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National Center *for*
Research on Education
Access and Choice

The Regulation of Charter Schools: National Patterns and Causal Effects

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Technical Report Published
November 2, 2023

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October 27, 2023

Abstract

There is considerable debate and evidence about how governments should regulate contractors and other firms, but little on how government should regulate schools. In the first phase of this study, we focus on the correlation between indices of state charter school policies and measures of charter quantity (market share) and three measures of quality: statewide student achievement growth from CREDO, closure of low-performing charter schools, and charter entry into low-performing school districts. States with no charter caps, multiple charter authorizers, and stronger contract renewal standards have higher charter market shares. We also see evidence of a quality-quantity trade-off. The regression coefficients on eight of the 11 policy variables are of opposite signs in the quality and quantity analyses. The positive correlation between charter market share and the number of charter authorizers motivates a follow-up analysis in which we test whether this correlation reflects causation. Using difference-in-differences analysis, we find evidence that adding a statewide authorizing body increased the statewide charter market share gradually over time.

Keywords: Regulation, firm entry and exit, charter schools

JEL Codes: I2, L5

Acknowledgments: This research was carried out under the auspices of the National Center for Research on Education Access and Choice (REACH). The research reported here was supported by the Institute of Education Sciences, U.S. Department of Education, through Grant R305C100025 to The Administrators of the Tulane Educational Fund. The opinions expressed are those of the authors and do not represent the views of the Institute or the U.S. Department of Education. We thank Valentina Martinez-Pabon for assisting in creating the National Longitudinal School Database (NLSD), a key starting point for this analysis.

1. Introduction

Since 1991, 46 states and the District of Columbia have passed charter school legislation and 7 percent of U.S. children now attend a charter school (NCES, 2019). The number of charter schools varies considerably across states, as does their effectiveness (CREDO, 2013, 2023). One possible reason, largely unstudied, is that state charter regulatory regimes also vary widely across states.

Charter schools can be viewed as regulated firms. Unlike traditional public schools (TPS), which are managed directly by the government, charter schools are public schools that are managed by private non-profit organizations and have considerable autonomy over personnel, budget, curriculum, extracurricular activities, and other operational matters. State governments exert control through laws related to funding, teacher certification, transportation, standardized testing, accountability, and more. State laws that apply to TPS also often extend to charter schools, though some are relaxed, in keeping with the goal of giving charter schools more autonomy.

Charter regulation also takes the form of contracts between charter organizations and governmental delegates called "charter authorizers." As the name implies, authorizers decide which schools are authorized to open and receive public funding, giving them considerable power (Bulkley et al., 2023). The contracts generally go beyond compliance with state laws and make additional stipulations (e.g., regarding financial compliance, grades served, and academic performance) that charter schools must follow to continue their operations and public funding.[1] State laws also circumscribe the roles of authorizers (e.g., limiting the total number of charter

[1] Though not generally required, authorizers can also provide support to charter schools to ensure their success.

schools they can open and the share of revenue they can take for their own operating costs) and the processes, content, and enforcement of contracts. The most common authorizers are school districts, but they also often include state boards and agencies, universities, and other local governments (e.g., mayors).

Charter school regulations can be evaluated, therefore, in ways similar to other private firms, based on the degree to which they successfully address market imperfections (Pigou, 1938; Posner, 1974; Shleifer, 2005). Such imperfections are legion in the schooling market (Betts, 2005; Harris, forthcoming). Positive externalities of schooling lead to under-provision in free markets. Peer effects give schools incentives to select their preferred students and exclude others (Bergman & McFarlin, 2018). Parents, who are generally responsible for making schooling decisions, have limited information because they experience schools only indirectly, through the eyes of their children. From the perspective of the public interest view of regulation, the government can conceivably step in to correct these problems.

The presence of market imperfections does not mean that regulation will improve matters, however. Policymakers face incentives that deter efficient regulation and have inadequate information to make efficiency-enhancing decisions (Shleifer & Vishny, 1993; Djankov et al., 2002; Balleisen & Moss, 2009; Rose, 2014). For example, there is evidence that regulation creates costs that tend to reduce firm entry (Ciccone & Papiaonno, 2007; Bertrand et al., 2007; Rostam-Afschar, 2014; Branstetter et al., 2013). While these marginal firms might have lower productivity (Lucas, 1978), this could still reduce overall market efficiency. These limitations reflect the public choice view of regulation.

Which view—public interest versus public choice—better represents the reality in the schooling market is unclear because the vast majority of schools are operated directly by the

government, and most of the remaining schools are almost entirely private, with little regulation and limited data to study them. Charter schools are one sector in the U.S. where these competing regulatory frameworks can be compared empirically. In this study, we start by describing the regulatory categories used by industry interest groups and then estimate the partial correlation between their rankings on each policy category and indicators of charter success. In the second stage of the study, we use this correlational evidence to identify potentially important policy changes and to test their effects using difference-in-differences (DD) analysis.

We start by studying charter school market efficiency through the entry and exit of charter schools. We use the National Longitudinal School Database (NLSD) to identify the number of charter schools that open and close, and we combine those data with the Stanford Education Data Archive (SEDA) to test whether charter schools open in low-performing traditional school districts, where they would seem most beneficial, and whether low-performing charters close. We also use value-added of charter schools relative to TPS, aggregated to the state level, using state-level measures from the Center for Research on Education Outcomes (CREDO, 2013, 2023). This combination of measures allows us to capture both the intended effects (e.g., excluding inefficient schools[2] and creating competition where school quality is low) and the unintended effects (e.g., keeping out possibly efficient firms or reducing efficiency among those that do enter).[3]

[2] The displacement of students from lower performing schools is unlikely to be the only mechanisms by which schools improve as charters enter a market. Studies on the spillovers or increased competition associated with the opening of charter schools generally show positive or undetectable effects on TPSs (Betts, 2009). Of the 24 studies examined by Mathematica (2019) on spillovers effects, 9 studies find positive competitive effects, 10 studies show no effects, 2 studies show mixed effects, and 3 studies show negative competition effects.

[3] Prior studies have examined the entry and exit of schools, independent of regulation. Studies on the closure of low performing schools have generally found long-term effects that are mixed (Enberg et al, 2012; Sacerdote, 2012; Brummet, 2014; Carlson & Lavertu, 2016; Bross et al., 2016; Bifulco & Schewegan 2019; Larsen, 2020). Perhaps more notably, the effects tend to be positive when students are displaced and move to higher quality schools (Bross

Our analysis examines measures of the *quantity* of charter schools (charter school and enrollment shares) and the *quality* of charter schools: (a) statewide CREDO results on participant effects; (b) the likelihood that low-performing charter schools close relative to higher-performing schools; and (c) the likelihood that charter schools located in low-performing traditional public school districts. We view measures (b) and (c) as being about the long-term prospects for charter schools to raise local academic outcomes in the future. Prior evidence suggests that accountability played a key role in improving charter school performance in New Orleans (Bross, Harris, & Liu, 2023) and that the total effects of charter schools are more positive in districts with lower baseline achievement (Chen & Harris, forthcoming).

In the first part of the study, we regress each of these outcomes on sets of policy indicators created by three charter industry groups: the Center for Education Reform (CER), the National Alliance for Public Charter School (NAPCS), and the National Association of Charter School Authorizers (NACSA). While we control for various policy elements, and various non-policy factors, simultaneously, we interpret these as correlations between policy, charter quantity, and charter quality, which serves as suggestive evidence for the second part of the study.

Due in part to the small sample size (fewer than 50 states), most of the estimated correlations between the specific elements of the charter laws and our measures of market outcomes are imprecisely estimated. However, there are some noteworthy patterns. First, we see higher charter market shares (charter quantity) in states with no charter caps, multiple charter authorizers, and more robust contract renewal standards. The estimated correlations are also

et al., 2016, 2023). This suggests that charter contract provisions that close low performing schools have positive effects.

consistently positive and sometimes significant for charter school funding. Given the role that school funding plays in schools generally (e.g., Jackson et al. 2016), this would also seem to imply that more equitable funding improves the quality of charter schools. This is also likely why charter schools are more likely to be located in school districts within states that give them a relative financial advantage (Glomm, Harris, & Lo, 2004).

Second, as measured by CREDO, the quality of charter schools is higher in states with more equitable funding and lower in states with no charter caps. This means that the lack of charter caps is associated with both a larger quantity of charter schools and lower quality, which might mean that letting in more charter schools involves accepting lower-quality charter school applicants. We also see evidence of a quality-quantity trade-off across the spectrum of policy elements. For eight of the 11 policy variables, the relationship with charter market share is in the opposite direction of the relationship with charter achievement growth. Conversely, there are no policy elements where the quality and quantity correlations coefficients go in the same direction with either one being precisely estimated.

Given prior evidence about the role of accountability (Bross, Harris, & Liu, 2023), we might have expected the charter accountability provisions to be especially important for quality, but we see limited evidence of this. None of the four policy variables related to accountability are precisely related to the CREDO measures, though most of these policies are positively (and imprecisely) related to the closure of low-performing charter schools.[4] This may reflect that, in

[4] This is also broadly consistent with one prior study using data from Africa. Baum et al. (2018) exploit the varying regulations that exist across countries in the Sub-Saharan region by constructing a composite index quantifying the level of restrictions of entry for each nation. They then estimate the relationship between the index and the growth of the private education sector. The index components include regulations pertaining to tuition levels, teacher qualifications, teacher salaries, class sizes, and land ownership requirements. They conclude that restrictive regulations are insufficient to reduce market failures because they limit the supply of the official private education market and are likely leading to a growth in the unofficial market. An unofficial market where unregulated, unmonitored, and low-quality private education services are likely to grow in influence.

practice, charter authorizers have considerable autonomy to implement accountability as they see fit, so that state policies have limited practical impact.

Third, we find that the presence of an alternative authorizer, in addition to local school districts as authorizers, is related to a number of outcomes. In addition to being associated with an increased number of charter schools, it is correlated with a reduction in closures of low-performing charter schools but an increase likelihood of location in low-performing school districts. This suggests that alternative authorizers might allow charter schools to open in low-performing school districts that may otherwise resist such charter schools, but that the alternative authorizers are less likely to close charter schools when they fail.

Given that all of the above analysis is correlational, and many of those correlations are imprecise, we view the analysis as speculative, but the correlations do guide us toward additional analysis of causal effects. Given the negative correlation between quality and whether policy allows multiple authorizers, we looked for and found states that had changed their authorizer policies to study the effects of this change. Using difference-in-differences (DD) analysis, we compare states that changes these policies with those that kept them constant and used Callaway and Sant'Anna (2021) method to account for the staggered design. These results suggest that the above correlation probably does reflect causation in this case---having an alternative, statewide authorizer likely increases charter market share, gradually over time.

While analysis of school regulation is nascent, this work builds on two streams of prior work in New Orleans (Ruble & Harris, 2014; Bross, Harris, & Liu, forthcoming).[5] Other studies have examined the regulation of school vouchers. Sude et al. (2018) study the participation of

[5] Bross, Harris, & Liu, (forthcoming) also focused on the effects of ending failed charter contracts on the students in the failed schools, which is less pertinent to the present study.

private schools in voucher programs in Washington, DC, Indiana, and Louisiana. They find that private schools with high tuition are less likely to participate in voucher programs compared to their lower tuition counterparts. The same may be true of private schools with high Great Schools ratings, but these results are statistically insignificant. To examine why private schools might be less likely to participate voucher programs, Wolf et al. (2019a, 2019b) conduct surveys in California, Florida, and New York to find the regulations which are most burdensome. The most onerous regulations, according to schools' self-reports, include requirements that schools admit students at random (no admission requirements) and mandatory participation in state standardized testing.[6,7] Both of these requirements are nearly universally imposed on charter schools.

But we are less interested in whether private schools and charter schools oppose regulation than we are in the question, what effect does regulation have on market outcomes? This is the first study to our knowledge that examines the effectiveness of charter regulation across states and one of few to use many different dimensions of regulation and multiple measures of effectiveness. Sections 2 describes our data, including the entry, exit, and school quality measures. Next, in Section 3, we describe both the descriptive and causal analysis methods. Section 4 summarizes our results and Section 5 concludes.

