLES	(1) Average Years Open	(2) Average Years Open	(3) Average Years Open	(4) Average Years Open	(5) Average Years Open
Authorizers	0.0730				
	(0.106)				
School Cap		0.0776			
		(0.0784)			
Wavier			-0.0575		
			(0.130)		
Teacher Hiring				-0.175**	
				(0.0832)	
Funding					-0.0985
					(0.0982)
State and Year Fixed Effect	Yes	Yes	Yes	Yes	Yes
Charter Controls	Yes	Yes	Yes	Yes	Yes
Observations	360	360	360	360	360

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Note: All 40 states years 2006-2014. Each charter law, authorizers funding, wavier, teacher hiring and school cap is scored from 0 to 5, 0 being the strictest. Average year open are the average years a charter is open for each state, in each given year.

Table 11: Impact of Law Strength the Previous Year on Percent Closure

VARIABLES	(1) Percent Closure	(2) Percent Closure	(3) Percent Closure	(4) Percent Closure	(5) Percent Closure
$Authorizers_{(t-1)}$	0.00690				
	(0.00538)				
$Wavier_{(t-1)}$		-0.00359			
		(0.00590)			
$School\ Cap_{(t-1)}$			0.00702		
			(0.00740)		
$Teacher\ Hiring_{(t-1)}$				0.00559**	
				(0.00267)	
$Funding_{(t-1)}$					0.00101
					(0.00425)
State and Year Fixed Effects	Yes	Yes	Yes	Yes	Yes
Charter Controls	Yes	Yes	Yes	Yes	Yes
Observations	469	469	469	469	469

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Note: All 40 states from years 2002-2013. Each charter law, authorizers funding, wavier, teacher hiring and school cap is scored from 0 to 5, 0 being the strictest. Each law component is from the previous year. Percent closure is the percentage of charter schools in the state that closed in each given year.

Table 12: Impact of Law Strength the Previous Year on Average Years Open

VARIABLES	(1) Years Open	(2) Years Open	(3) Years Open	(4) Years Open	(5) Year Open
Authorizer (t-1)	0.0860				
	(0.106)				
School Cap (t-1)		0.0225			
		(0.0838)			
Wavier (t-1)			-0.0976		
			(0.144)		
Teacher Hiring (t-1)				-0.199**	
				(0.0841)	
Funding (t-1)					-0.0933
					(0.101)
State and Year Fixed Effects	Yes	Yes	Yes	Yes	Yes
Charter Controls	Yes	Yes	Yes	Yes	Yes
Observations	360	360	360	360	360

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Note: All 40 states years 2006-2014. Each charter law, authorizers funding, wavier, teacher hiring and school cap is scored from 0 to 5, 0 being the strictest. Each law component is from the previous year. Average year open are the average years a charter is open for each state, in each given year.

Table 13: Impact of Law Strength Five Years Ago to Percent Closures

VARIABLES	(1) Percent Closed	(2) Percent Closed	(3) Percent Closed	(4) Percent Closed	(5) Percent Closed
$Wavier_{(t-5)}$	0.00410				
	(0.00450)				
$Authorizers_{(t-5)}$		-0.00599			
		(0.00547)			
$Teacher\ Hiring_{(t-5)}$			-0.00395		
			(0.00318)		
$School\ Cap_{(t-5)}$				-0.00812**	
				(0.00366)	
$Funding_{(t-5)}$					0.00813
					(0.00720)
State and Year Fixed Effects	Yes	Yes	Yes	Yes	Yes
Charter Controls	Yes	Yes	Yes	Yes	Yes
Observations	320	320	320	320	320

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Note: All 40 states from years 2006-2013. Charter law is the combination of all law components, scored from 0 to 5. Each charter law, authorizers funding, wavier, teacher hiring and school cap is scored from 0 to 5, 0 being the strictest. Each law component is from five years prior. Percent closure is the percentage of charter schools in the state that closed in each given year.