2. Data

This study examines 2003 to 2019 school years in the National Longitudinal School Database (NLSD), an annual near census of schools in the United States. The database is

[6] In a survey of school leaders by Kisida et al. (2015), the authors find that private schools prefer national norm-referenced testing to maintain more curriculum independence than state-based curriculum.
[7] NACSA is a partial exception as their ratings of laws are more positive when standards are high.

compiled by the authors of this study and others at the National Center for Research on Education Access and Choice (REACH). The linked components of the database that we rely on include, but are not limited to, the Common Core of Data (CCD) from the US Department of Education, the Stanford Education Data Archive (SEDA),[8] Center for Research on Education Outcomes (CREDO), U.S. Census and American Community Survey demographic data, the National Association for Public Charter Schools (NAPCS) database of all charter schools in the US, and regulation records by each state collected by the REACH center. The identification of school openings, closures, and whether they are charter are defined by Harris and Martinez-Pabon (forthcoming).

While we use the full range of years in the causal analysis, the correlational analysis focuses just on the years 2014-2019 because we need to align the student outcomes to most recent (pre-COVID) years of the policy variables. Also, in focusing only on the quantity of charter schools, the causal analysis allows us to use data across multiple decades.

2.1 Regulatory Indices

To better understand the relationship between charter school regulations and their consequence for the education marketplace, we gather state ratings of charter school policies

[8] To make the estimates are comparable across states, grades, and years, the SEDA research team took the following steps: (1) estimate the location of each state's proficiency "thresholds" in the distribution of scores; (2) place the proficiency thresholds on the same scale using the National Assessment of Educational Progress (NAEP), a test taken by a representative sample of students in each state; (3) estimate the mean test scores in each school, district, county, metropolitan statistical area, commuting zone, and state from the raw data and the threshold estimates, and (4) create estimates of average scale scores and achievement growth measures. See details in SEDA website https://edopportunity.org/methods/. While this method is of course based on assumptions (e.g., that the NAEP sample is truly state representative and the distribution of state scores is the same as the NAEP distribution despite the differing content of these various tests), this could only result in bias if test error in charter-entering districts differs from never-charter districts (within grades and states and conditional on other included covariates) and changes over time in conjunction with charter school entry. We could not come up with potential examples where this might be the case.

published in 2014 by the Center for Education Reform (CER), the National Alliance for Public Charter School (NAPCS), and the National Association of Charter School Authorizers (NACSA). These rankings are useful for understanding regulation because these organizations are well-informed about charter laws and are likely to focus their rankings on policies that are genuinely important, at least to their charter constituents. While we do provide evidence about the relationship between each group's overall ranking and the various market outcomes, our main interest is in the information the rankings provide about the components of charter regulation. The proceeding sections provide a short description of each composite index and the index components that we included for our study.[9]

2.1a Center for Education Reform (CER)

CER ranks states based on "laws that have a strong, permanent authorizing structures, equitable funding codified in law, and autonomy across state, district, and teacher rules and regulations, giving charters the freedom to do what they do best." The organization's three most heavily weighted criteria are: the presence of independent (alternate) authorizers, number of schools allowed, and 100% charter funding (similar to the above "equitable funding"). The number of schools refers to enrollment caps and whether states are approving charter schools on a regular basis.[10]

2.1b National Alliance for Public Charter School (NAPCS)

NAPCS evaluates state charter laws based on charter school laws that promote the creation of "high-quality charter schools while holding underperforming schools and authorizers

[9] We selected the highest weighted components from each sub-index that are likely to be relevant for school performance, openings, and closures.
[10] We note that this almost guarantees a relationship between this criterion and charter market share in the empirical analysis that follows.

accountable."[11] The five most heavily weighted components used for our study include state ratings by performance-based contract required, clear processes for renewal/nonrenewal, automatic exemption of charter schools from laws applied to traditional public schools (TPS), no caps on the growth of public charter schools, and equitable operational funding. The performance-based contract requirement component provides higher ratings to state laws that have requirements for contracts that provide academic performance expectations, operational performance expectations, and school and authorizer rights and duties. The process for renewal component examines whether there are "clear processes" for renewal, nonrenewal, and revocation decisions, including school closure and dissolution procedures. The no charter caps category determines whether there are caps on growth for public charter schools in a state. Equitable operational funding compares general operational, transportation, and other categorical funding of charter schools to TPS.

2.1c National Alliance for Public Charter School (NACSA)

NACSA's policy ratings emphasizes policies that "facilitate the development of successful charter schools and enhance accountability for schools and authorizers alike."[12] The three most heavily weighted components include a rating for alternate authorizer, renewal standard, and default closure. The alternate authorizer ranks states based on whether they include authorizers other than school districts and whether the state can sanction poor authorizers. The renewal standard component ranks states by whether they require a strong standard that hold schools accountable for performance. A default closure policy standard means that there are

[11] https://www.publiccharters.org/publications/model-law-supporting-high-quality-charter-public-schools
[12] http://www.qualitycharters.org/wp-content/uploads/2015/08/State-Policy-Analysis.pdf

minimum requirements for renewal and/or provisions for closure in extreme conditions prior to contract expiration.

2.1d General Differences Between the Indices

Although all three industry group rankings are clearly interested in expanding charter schooling, they differ in important ways. First, NACSA, as an organization of charter authorizers, is more focused on state policies that directly pertain to the authorizer roles, whereas NAPCS and CER rankings are based on a broader range of factors (e.g., funding). Second, NACSA is more focused on government accountability, while CER focuses on market accountability—"autonomy" and "freedom" for charter schools. (The NAPCS ranking is somewhere in between the two.) The NACSA approach is noteworthy given that the group represents the government-designated organizations—authorizers—who are responsible for holding schools accountable.

2.2 Summary Statistics

The main sample used to examine the correlation between regulatory indices and student outcomes includes all public schools in the NLSD from the 2015-2019. The data on school performance for this set of schools comes from SEDA whose measures are based on data from the years 2009-2016. The analysis is conducted using charter regulation policies on 42 states that had at least one charter school in 2015 school year.[13] We would have preferred, in the correlational analysis, to focus on student outcomes that came entirely after the policies, had been adopted, but we could not find clear descriptions of the policies in earlier years. Also,

[13] We include Washington, DC as a state for purposes here. The nine remaining states without charter schools in 2014 include AL, KY, MS, MT, ND, NE, SD, VT, and WV.

charter policies appear to be fairly stable over time, so we do not see this as a significant problem for purposes of the correlational analysis. (This concern does not apply to the causal analysis where we have a longer panel and focus only on changes in one policy variable.)

Table 1 reports descriptive statistics. The first column lists the 42 states that we examine and the three columns immediately to the right are the reversed state rankings. We "reverse" the rankings so that higher values indicate "better" regulations, in the eyes of the industry groups. The values are based on the point and weight system created by the industry groups in 2014. These three columns report a slight variation in ranking of states between organizations. NACSA rankings are most strongly correlated with NAPCS (0.648), NAPCS rankings are most strongly correlated with CER (0.690), and the weakest correlation is between NACSA and CER (0.401).

The three sets of columns to the right in Table 1 of the state rankings report the primary outcomes that we examine. The first set displays the share of public schools that are charter and the change in share over time; specifically, the share in the last available year of 2019 and the change from 2014-2019. In our sample, among those states that have charter school laws, Iowa has the lowest share of schools that are charter (0.15 percent) while the District of Columbia has the highest share (over 50 percent). The greatest growth occurs in Nevada (4.80 percentage points) and the greatest contraction occurs in Arizona (3.57 percentage points). The second set of outcomes is like the first set but is reported in terms of student enrollments.[14]

The final set of outcomes displayed in Table 1 show CREDO's 2013 and 2023 estimates on learning gains at charter schools relative to TPSs (student-level standard deviation units).[15]

[14] It is important to note that the student enrollment data only extends to 2017.
[15] CREDO reports math and reading achievements separately. For the purpose of this study, we average the two. The average that we use is what is reported on the table.

The left column represents the charter school impact for the 26 states reported in 2013.[16] The middle column represents the charter school impact for the 30 states reported in 2023.[17] In both columns, positive values indicate the extent that charter schools are performing better than their non-charter counterfactual schools while negative values indicate the extent that charter schools are lagging. The charter school impact measures range from a low of -0.17 s.d. in Nevada to a high of 0.15 s.d. in Rhode Island. The final column reports the change in charter school impact from 2013 to 2023 for the 25 states with achievement measures in both years. A positive value indicates the extent charter schools have been improving relative to their counterfactual TPSs in this timeframe. These values range from -0.09 s.d. in the District of Columbia to 0.18 s.d. Nevada.

We use the above data in the sections that follow to describe the relationship between charter regulations and market outcomes; and to study the effects of the addition of statewide authorizers on market outcomes.

3. Econometric Framework

3.1 Analysis of Regulation Indices

We study how charter school regulations correlate with market size, entry, exit, and overall quality of the charter sector. Market size is proxied by using both the share of publicly funded schools that are charters and the share of enrollment in charter schools within each state. To measure the overall performance of schools in the charter sector (by state), we use CREDO's charter school impact measures published in the years 2013 and 2023, including the change

[16] The 2013 report used data up to the 2010-11 school year.
[17] The 2023 report used data up to 2019.

(improvement) from 2013-2023. Measuring the change in performance allows us to observe the relationship between charter regulations on the overall trajectory of charter school quality.

We also analyze the exit of low-performing charter schools relative to other charter schools. This allows for us to report within-state (or within-district) estimates, which significantly reduce the potential for omitted variable bias due to the correlations that are likely to exist between state regulations and unobserved factors that are likely to affect the performance of schools within the state.[18] To conduct this analysis, we use a baseline sample of all publicly funded schools with SEDA cohort growth measures that are open in the spring of 2015 and indicate whether they are closed by the spring of 2019.[19]

Below, we discuss the statistical models we use to correlate policy design and the above measures of market functioning. The main models for analysis of state-level outcomes are:

$$y_s = \beta_1 Rank_s + \kappa_1 X_s + u_{1s} \quad (1a)$$

$$y_s = \beta_1 Rank_{1s} + \cdots + \beta_p Rank_{ps} + \kappa_2 X_s + u_{2s} \quad (1b)$$

where y_s represents the charter market outcome of state *s*. These include the percentage point change in charter market share, the most recent market share, change in state-level charter performance, and the most recent state-level charter performance.

In (1a), the variable $Rank_s$ represents the inverse rank of the overall composite index for CER, NACSA, and NAPCS (i.e., higher values mean better policy from the perspective of the industry group). X_s is a vector of state-level demographic controls: median household income and population shares of school-age children, married households, minority race, educational attainment, and poverty. Here, we are mainly interested in the estimates of β which reflect the

[18] To limit redundancy throughout the paper, our references to "district" is specifically a geographic school district.
[19] The national average is standardized a mean of zero and standard deviation of one.

relationship between overall industry rankings and the outcomes of interest. A value greater than zero signifies that a better/higher ranking is associated with a higher value for the market outcome measure.

Equation (1b) is the same except that we now separate each industry group's composite ranking into its *P* subcomponents; with *P*=3 for NACSA and CER and *P*=5 for NAPCS. So, each industry group block is a separate regression and therefore controls for other policy components. This means that each column shows the results of six separate regressions, one each for the three industry group composite rankings and one for each industry group subcomponents.

These are essentially cross-sectional regressions, but where the data sources all come from slightly different years, so they do not perfectly align (see the years above). This is unlikely to affect the results given how slow charter regulations are to change. Even if it does affect the empirical findings, we emphasize again that this part of the analysis is correlational and exploratory.

In contrast to the above analysis at the state level of aggregation, the analysis of low-performing charter school closure is at the school level and given by:

$$y_c = \gamma(\, LowPerf_c \times Rank_s) + \pi_1\, LowPerf_c + \varphi_1 X_c + \lambda_s + \eta_{1c} \quad (2a)$$

$$y_c = \gamma_1(\, LowPerf_c \times Rank_{1s}) + \cdots + \gamma_p\big(\, LowPerf_c \times Rank_{ps}\big) + \pi_1\, LowPerf_c + \varphi_2 X_c + \lambda_s + \eta_{2c} \quad (2b)$$

where the outcome of interest y_c represents an indicator of 1 when individual charter school *c* is closed by spring of 2019. The remaining charter schools that are still open take on the value of 0. $LowPerf_c$ is an indicator variable for whether a charter school is a bottom-third performing charter

school in terms of achievement levels or growth.[20] λ_s represents state fixed effects, which account for unobserved and observed differences across states.[21] Since we are now estimating at the school level, X_c is a vector of school and Census block-group demographic controls. School demographic controls include proportions of minority and free/reduced lunch students. The Census block-group controls include median household income and population shares of married families, educational attainment, and poverty.

We are mainly interested in γ, which represents the interaction between state policy rankings and the closing of low-performing charter schools, i.e., charter schools that are in the bottom-third of the state distribution of all publicly funded schools (controlling for school and Census block-group demographic controls and other policy components). When $\gamma > 0$, low-performing charter schools are more likely to close when they are in states with better ratings.

Charter schools might have a more positive correlation with student outcomes if they open in low-performing traditional public school district—where the need for alternatives is highest. To test this, we estimate the following district-level equation:

$$y_d = \delta(\, LowPerf_d \times Rank_s) + \pi_1\, LowPerf_d + \varphi_1 X_d + \lambda_s + \varepsilon_{1d} \tag{3a}$$

$$y_d = \delta_1(\, LowPerf_d \times Rank_{1s}) + \cdots + \delta_p\big(\, LowPerf_d \times Rank_{ps}\big) + \pi_2\, LowPerf_d + \varphi_2 X_d + \lambda_s + \varepsilon_{2d} \tag{3b}$$

where the outcome of interest y_d represents one of two dependent variables: (a) the percentage change in charter schools in geographic district *d*, using the 2015 spring year as the base;[22] and (b)

[20] We specifically use the mn_avg_ol_cls and mn_coh_ol_gcs variable from SEDA. For details on the achievement measure please see https://edopportunity.org/help-faq/#how-measures-computed.
[21] We also examine the model with district fixed effects.
[22] The numerator is the number of newly opened charter schools between 2016 and 2019 spring years.

an indicator for whether a district has new charter schools from 2015 to 2019 spring years. $LowPerf_d$ is an indicator variable for whether a district is a bottom-third performing district in terms of achievement or growth and λ_s represents state fixed effects.[23] X_d is a vector of Census block-group demographic controls, including median household income and population shares of married families, educational attainment, and poverty.

We are mainly interested in the δ vector, which reflects whether low-performing districts are more likely to have charter schools enter in states with high policy rankings. Again, in a healthy charter school market, we expect these parameters to be positive.

3.2 Methods for Analyzing Effects of Authorizer Policy Changes

The purpose of the above analysis, given the paucity of evidence on charter schools, was to identify policies that *might* affect the charter market. Indeed, one key finding from the above analysis, as explained later, is that states with alternative authorizers have different charter outcomes. In the methods described in this section, we explain how we test whether this correlation reflects a causal effect.

We compare charter market share in states that had the same authorizers over time to those that switched from district-only to district plus statewide authorizer(s). We estimate this effect following an event study difference-in-differences (DD) specification that allows for time-varying treatment effects. The two-way fixed effects (TFWE) version is represented by:

$$y_{st} = \alpha_s + \delta_t + \sum_{\tau=-q}^{-2} \theta_\tau \mathrm{D}_{s\tau} + \sum_{\tau=0}^{m} \theta_\tau D_{s\tau} + \beta \mathrm{X}_{st} + \varepsilon_{st} \quad (4)$$

[23]We specifically use the mn_avg_ol_cls and mn_coh_ol_gcs variable from SEDA. For details on the achievement measure please see https://edopportunity.org/help-faq/#how-measures-computed.

where y_{st} represents the percent of schools that are charter within a state or the percent of school districts that contain a charter school. α_s is a vector of state fixed effects and δ_t represents year fixed effects. The state fixed effects separately control for time-invariant characteristics specific to each state. The variable $D_{s\tau}$ takes on a value of 1 if observation's period t is τ years away from the expansion year for state s. We are interested in θ_τ, which represents lead and lag effects of adoption up to q years before the initial adoption year and m years after. Our omitted period is $\tau = -1$, representing the year before the expansion. Our time-trend controls are represented by X_{st}, which include by year state-year weighted averages of school level racial compositions and free and reduced-price lunch eligibility percentages. Finally, ε_{st} is an error term that accommodates clustering at the state level.

Our main identifying assumption is that there are no unobserved shocks affecting the market outcomes that are also correlated with the timing and location of state authorizer policy changes. One specific threat to identification is that other charter policies (e.g., charter funding) might have changed at the same time as the charter authorizer policy in the treatment states—a bundle of policy changes. To address this concern, we omit states whose charter laws underwent significant changes other than expansion during the period of analysis from our sample (see details below). Another concern is that comparison states adopted different charter policies changes (e.g., tried to increase charter market share in some way other than a statewide authorizer). More broadly, we are assuming that the comparison and treatment groups would have followed parallel trends in the absence of treatment.

A statewide authorizer can authorize charter schools in any school district, without the district's approval and often despite district opposition. Examples include the state board of

education or independent charter board/commissions.[24] Table A1 reports the states used for control and treatment and the years in which statewide authorizing was enacted (if ever). We identify each state's annual state treatment status during 2002-2017 using data from NACSA, NAPCS, the Education Commission of the States, and internet sources such as news outlets and state board of education websites. As we explain later, some states do not fit clearly into control and treatment groups and we therefore create multiple definitions as robustness checks.

Twelve states are omitted from our sample because they had yet to enact a charter law or have enacted their charter law too recently to provide a balanced panel over the period of analysis.[25] Another 21 are omitted because their charter law experienced extraneous changes during the period of analysis that could inhibit the identification of the effect of statewide authorizers. These changes could include an increase in the charter cap set for the state, a change in the charter funding structure, or a change in the appeal structure for charter authorization in the state. Similarly, categorizing states whose authorizers remain constant but who experience these other types of changes as control states could lead us to under-estimate the impact of authorizer expansion in treatment states if these other changes also led to increases in the performance of charter markets in the states that did not undergo authorizer expansion. So, we focus this part of the analysis on the remaining 18 states.

[24] Depending on the state, a higher education entity may authorize charter schools throughout the state.
[25] These states are: AL, KY, ME, MD, MS, MT, NE, ND, SD, VT, WA, WV

4. Results

4.1 Regulation Indices

Estimates of the partial correlations between state policies and charter market share, from equations (1a) and (1b), are reported on Table 2, along with their corresponding heteroscedasticity-robust standard errors. In general, estimates from school market share and student enrollment share have similar magnitudes and signs therefore we focus on the former in our interpretation. We also focus on our preferred regressions in Column (2), (4), (6) and (8), which control for state demographic variables.

The top three rows of Table 2 display the relationship between the composite policy ranks by charter industry groups and charter school market share. These composite ranks predict the 2019 market share, but less so for predicting growth. All three composite indices are positively related to charter market share levels (NAPCS and CER are significant). The NACSA and NAPCS ratings are consistently positively correlated with charter market share.

We are mainly interested in the components of the indices, however. Charter market share levels are positively related to having no charter cap/number of schools allowed, renewal standards, and alternate/independent authorizers, as well as 100 percent funding (i.e., high charter funding relative to TPS). The magnitudes of these coefficients suggest that going from the lowest- to the top-ranked state is associated with a 4-6 percentage point increase in market share (for each variable separately). This means that are associated with 60-86 percent increase relative to the national average charter market share.

In Table 3, we report estimates of the relationship between state policies and charter school academic performance, also based on equations (1a) and (1b). These academic

performance measures come from CREDO's 2013 and 2023 national reports on charter school performance. We focus on the 2023 measures and the 2013-2023 changes, as we are mainly interested in the most recent years and improvement over time. The number of states in the analysis drops to the 25-30 range because not all states have CREDO measures.

Only three of the policy variables are ever precisely related to achievement growth, but they include three that are also related to market share. Hundred-precent funding is positively associated with charter achievement growth. However, while charter caps/number of schools allowed is associated with higher *quantity* of charter schools, it is also associated with lower *quality*. Going from the bottom- to the top-ranked state on the number of schools allowed reduces the average CREDO measure by roughly 0.06 s.d. This suggests that states trying to limit charter entry are more successful in attracting and retaining higher-performing charter schools, perhaps because they can be more selective in which charters open. On the other hand, with fewer charter schools, the higher growth arises benefits a smaller number of students.

Another sign of the way that charter school regulations influence educational quality is by their influence on closing low-performing schools. Table 4 shows the results of estimating equations (2a) and (2b), examining rates of charter school closure from 2015 to 2019. Based on these estimates, closures of low-performing charter schools are more common (relative to other charter closures) when there are no charter caps/more charter schools allowed, a process for renewal, and 100-percent funding, but negatively associated with having an alternate/independent authorizer. It is easiest to see the logical connection between renewal standards and closures of low-performing schools since the latter is a direct outcome of the former.

As another example, having an alternative authorizer reduces the odds of a low-performing charter schooling closing by 0.005, or four percent less than the baseline mean. This is consistent with the earlier finding that having an independent authorizer leads to higher market share overall, regardless of quality. The combination of findings could reflect that independent authorizers have fewer incentives to close low-performing schools (e.g., because they are paid a share of the funds that all charters under their authority receive), which in turn leads to higher market shares.

A final marker of the role of charter regulation is the degree to which charter schools open in low-performing school districts, where they are likely to have the greatest benefit (Chen & Harris, forthcoming). Our estimates of equations (3a) and (3b) in Table 5 show that equitable funding is positively related with this measure. Taking this together with Table 2 suggests that equitable funding increases the number of schools in total and more of those schools end up in low-performing districts. Charter schools are also more likely to locate in low-performing districts when there are alternative authorizers.

As robustness checks, we re-analyzed the data switching the low-performance threshold from bottom-third to bottom-half for the two broader quality measures—closure of low-performing charter schools and opening in low-performing districts. These results, in Appendix Tables F1-2, show that the results are qualitatively similar when we switch the thresholds. The results are also robust to replacing the state *rankings* with the underlying *ratings*[26] (Appendix Tables E1-4), and, for the analysis of the closure of low-performing schools, to measuring performance in terms of achievement levels, rather than growth (Appendix Table G1).

[26] We focused on the rankings to this point because this keeps all the policy variables on the same scale, which eases the interpretation.

We emphasize two key caveats here. First, this is only meant to be a correlational analysis, one that identifies patterns in the data and possible prospects for causal analysis. Second, we note the possibility of false positives due to the multiple comparisons being made; 55 of 264 estimates in Tables 2-5 are precisely estimated.[27] This is roughly double the number expected by chance, which suggests that some of these patterns are more than statistical aberrations, but it still reduces our confidence in any individual estimate. Given the first caveat—that this is exploratory—we do not make any formal adjustment to the standard errors (e.g., Bonferroni).

4.2 Descriptive Statistics Pertaining to Causal Analysis of Statewide Authorizers

The above results suggest that the presence of alternative/independent authorizers (i.e., authorizers other than school districts) might affect charter outcomes. State charter authorization policies have also changed over time in many states and this provides us with an opportunity to estimate the causal effects of regulation.

We focus specifically on statewide authorizers, which have the ability to authorize charter schools across local jurisdictions in a state. Statewide authorizers can include the state department of education, independent state charter commissions/boards, or any other statewide authority that can directly receive and approve applications from charter schools. In our analysis, we define group T2 as states that had any type of statewide authorizing expansion; this includes eight treatment states (AR, CO, GA, ID, IL, IN, NM, and OH). For example, since 2000, the state of Georgia allowed for charter authorization both from local school districts and from the state board of education. But, in 2008, Georgia also created the Georgia Charter School

[27] This is a somewhat crude way of looking at it because many of these are different specifications and we only deem coefficients to be precisely estimated when the point estimates are robust.

Commission, an independent charter board serving as an additional state level authorizer. Group T1 is a more limited group of states that initially allowed only for local authorization, and then later created a statewide authorizer. T1 is a subset of T2 and includes only Idaho and Illinois.

We also separately examine two types of counterfactual states. The first type, C1, includes three states that only offer local district authorizing for the full duration of the panel (KS, VA, and WY), i.e., never-treated states. The second counterfactual group, C2, includes the C1 states, but also states that had statewide authorizers during the entire panel (CA, DE, KS, MA, MI, MN, NJ, PA, VA, and WY). The advantage of using this second type of counterfactual is the inclusion of more states, but the more extended comparison also means that the lagged effects of statewide authorization may contaminate the estimated effects using C2. Overall, this means that C2 and T2 have the larger number of states where T1 is a subset of T2 while C1 and C2 are mutually exclusive. For more information on these definitions, see Appendix A.