Table 14: Impact of Law Strength Five Years Ago to Average Years Open

VARIABLES	(1) Average Years Open	(2) Average Years Open	(3) Average Years Open	(4) Average Years Open	(5) Average Years Open
Authorizers(t-5)	-0.00457				
	(0.0648)				
School Cap(t-5)		0.00559			
		(0.0864)			
Wavier (t-5)			-0.120		
			(0.0784)		
Teacher Hiring(t-5)				-0.0646	
				(0.0594)	
Funding(t-5)					0.0689
					(0.0696)
State and Year FE	Yes	Yes	Yes	Yes	Yes
Charter Controls	Yes	Yes	Yes	Yes	Yes
Observations	360	360	360	360	360

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Note: All 40 states years 2006-2014. Each charter law, authorizers funding, wavier, teacher hiring and school cap is scored from 0 to 5, 0 being the strictest. Each law component is from five years prior. Average year open are the average years a charter is open for each state, in each given year.

Table 15: Impact of Strength of Law Components on Number of Each Type of Closure Reason

VARIABLES	(1) Financial	(2) Mismanagement	(3) District	(4) Facility	(5) Other/Unknown	(6) Academic
Teacher Hiring	0.106*	-0.0207	0.0204	-0.00774	-0.00355	-0.0270
	(0.0611)	(0.0254)	(0.0245)	(0.0131)	(0.0179)	(0.0335)
Authorizers	0.215*	0.120	0.00385	-0.00936	-0.0289	-0.00589
	(0.118)	(0.0747)	(0.0207)	(0.0191)	(0.0344)	(0.0961)
School Cap	0.0165	-0.0447	-0.0188	-0.00734	-0.0416*	-0.0693
	(0.0655)	(0.0504)	(0.0182)	(0.0121)	(0.0230)	(0.0756)
Funding	0.126	0.00798	0.0141	0.00752	0.0282	0.0477
	(0.101)	(0.0652)	(0.0318)	(0.0279)	(0.0299)	(0.0711)
Wavier	-0.143*	0.0867	-0.0753**	-0.00131	0.000910	0.0291
	(0.0758)	(0.0728)	(0.0354)	(0.0284)	(0.0322)	(0.0870)
State and Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Charter Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	440	440	440	440	440	440

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Notes: All 40 states; years 2001-2011. Each charter law, authorizers funding, wavier, teacher hiring and school cap is scored from 0 to 5, 0 being the strictest. The outcome variables are the number of school closings for each reason, financial, mismanagement, district, facility, other/unknown, and academic.

Table 16: Impact of Strength of Law Components in the Previous Year on Number of Each Closure Reason

VARIABLES	(1) Financial	(2) Mismanagement	(3) District	(4) Facility	(5) Other/Unknown	(6) Academic
Authorizers(t-1)	0.115	0.0162	-0.0137	0.0189	-0.0409	0.0503
	(0.0892)	(0.119)	(0.0324)	(0.0216)	(0.0467)	(0.124)
School Cap(t-1)	0.0151	-0.0548	0.00826	0.0131	0.0104	-0.0545
	(0.0746)	(0.0521)	(0.0160)	(0.0197)	(0.0280)	(0.0666)
Wavier(t-1)	-0.0937	0.0322	-0.0345	-0.00306	-0.0505	-0.0119
	(0.133)	(0.0775)	(0.0458)	(0.0142)	(0.0304)	(0.0768)
Teacher Hiring(t-1)	0.00888	0.0527	-0.0164	-0.0142	0.0142	0.0192
	(0.0705)	(0.0337)	(0.0409)	(0.0115)	(0.0255)	(0.0454)
Funding(t-1)	0.261**	0.0353	-0.0559	0.00626	0.0425	-0.00850
	(0.0977)	(0.0691)	(0.0434)	(0.0330)	(0.0282)	(0.0603)
State and Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Charter Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	400	400	400	400	400	400

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Notes: All 40 states; years 2001-2011. Each charter law, authorizers funding, wavier, teacher hiring and school cap is scored from 0 to 5, 0 being the strictest. Each law component is from the previous year. The outcome variables are the number of school closings for each reason, financial, mismanagement, district, facility, other/unknown, and academic.