Figure 1 plots the trends in the number of charter schools in each of the treatment states (using the broader T2 definition) relative to the time of the policy change. This leads to several important observations. First, we see a gradual increase in the number of charter schools in each state. This general, gradual increase is not at all surprising since we know that the national charter market share was increasing during this period. (Ohio is an exception to this. We also note that Ohio saw a sharp rise in charter schooling five years prior to expansion authorization.)

Second, it is not evident that the policy changes affected the number of charter schools; in each state, the number of charter schools seems to increase steadily through the trend. But, as we show later, this is somewhat misleading. Just because the trend is smooth does not mean that it would have been smooth in the absence of treatment. This is why adding a comparison group and carrying out DD analyses is important generally.

The next two observations identify limitations of the data that inform our later interpretation. Figure 1 shows that the panel is imbalanced, which means that, especially in the out years, the changes in the point estimates partially reflect changes in the sample. We revisit this below when examining the event studies. Appendix A also provides more detail about the years that policies were adopted in each state.

Finally, Figure 1 highlights distinctive patterns in two states. The rise in charter schools is especially pronounced in Colorado. Also, we see a potential problem in the Illinois data. Notice the spike in the state's number of charter charters in the last period. After additional investigation, it appears that some Illinois CMOs were previously operating many campuses under a single school identification number, but then later assigned each campus its own school identification number, which gives the false appearance of a spike in the number of schools. To address this, and the possibility that it might have happened in other states, we re-estimate the results using the share of students who are attending charter schools, which side-steps the above problem.

4.3 Effects of Statewide Authorizing

We study the effects of state-level authorization using equation (4), an event study DD design that compares the changes in the outcome of the states that adopt statewide authorizing with contemporaneous changes in the counter-factual states and states that had not yet implemented statewide authorizing. Our main results focus on the percent of schools that are charters, but we also report results for other versions of the dependent variable (see below). More generally, the results are robust to a wide variety of methodological choices.

Figure 2a-2b show event study results for the T1/C1 and T2/ C2 comparisons where the dependent variable is the percent of schools that are charters. These two estimates pass a pre-trends test and suggest a gradual increase of 3-5 percentage points in the share of publicly funded schools that are charter schools 10 years later. The point estimates are similar in Figures 2c and 2d (for the T2/C1 and T1/C2 comparisons, respectively), but the pre-trends are more questionable in those two cases.

When we turn to the Callaway and Sant'Anna (2021) results, in Figures 3a-3d, the results are more convincing and suggest flatter pre-trends and gradual increase in effects post-treatment (except in Figure 3d where the increase is delayed and sharp, similar to the TWFE method in Figure 2d). Appendix D shows that the Callaway and Sant'Anna results are robust to changing the dependent variable to the percentage of geographic districts containing a charter school.

We noted earlier that the panel is imbalanced and that Illinois had an unusual spike six years post-treatment. Also, the event study figures are only balanced for the periods -2 to +4. This opens up the possibility that the effects, which are most pronounced after +4, are driven by changes in the sample or a particular state. Additional analysis, however, suggests this is not the case. First, we switched the dependent variable to the share of *students attending* charter schools (Appendix C). The fact that the results look similar means that the main results are not driven by the changes in the way charter schools show up in the Illinois data (see above). Second, we re-estimated our main TWFE estimation comparing T2/C2 without controls using a leave-one-out analysis in which Illinois, and each other treatment state, is dropped from the analysis. These results (Appendix Figure H1) show that the prior tables and figures are not driven by a particular state and are not likely driven by the balanced panel. Third, we see evidence of positive effects even as soon at period +4.

The results are also robust to adding covariates to the TWFE model (Appendix B), and to estimating the impact on the share of geographic districts containing at least one charter school (Appendix D). The latter result suggests that the additional charter schools opening because of the policies are opening charter access in districts that worked to keep all charter schools out before the policy was adopted.

Based on these results, we conclude that that expanding the range of statewide authorizers likely increased the number of charter schools, especially in school districts that had no charter schools before the policy. The results are generally robust to the definition of treatment and comparison groups, robust to alternative definitions of treatment (share of students in charters, share of schools that are charters, and share of districts that have charters), the use of covariates, the choice of DD method (TWFE) and Callaway and Sant'Anna (2021), and dropping individual states. Given the way we constructed the sample, especially that we narrowed to states that did not have contemporaneous changes in charter school policies other than the statewide authorizer, it also appears that our identifying assumptions hold.

Our results suggest that the correlation between charter market share and the presence of alternative/independent authorizers reflects a causal effect. The national charter share would have tapered off more if not for the number of states that added statewide authorizers.

5. Conclusion

This study provides the first analysis of the relationship between charter school regulations and market outcomes. States with no charter caps, alternative/independent charter authorizers, and stronger contract renewal standards have higher charter market shares. We also

see some evidence that more equitable charter school funding (relative to traditional public schools) increases school quality. While almost all of the preferred estimates show a positive correlation for one of the two funding measures, they are inconsistent across the two measures and almost none of them reach the usual standards of statistical significance.

We also see evidence of a quality-quantity trade-off. The regression coefficients on eight of the 11 policy variables are of opposite signs in the quality and quantity analyses. This pattern is consistent with the theory that regulation plays a beneficial role, increasing the quality of contractors. This potential quality-quantity trade-off is related to the larger focus of the economics of regulation literature, which emphasizes the productivity of the marginal firms who may be dissuaded or banned form entry (Lucas, 1978). These effects are inherently difficult to test in part because the productivity of never-entrants is never observed.[28] But the fact that many of the policy elements considered here are correlated with lower charter market share—and higher-quality entrants—provides some suggestive that charter regulation may be effective in improving market efficiency.[29] If our findings had instead suggested that charter regulations generally reduced both quality and quantity, then that would have suggested the opposite conclusion. But, again, these are only correlations and more research is necessary to determine whether a causal quantity-quality trade-off exists.

We chose one of the policy elements—the alternative/independent authorizer—for causal analysis using difference-in-differences. Using difference-in-differences analysis, we find evidence that adding a statewide authorizing body increased the statewide charter market share,

[28] When new regulations are added, it is possible to observe the productivity of firms that are pushed out of the market. That is on the case in the present study.
[29] This may be especially true when accountability provisions that close low-performing schools are enforced (Bross, Harris, & Liu, 2023).

gradually over time. Still, this causal analysis is not sufficient to establish a quality-quantity trade-off, even for this one policy. The available data only allow us to study the causal effects of statewide authorizers on quantity, not quality. Ideally, we would also be able to study the quality-related outcomes discussed in the prior section—closing of low-performing charter schools, opening charters in low-performing districts, and charter participant effects—but the data demands for a DD analysis are much higher than the largely-cross-section analyses described earlier. We leave this for future research.

This is one of the first analyses to examine the relationships and effects of charter policy design on charter outcomes. Our work reinforces the difficulties of this task, especially the fact that many charter policies change at the same time and in complex packages, making it difficult to isolate one policy change from another. Still, as charter market share continues to expand, and debate continues about the role of government in regulating vouchers, it is imperative that we try to learn what we can.

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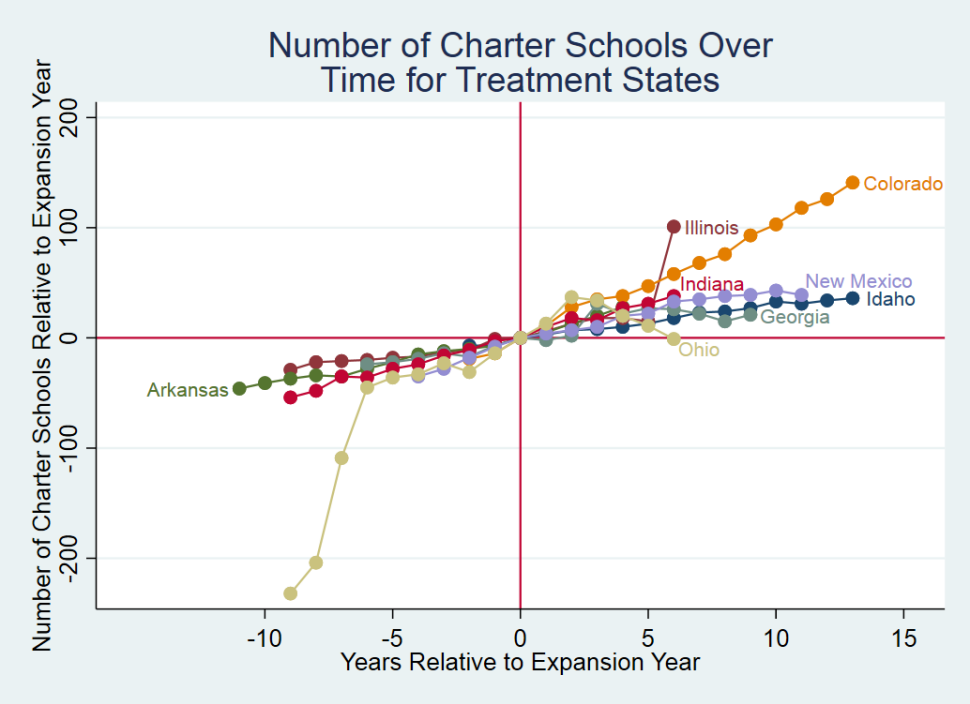
Figure 1: Trends in Charter School Share by Treatment State



Notes: This figures shows the number of charters schools over time in each of our treatment states (T2). Both the years and number of schools shown are relative to the identified year of authorizer expansion for each of these states.

Figures 2a-2d: The Effect of Expanding Charter Authorizing to a Statewide Body on the Percent of Schools that are Charters (TWFE Estimates, No Controls)

Figure 2a: T1/C1

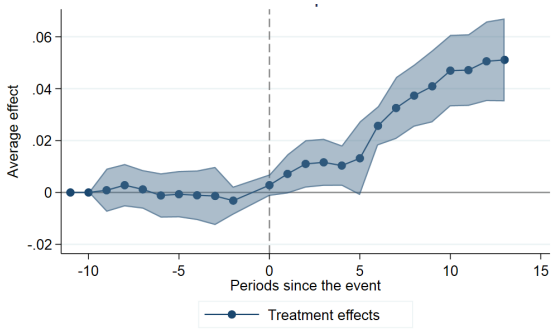


Figure 2b: T2/C2

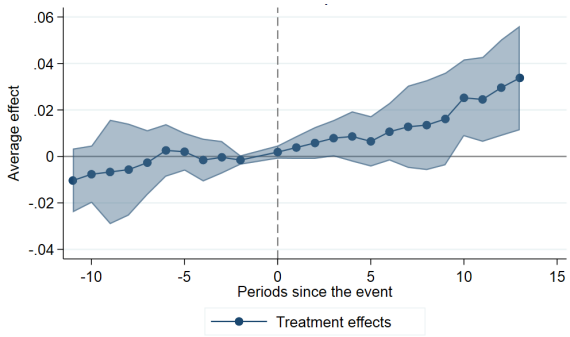


Figure 2c: T2/C1

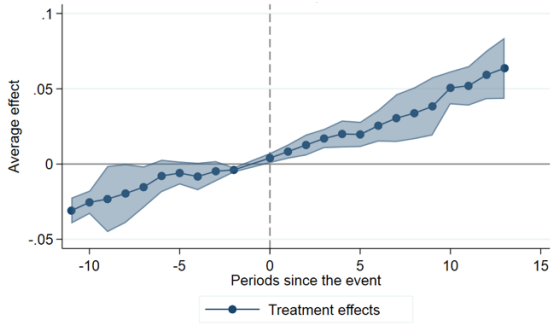
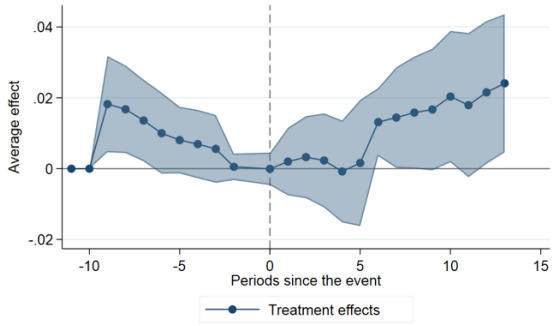


Figure 2d: T1/C2



Notes: These figures show the impact of a statewide charter authorizer expansion on the percentage of schools that are charters, based on the estimation of equation (4) without control variables. Group T1 includes ID and IL. T2 includes AR, CO, GA, ID, IL IN, NM, and OH. C1 includes CA, VA, and WY. C2 includes CA, DE, KS, MA, MI, MN, NJ, PA, VA, and WY. See text for explanations.

Figures 3a-3d: The Effect of Expanding Charter Authorizing to a Statewide Body on the Percent of Schools that are Charters (Callaway and Sant'Anna Estimates, No Controls)

Figure 3a: T1/C1

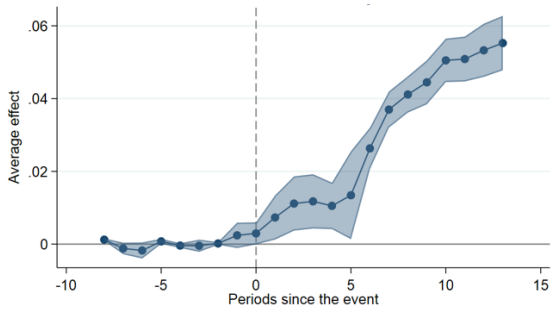


Figure 3b: T2/C2

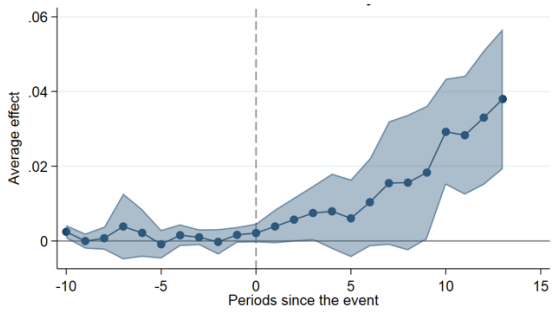


Figure 3c: T2/C1

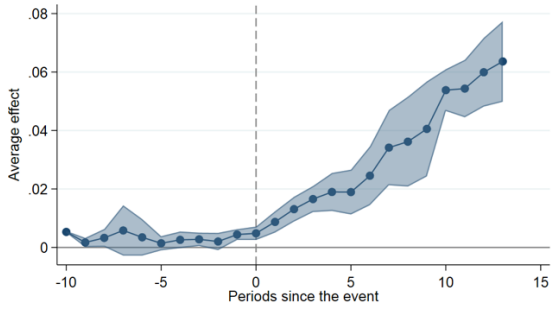
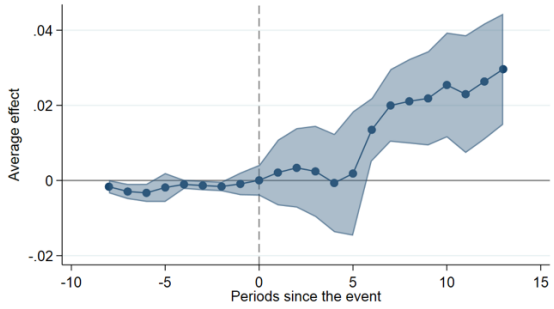


Figure 3d: T1/C2



Notes: These figures are the same as Figure 2, but using the Callaway and Sant'Anna method.

Table 1: Descriptive Statistics

State	Inverse Ranking (Higher values denote better)			Percent of public schools that are charter		Percent of students in charter schools		CREDO charter school performance (Average of math and reading)		
	NACSA	NAPCS	CER	2019	14-19 change	2017	14-17 change	2013	2023	13-23 change
AK	5	4	7	5.71	0.45	5.03	0.30			
AR	22	14.5	9.5	7.89	2.54	5.62	1.56	-0.03	0	0.03
AZ	15.5	28.5	38	23.84	-3.56	16.46	-2.20	-0.04	0.02	0.05
CA	20	34.5	34	13.32	1.75	9.82	0.96	0.01	0.01	0
CO	15.5	38.5	34	13.53	2.05	12.66	1.27	0	0.02	0.02
CT	7.5	11	6	2.33	0.63	1.79	0.30			
DC	32.5	33	42	50.87	0.22	44.01	-0.04	0.12	0.03	-0.09
DE	25.5	27	24	10.96	0.06	10.86	1.74			
FL	27.5	34.5	36	15.73	-0.15	10.16	0.92	0	0.01	0.01
GA	12.5	22	26.5	4.03	0.26	3.86	-0.25	0		
HI	32.5	23	12	12.63	0.86	5.88	0.16			
IA	7.5	3	2.5	0.15	-0.07	0.08	0.01			
ID	27.5	24	34	8.78	1.31	6.87	0.34		0.02	
IL	20	13	9.5	3.29	1.64	3.33	0.27	0.03	0.08	0.05
IN	38	41	40	5.68	1.43	4.15	0.52	0.04	-0.02	-0.06
KS	1	2	1	0.76	-0.06	0.64	0.08			
LA	32.5	40	26.5	11.35	1.86	10.95	1.33	0.08	0.01	-0.07
MA	36	32	18	4.44	-0.01	4.57	0.60	0.07	0.07	0
MD	3	1	4.5	3.51	-0.08	2.57	0.17		0.06	
ME	32.5	38.5	14	1.98	1.02	1.10	0.62			
MI	5	26	39	10.78	-0.32	10.02	0.33	0.06	0.05	-0.01
MN	37	42	41	9.27	0.74	5.91	0.65	0	0.03	0.02
MO	32.5	18	31.5	3.03	0.37	2.53	0.29	0.03	0.08	0.06
NC	25.5	25	14	6.90	1.18	5.95	1.36	0.01	0	-0.01
NH	17.5	14.5	8	7.19	1.46	1.90	0.51			
NJ	23	12	14	3.50	-0.06	3.53	0.70	0.07	0.06	-0.01
NM	24	30.5	22	10.97	0.22	7.54	0.78	-0.02	0.02	0.04
NV	40	30.5	16.5	11.72	4.80	8.50	2.14	-0.17	0.01	0.18
NY	12.5	36	37	6.18	1.12	4.81	0.89	0.08	0.13	0.05
OH	32.5	16.5	28	9.64	-1.33	6.91	-0.36	-0.04	-0.04	0
OK	17.5	8.5	23	3.42	1.49	3.77	1.39			
OR	9.5	16.5	16.5	10.60	0.41	5.70	0.40	-0.05	-0.04	0.01
PA	20	20.5	25	6.03	0.09	7.77	0.14	-0.05	-0.02	0.04
RI	9.5	10	11	11.38	3.21	5.71	1.13	0.14	0.15	0.02
SC	39	28.5	30	6.24	0.64	4.24	0.60		-0.05	
TN	29	8.5	21	6.35	1.68	3.54	1.27	0.11	0.06	-0.05
TX	41	20.5	19.5	8.98	1.07	5.87	0.83	-0.04	0.02	0.05
UT	14	19	31.5	12.71	2.00	10.83	1.17	-0.04	-0.01	0.02
VA	2	5	2.5	0.38	0.05	0.09	0.02			
WA	42	37	19.5	0.49	0.45	0.16	0.16		0.06	
WI	11	6	29	10.64	-1.03	5.23	-0.23		0.03	
WY	5	7	4.5	1.34	0.27	0.53	0.05			

Notes: We compute the inverse rank based on policy scores reported in 2014 by each organization. Higher values indicate a better policy as determined by the rating organization. The inverse rank of 42 signifies best and 1 signifies the worst. Differences in end line years between percent of schools and percent of students exist due to a lag in the availability of student enrollment data. The change in school performance reported in right most column do not align exactly with the previous two columns due to rounding.

Table 2: Regression Analysis of Charter Market Share on State Policy Rankings

	School				*Enrollment*			
	Percentage point growth in share of charter schools 2014-2019		2018-19SY Percent of schools that are charter		Percentage point growth in share of students in charter schools 2014-2017		2016-17SY Percent of students enrolled in charter	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Composite								
NACSA	0.0243	0.0244	0.1479	0.1111	0.0218**	0.0178	0.1238	0.0986
	(0.0144)	(0.0186)	(0.0970)	(0.0809)	(0.0101)	(0.0123)	(0.0836)	(0.0620)
NAPCS	0.0154	0.0164	0.2415**	0.1097	0.0183**	0.0151	0.2194**	0.1183**
	(0.0123)	(0.0150)	(0.1000)	(0.0664)	(0.0087)	(0.0106)	(0.0864)	(0.0511)
CER	-0.0102	-0.0189	0.3634***	0.2788***	0.0015	-0.0058	0.3134**	0.2224***
	(0.0161)	(0.0232)	(0.1328)	(0.0636)	(0.0114)	(0.0163)	(0.1175)	(0.0514)
Sub-Categories								
NACSA								
Alternate Authorizer	-0.0075	-0.0186	0.0920	0.0426	-0.0055	-0.0113	0.0811	0.0345
	(0.0165)	(0.0177)	(0.0898)	(0.0882)	(0.0111)	(0.0116)	(0.0695)	(0.0655)
Renewal Standard	0.0428**	0.0509**	0.1676	0.1460	0.0398***	0.0387**	0.1832	0.1545**
	(0.0185)	(0.0205)	(0.1714)	(0.0921)	(0.0131)	(0.0150)	(0.1498)	(0.0673)
Default Closure	-0.0045	-0.0001	-0.1738	-0.0865	-0.0102	-0.0098	-0.2012	-0.1164
	(0.0257)	(0.0258)	(0.1638)	(0.1006)	(0.0164)	(0.0158)	(0.1393)	(0.0727)
NAPCS								
No Charter Caps	-0.0144	-0.0146	0.0668	0.1678*	0.0009	-0.0093	0.0625	0.1326*
	(0.0197)	(0.0277)	(0.0971)	(0.0926)	(0.0142)	(0.0194)	(0.0787)	(0.0660)
Performance Based Contracts	0.0209	0.0211	0.0307	-0.0157	0.0153	0.0127	-0.0080	-0.0410
	(0.0216)	(0.0243)	(0.0949)	(0.0989)	(0.0124)	(0.0148)	(0.0744)	(0.0735)
Process for Renewal	0.0170	0.0207	0.1275	0.1137	0.0138	0.0135	0.0951	0.0941
	(0.0155)	(0.0180)	(0.1071)	(0.0914)	(0.0133)	(0.0158)	(0.0908)	(0.0741)
Exemption from Laws	-0.0272	-0.0340	0.1995	0.0757	-0.0041	-0.0079	0.2080*	0.0974
	(0.0256)	(0.0342)	(0.1432)	(0.1062)	(0.0169)	(0.0239)	(0.1202)	(0.0802)
Equitable Operational Funding	0.0014	-0.0053	-0.0792	-0.0875	0.0059	0.0030	-0.0296	-0.0273
	(0.0189)	(0.0238)	(0.1743)	(0.1194)	(0.0114)	(0.0161)	(0.1554)	(0.0948)
CER								
Independent Authorizers	-0.0218	-0.0367	0.1796*	0.1711*	-0.0177	-0.0242	0.1544**	0.1313*
	(0.0212)	(0.0296)	(0.0929)	(0.0893)	(0.0135)	(0.0165)	(0.0757)	(0.0717)
Number of Schools Allowed	-0.0112	-0.0094	0.1082	0.1650**	-0.0089	-0.0125	0.0910	0.1306***
	(0.0158)	(0.0192)	(0.0698)	(0.0622)	(0.0120)	(0.0145)	(0.0552)	(0.0470)
100% Funding	0.0278	0.0416*	0.1960*	0.0004	0.0284**	0.0342**	0.1695*	0.0139
	(0.0170)	(0.0225)	(0.1066)	(0.0902)	(0.0115)	(0.0161)	(0.0895)	(0.0695)
Observations	42	42	42	42	42	42	42	42
Controls	NO	YES	NO	YES	NO	YES	NO	YES

Note: This table shows regression results of equation (1) with market share as dependent variables. Robust standard errors are reported in parentheses. Each group of cells corresponds to a separate regression of the dependent variable on the inverse policy rank. Controls include state demographic characteristics. They are total enrollment in public schools in 2015 spring year, state proportions of school age children, married, minorities, bachelor degree or higher, poverty, and median household income.

Table 3: Regression of State Charter School Performance on State Policy Rankings

	Change in charter school performance by state (From 2013 - 2023)		Charter school peformance (2013)		Charter school perfomance (2023)	
	(1)	(2)	(3)	(4)	(5)	(6)
Dep. Var. Mean	*0.0142*	*0.0142*	*0.0138*	*0.0138*	*0.0279*	*0.0279*
NACSA	0.0000	0.0001	-0.0014	-0.0010	-0.0013	-0.0009
	(0.0013)	(0.0012)	(0.0015)	(0.0015)	(0.0009)	(0.0009)
NAPCS	-0.0006	-0.0008	-0.0002	-0.0002	-0.0008	-0.0010
	(0.0009)	(0.0011)	(0.0013)	(0.0014)	(0.0007)	(0.0008)
CER	-0.0013	-0.0010	0.0007	0.0001	-0.0008	-0.0010
	(0.0009)	(0.0009)	(0.0013)	(0.0015)	(0.0008)	(0.0010)
NACSA						
Alternate Authorizer	0.0011	0.0012	-0.0016	-0.0018	-0.0005	-0.0004
	(0.0010)	(0.0010)	(0.0014)	(0.0019)	(0.0007)	(0.0014)
Renewal Standard	-0.0010	-0.0005	0.0001	-0.0004	-0.0009	-0.0006
	(0.0010)	(0.0012)	(0.0012)	(0.0014)	(0.0009)	(0.0013)
Default Closure	0.0012	0.0001	-0.0016	-0.0003	-0.0005	-0.0002
	(0.0015)	(0.0012)	(0.0016)	(0.0019)	(0.0008)	(0.0012)
NAPCS						
No Charter Caps	-0.0005	-0.0019	-0.0010	0.0005	-0.0015*	-0.0012
	(0.0010)	(0.0012)	(0.0014)	(0.0011)	(0.0009)	(0.0010)
Performance Based Contracts	0.0005	0.0006	0.0010	0.0010	0.0008	0.0012
	(0.0010)	(0.0012)	(0.0015)	(0.0017)	(0.0010)	(0.0010)
Process for Renewal	-0.0000	0.0004	-0.0010	-0.0017	-0.0005	-0.0005
	(0.0014)	(0.0014)	(0.0018)	(0.0015)	(0.0008)	(0.0010)
Exemption from Laws	-0.0008	0.0007	0.0005	-0.0011	-0.0008	-0.0011
	(0.0014)	(0.0012)	(0.0017)	(0.0015)	(0.0008)	(0.0011)
Equitable Operational Funding	0.0001	-0.0016	-0.0002	0.0023	-0.0004	-0.0002
	(0.0014)	(0.0015)	(0.0018)	(0.0017)	(0.0008)	(0.0011)
CER						
Independent Authorizers	-0.0003	0.0010	-0.0005	-0.0018	-0.0008	-0.0009
	(0.0008)	(0.0008)	(0.0014)	(0.0018)	(0.0009)	(0.0013)
Number of Schools Allowed	-0.0014*	-0.0023*	0.0001	0.0009	-0.0014**	-0.0010
	(0.0007)	(0.0011)	(0.0010)	(0.0016)	(0.0007)	(0.0010)
100% Funding	-0.0001	-0.0006	0.0020	0.0027	0.0017*	0.0015
	(0.0009)	(0.0010)	(0.0013)	(0.0016)	(0.0009)	(0.0013)
Observations	25	25	26	26	30	30
Controls	NO	YES	NO	YES	NO	YES

Note: The methods in this table are the same as Table 2 except that the dependent variable is now statewide charter school performance measures come from the 2013 and 2023 CREDO national reports.

Table 4: Regression of Closure of Bottom-Third Charters on State Policy Rankings

	(1)	(2)	(3)	(4)
Dep. Var. Mean	*0.1231*	*0.1231*	*0.1231*	*0.1231*
NACSA	0.0019	0.0021	0.0010	0.0016
	(0.0041)	(0.0036)	(0.0034)	(0.0039)
NAPCS	0.0017	0.0034*	0.0032	0.0039
	(0.0028)	(0.0019)	(0.0021)	(0.0025)
CER	0.0011	0.0033	0.0030	0.0039
	(0.0028)	(0.0022)	(0.0022)	(0.0027)
NACSA				
Alternate Authorizer	-0.0025	-0.0021	-0.0029	-0.0047*
	(0.0030)	(0.0025)	(0.0025)	(0.0023)
Renewal Standard	0.0010	0.0015	0.0007	0.0019
	(0.0021)	(0.0016)	(0.0019)	(0.0017)
Default Closure	0.0037	0.0029	0.0024	0.0014
	(0.0029)	(0.0024)	(0.0021)	(0.0014)
NAPCS				
No Charter Caps	0.0021	0.0019	0.0037	0.0056**
	(0.0041)	(0.0030)	(0.0030)	(0.0021)
Performance Based Contracts	-0.0010	-0.0000	-0.0005	0.0001
	(0.0023)	(0.0018)	(0.0018)	(0.0026)
Process for Renewal	0.0081**	0.0072**	0.0058*	0.0020
	(0.0038)	(0.0028)	(0.0030)	(0.0031)
Exemption from Laws	-0.0032	0.0009	-0.0004	-0.0004
	(0.0031)	(0.0020)	(0.0021)	(0.0022)
Equitable Operational Funding	-0.0033	-0.0035	-0.0022	0.0021
	(0.0033)	(0.0027)	(0.0028)	(0.0028)
CER				
Independent Authorizers	-0.0054*	-0.0029	-0.0048**	-0.0039*
	(0.0029)	(0.0019)	(0.0018)	(0.0020)
Number of Schools Allowed	0.0044	0.0055***	0.0047***	0.0029
	(0.0028)	(0.0016)	(0.0014)	(0.0021)
100% Funding	0.0027	0.0039*	0.0043**	0.0053**
	(0.0026)	(0.0020)	(0.0016)	(0.0019)
Observations	1,349	1,349	1,349	1,348
Controls	NO	YES	YES	YES
FE	NO	NO	STATE	GEO. DISTRICT

Note: This table shows regression results of equation (2). Charter schools are placed into performance categories based on their SEDA achievement *growth* measures. The dependent variable is the share of low-performing (bottom-1/3) charter schools that close relative to higher-performing (top-2/3) charter schools. The sample only includes charter schools with SEDA ratings in the 2019 report. States with 5 or fewer charter schools with SEDA ratings are excluded from the analysis. We include closures that took place between 2015-2019 to align with the SEDA measures. Standard errors are clustered by state. Each group of cells corresponds to a separate regression. Controls are the same as in prior tables.

Table 5: Regression of Charter School Openings in Bottom-Third Performing Geographic Districts on State Policy Rankings

	Percent of *schools* that are new charters			Percent of *districts* with a new charter		
	(1)	(2)	(3)	(4)	(5)	(6)
Dep. Var. Mean	*0.5464*	*0.5464*	*0.5464*	*0.0525*	*0.0525*	*0.0525*
NACSA	-0.0123	-0.0132	-0.0031	0.0001	-0.0001	0.0006
	(0.0079)	(0.0080)	(0.0074)	(0.0008)	(0.0008)	(0.0006)
NAPCS	0.0337***	0.0287***	0.0094	0.0027***	0.0019***	0.0010
	(0.0122)	(0.0095)	(0.0101)	(0.0008)	(0.0007)	(0.0007)
CER	0.0275**	0.0236***	0.0168***	0.0017**	0.0013**	0.0013**
	(0.0113)	(0.0081)	(0.0061)	(0.0008)	(0.0006)	(0.0006)
NACSA						
Alternate Authorizer	0.0020	0.0020	-0.0051	0.0019	0.0016	0.0010
	(0.0091)	(0.0076)	(0.0095)	(0.0012)	(0.0011)	(0.0010)
Renewal Standard	0.0200	0.0171	0.0081	0.0012	0.0008	0.0005
	(0.0146)	(0.0113)	(0.0083)	(0.0012)	(0.0009)	(0.0008)
Default Closure	-0.0260*	-0.0255**	-0.0072	-0.0024	-0.0020	-0.0007
	(0.0144)	(0.0124)	(0.0090)	(0.0018)	(0.0014)	(0.0013)
NAPCS						
No Charter Caps	0.0152	0.0147	0.0040	-0.0001	-0.0006	-0.0014
	(0.0105)	(0.0096)	(0.0099)	(0.0013)	(0.0012)	(0.0012)
Performance Based Contracts	-0.0254***	-0.0235***	-0.0044	-0.0008	-0.0008	0.0000
	(0.0074)	(0.0078)	(0.0107)	(0.0010)	(0.0008)	(0.0009)
Process for Renewal	-0.0023	-0.0010	-0.0034	0.0005	0.0001	-0.0004
	(0.0089)	(0.0074)	(0.0098)	(0.0012)	(0.0009)	(0.0010)
Exemption from Laws	0.0071	0.0058	-0.0014	-0.0001	-0.0001	-0.0008
	(0.0092)	(0.0087)	(0.0078)	(0.0010)	(0.0009)	(0.0008)
Equitable Operational Funding	0.0196***	0.0171***	0.0025	0.0017**	0.0015**	0.0007
	(0.0063)	(0.0057)	(0.0101)	(0.0008)	(0.0006)	(0.0007)
CER						
Independent Authorizers	0.0128	0.0119	0.0117*	0.0014	0.0012*	0.0013*
	(0.0097)	(0.0077)	(0.0068)	(0.0009)	(0.0007)	(0.0007)
Number of Schools Allowed	0.0130**	0.0091	0.0060	0.0006	-0.0004	-0.0006
	(0.0063)	(0.0061)	(0.0061)	(0.0008)	(0.0007)	(0.0007)
100% Funding	0.0161	0.0112	0.0042	0.0011	0.0009	0.0007
	(0.0141)	(0.0103)	(0.0065)	(0.0010)	(0.0008)	(0.0006)
Observations (Geographic Districts)	8,730	8,730	8,730	8,730	8,730	8,730
Controls	NO	YES	YES	NO	YES	YES
State FE	NO	NO	YES	NO	NO	YES

Note: This table shows regression results of equation (3). We identify low-performing schools using SEDA achievement *levels*. Since these measures are only available for grades 3-8, high schools are excluded from the sample. Standard errors are clustered by state. Each group of cells corresponds to a separate regression. Controls are the same as in prior tables. The percent of schools that are new charters is computed using the baseline number of publicly funded schools in a district in 2015 spring year. For example, if a district had 5 schools in 2015 spring year and 2 new charter schools opened in the district by 2019 spring year, the percent of schools that are new charters is 40 percent.

Appendix A: Details on State Policies

Table A1: The Year States Expanded Local Authorizing to Statewide Authorizing (or appeals)

State	Original Charter Law	Statewide Authorizing	Group Coding
AR	1995	2013	T2
CA	1992	Never	C2
CO	1993	2004	T2
DE	1995	1995	C2
GA	1994	2008	T2
ID	1998	2004	T1
IL	1996	2011	T1
IN	2001	2011	T2
KS	1994	Never	C1
MA	1993	1993	C2
MI	1994	Never	C2
MN	1991	Never	C2
NJ	1995	1995	C2
NM	1993	2006	T2
OH	1997	2011	T2
PA	1997	Never	C2
VA	1998	Never	C1
WY	1995	2021	C1

Note: The states above are all those included in the differences-in-differences analysis. Alabama, Kentucky, Maine, Maryland, Mississippi, Washington, and West Virginia are excluded from analysis because their charter laws are too recent to allow for a balanced panel. Montana, Nebraska, North Dakota, South Dakota, and Vermont are excluded because they have no charter law. The remaining 21 states (Alaska, Arizona, Connecticut, D.C., Florida, Hawaii, Iowa, Louisiana, Missouri, Nevada, New Hampshire, New York, North Carolina, Oklahoma, Oregon, Rhode Island, South Carolina, Tennessee, Texas, Utah, and Wisconsin) were omitted because of multiple overlapping changes to state charter laws over the period analysis that excluded them from serving as either treatment or control states.

Appendix B: TWFE Event Studies, Adding Controls

Figure B1: The Effect of Expanding Charter Authorizing to a Statewide Body on the Percentage of Schools that are Charter: TWFE Estimates with Controls

Figure B1a: T1/C1

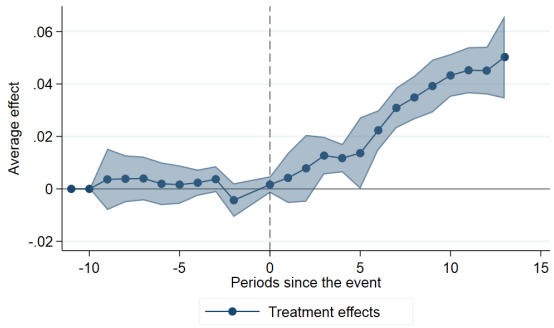


Figure B1b: T2/C2

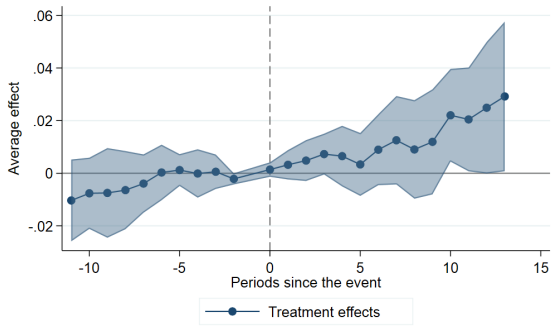


Figure B1c: T2/C1

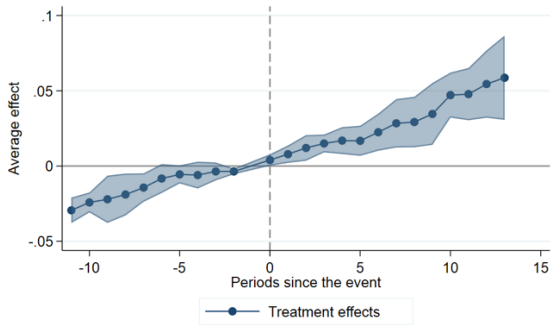
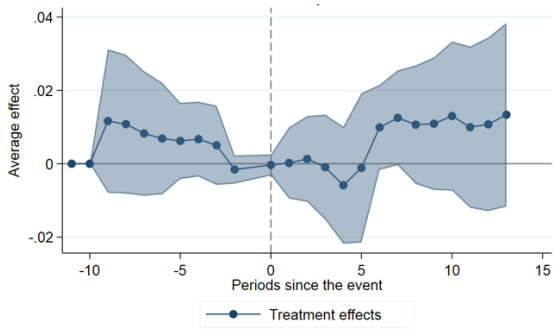


Figure B1d: T1/C2



Notes: These figures are the same as Figures 2a-2d in the main text, except for adding covariates.

Appendix C: Switching the Dependent Variable to Percent of Students in Charters

Figure C1: The Effect of Expanding Charter Authorizing to a Statewide Body on the Percentage of Total Students in Charters: TWFE Estimates, No Controls

Figure C1a: T1/C1

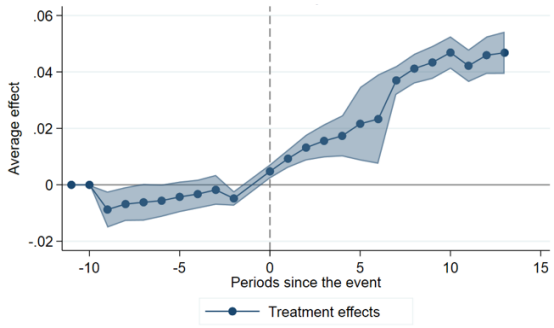


Figure C1b: T2/C2

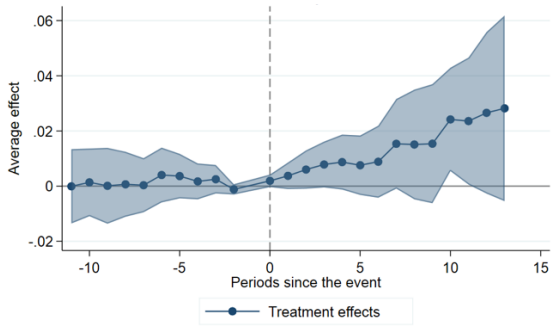


Figure C1c: T2/C1

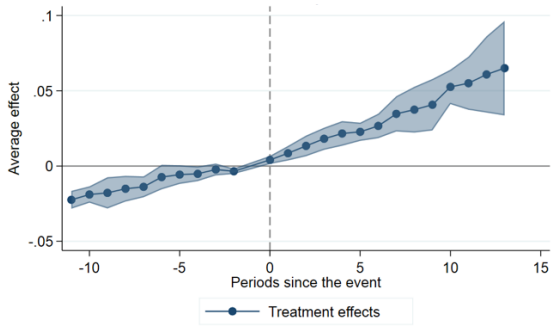
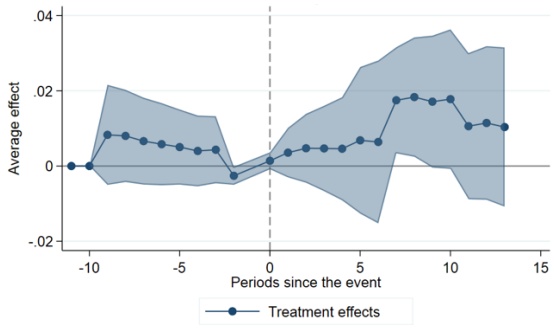


Figure C1d: T1/C2



Notes: These figures are the same as Figures 2a-2d except for changing the dependent variable to the percentage of total *students* in each state that are enrolled in a charter.

Figure C2: The Effect of Expanding Charter Authorizing to a Statewide Body on the Percentage of Total Students in Charters: TWFE Estimates, with Controls

Figure C2a: T1/C1

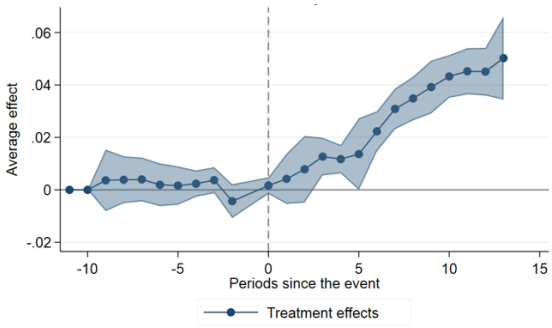


Figure C2b: T2/C2

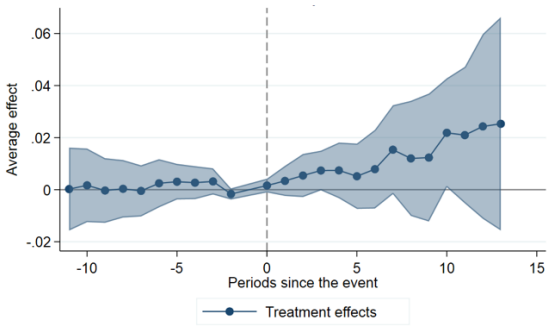


Figure C2c: T2/C1

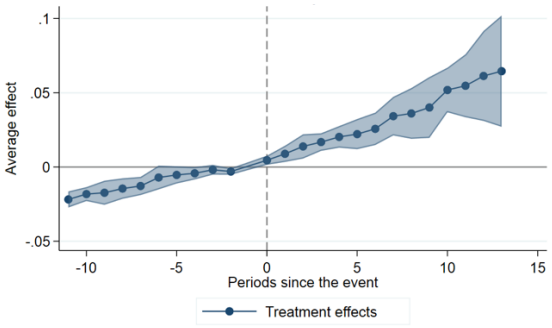
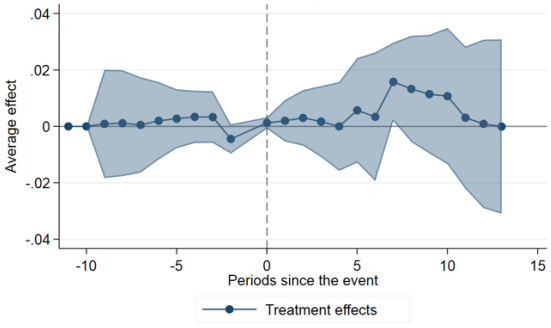


Figure C2d: T1/C2



Notes: This figure is the same as Figure C1, except for adding control variables.

Figure C3: The Effect of Expanding Charter Authorizing to a Statewide Body on the Percentage of Total Students in Charters: No Controls, Callaway and Sant'Anna Estimates

Figure D4a: T1/C1

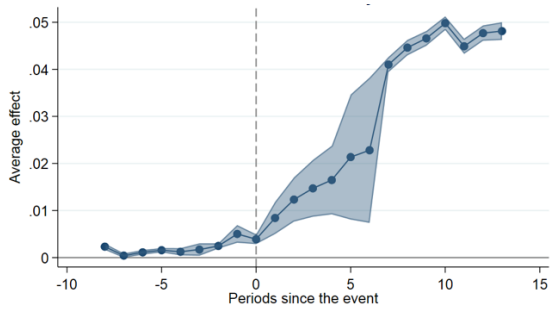


Figure D4b: T2/C2

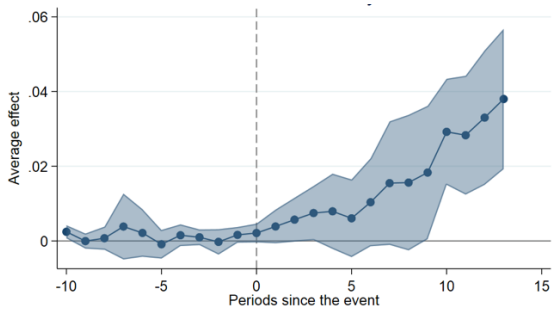


Figure D4c: T2/C1

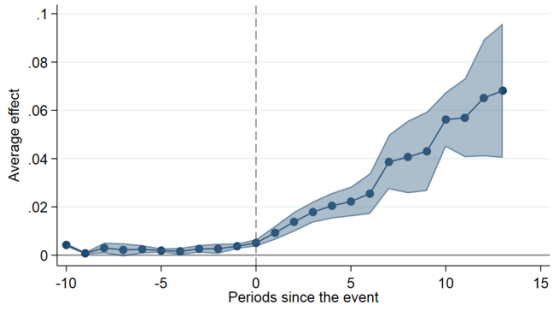
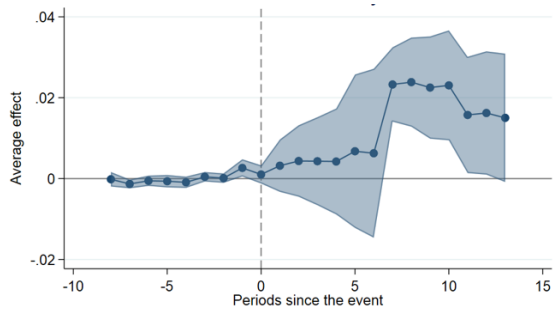


Figure D4d: T1/C2



Notes: These figures are the same as Figures 3a-3d in the main text, except switching the dependent variable to the percentage of students in charter schools.

Appendix D: Switching the Dependent Variable to Percent of Districts with a Charter

Figure D1: The Effect of Expanding Charter Authorizing to a Statewide Body on the Percentage of Geographic Districts Containing a Charter: TWFE Estimates, No Controls

Figure D1a: T1/C1

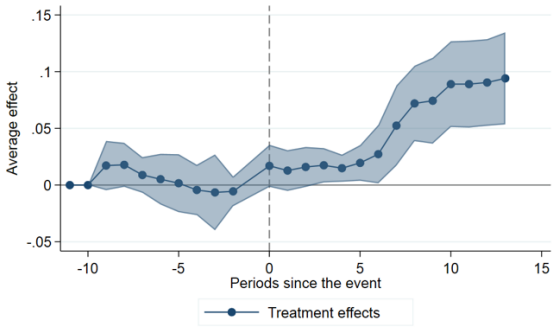


Figure D1b: T2/C2

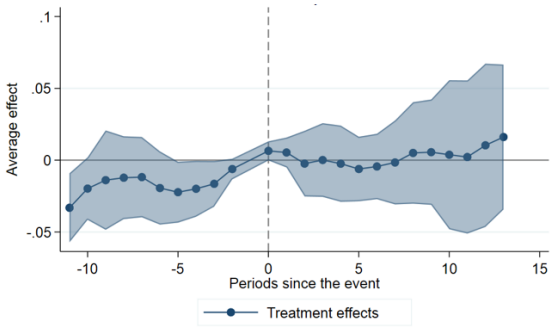


Figure D1c: T2/C1

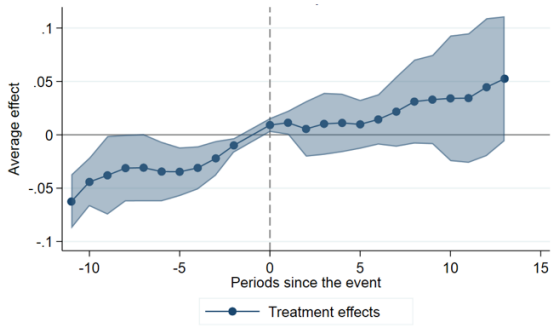
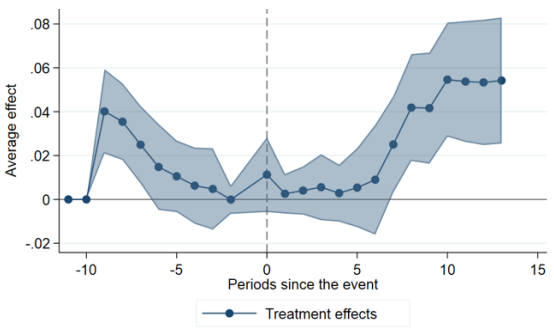


Figure D1d: T1/C2



Notes: These figures are the same as Figures 2a-2d, except for switching the dependent variable to the percentage of districts with at least one charter school.

Figure D2: The Effect of Expanding Charter Authorizing to a Statewide Body on the Percentage of Geographic Districts Containing a Charter: TWFE Estimates, with Controls

Figure D2a: T1/C1

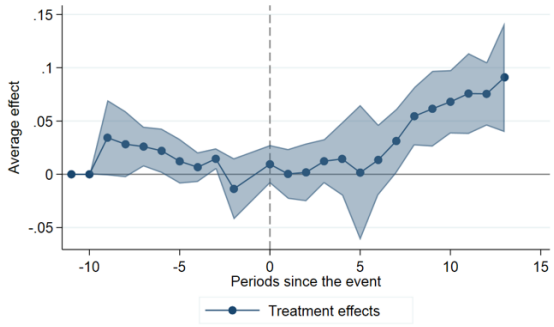


Figure D2b: T2/C2

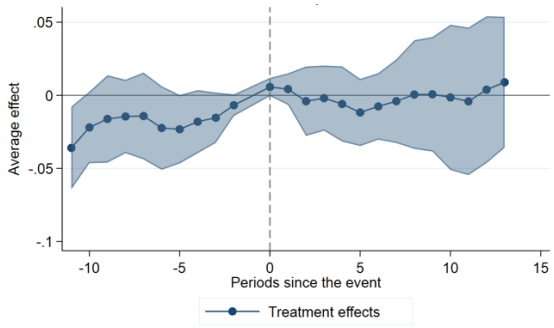


Figure D2c: T2/C1

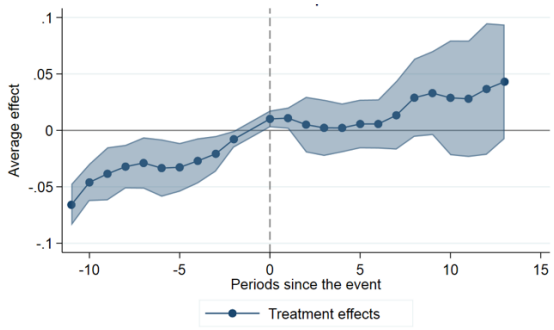
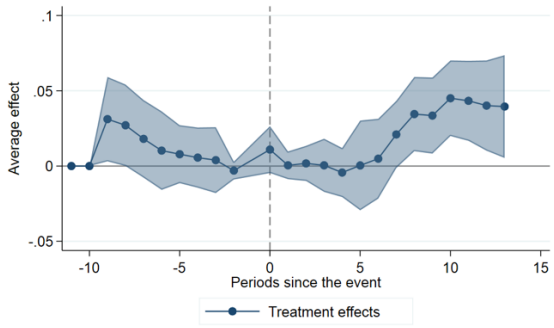


Figure D2d: T1/C2



Notes: These figures are the same as Figure D1, except with control variables.

Figure D3: The Effect of Expanding Charter Authorizing to a Statewide Body on the Percentage of Geographic Districts Containing a Charter: No Controls, Callaway and Sant'Anna Estimates

Figure D3a: T1/C1

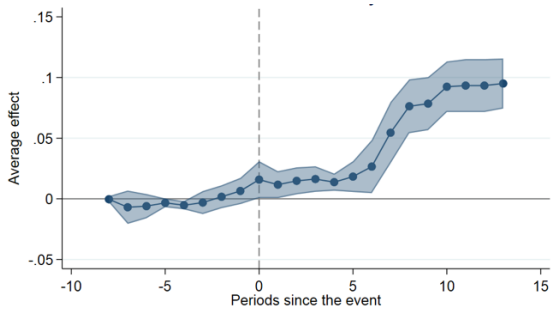


Figure D3b: T2/C2

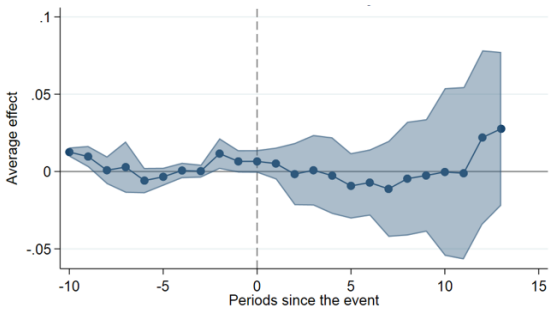


Figure D3c: T2/C1

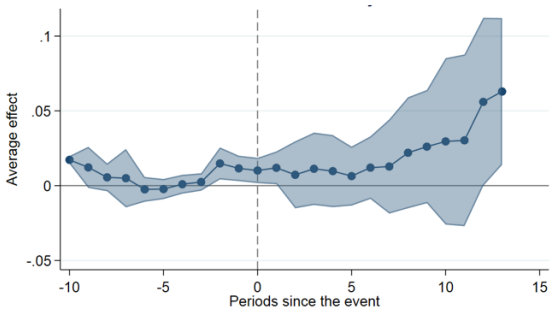
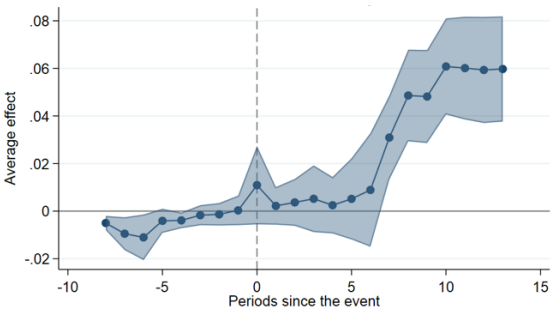


Figure D3d: T1/C2



Notes: These figures are the same as Figures 3a-3d, except the dependent variable is now the percent of districts containing a charter school.

Appendix E: Robustness to Changing Treatment Variable from State Rankings to *Ratings*

Table E1: Regression Analysis of Charter Market Share on State Policy *Ratings*

	School				*Enrollment*			
	Percentage point growth in share of charter schools 2014-2019		2018-19SY Percent of schools that are charter		Percentage point growth in share of students in charter schools 2014-2017		2016-17SY Percent of students enrolled in charter	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Composite								
NACSA	0.0323	0.0300	0.1389	0.1007	0.0248	0.0183	0.1114	0.0869
	(0.0232)	(0.0274)	(0.1266)	(0.1149)	(0.0165)	(0.0175)	(0.1064)	(0.0875)
NAPCS	0.0082**	0.0089	0.0880***	0.0502*	0.0088***	0.0089**	0.0789***	0.0529***
	(0.0036)	(0.0055)	(0.0300)	(0.0249)	(0.0025)	(0.0037)	(0.0256)	(0.0184)
CER	-0.0099	-0.0204	0.4924**	0.3592***	0.0056	-0.0033	0.4226**	0.2870***
	(0.0212)	(0.0319)	(0.1891)	(0.0821)	(0.0145)	(0.0211)	(0.1691)	(0.0674)
Sub-Categories								
NACSA								
Alternate Authorizer	-0.0256	-0.0929	0.6970	0.2830	-0.0121	-0.0440	0.5964	0.2306
	(0.0922)	(0.0994)	(0.4907)	(0.5160)	(0.0628)	(0.0674)	(0.3709)	(0.3953)
Renewal Standard	0.1490**	0.1800**	0.5395	0.4903	0.1378***	0.1353**	0.6017	0.5232**
	(0.0668)	(0.0732)	(0.5999)	(0.3314)	(0.0468)	(0.0533)	(0.5230)	(0.2420)
Default Closure	-0.0182	-0.0043	-0.5938	-0.2791	-0.0384	-0.0385	-0.6977	-0.3941
	(0.0935)	(0.0943)	(0.5991)	(0.3576)	(0.0595)	(0.0575)	(0.5110)	(0.2559)
NAPCS								
No Charter Caps	-0.1227	-0.1570	1.3532	2.2457**	0.0246	-0.1190	1.1840	1.7416**
	(0.2124)	(0.3051)	(0.9956)	(0.9181)	(0.1512)	(0.2140)	(0.7848)	(0.6674)
Performance Based Contracts	0.2494	0.2587	0.1327	-0.1405	0.1848	0.2115	-0.2703	-0.2922
	(0.2521)	(0.3029)	(1.2035)	(1.1538)	(0.1450)	(0.1824)	(0.9758)	(0.8903)
Process for Renewal	0.2295	0.2808	1.3324	1.4665	0.1931	0.2317	1.0571	1.3992
	(0.1940)	(0.2378)	(1.2209)	(1.2134)	(0.1687)	(0.2077)	(0.9787)	(0.9374)
Exemption from Laws	-0.3140	-0.4046	2.6973	1.0790	-0.0498	-0.1213	2.7198*	1.2236
	(0.3055)	(0.4134)	(1.8894)	(1.2087)	(0.2026)	(0.2839)	(1.5966)	(0.9088)
Equitable Operational Funding	0.0606	-0.0452	-0.4432	-1.1025	0.0889	-0.0079	-0.0456	-0.5534
	(0.2456)	(0.3127)	(1.9417)	(1.4621)	(0.1362)	(0.2149)	(1.7009)	(1.2144)
CER								
Independent Authorizers	-0.1288	-0.1722	0.6581	0.3357	-0.0981**	-0.1132	0.5602	0.2147
	(0.0783)	(0.1131)	(0.5833)	(0.3653)	(0.0472)	(0.0669)	(0.5036)	(0.2902)
Number of Schools Allowed	0.0049	0.0262	0.7013***	0.9255***	0.0135	0.0048	0.5854***	0.7443***
	(0.0676)	(0.0743)	(0.2423)	(0.2562)	(0.0523)	(0.0614)	(0.1927)	(0.2006)
100% Funding	0.2178**	0.2280*	1.2081***	0.5128	0.2188***	0.2005**	1.0475***	0.5080
	(0.0891)	(0.1155)	(0.3473)	(0.5080)	(0.0503)	(0.0771)	(0.2398)	(0.4074)
Observations	42	42	42	42	42	42	42	42
Controls	NO	YES	NO	YES	NO	YES	NO	YES

Note: This table is the same as Table 2, except that the policy variables switch from rankings to ratings.

Table E2: Regression of State Charter School Performance on State Policy *Ratings*

	Change in charter school performance by state (From 2013 - 2023)		Charter school peformance (2013)		Charter school perfomance (2023)	
	(1)	(2)	(3)	(4)	(5)	(6)
Dep. Var. Mean	*0.0142*	*0.0142*	*0.0138*	*0.0138*	*0.0279*	*0.0279*
NACSA	0.0007	0.0004	-0.0023	-0.0016	-0.0016	-0.0012
	(0.0019)	(0.0016)	(0.0020)	(0.0019)	(0.0011)	(0.0011)
NAPCS	-0.0003	-0.0003	-0.0004	-0.0003	-0.0004*	-0.0004
	(0.0006)	(0.0006)	(0.0008)	(0.0009)	(0.0002)	(0.0003)
CER	-0.0020	-0.0013	0.0012	-0.0001	-0.0011	-0.0015
	(0.0013)	(0.0013)	(0.0017)	(0.0020)	(0.0010)	(0.0012)
NACSA						
Alternate Authorizer	0.0080	0.0090	-0.0117	-0.0155	-0.0030	-0.0039
	(0.0074)	(0.0064)	(0.0098)	(0.0132)	(0.0047)	(0.0091)
Renewal Standard	-0.0036	-0.0016	0.0007	-0.0013	-0.0029	-0.0019
	(0.0033)	(0.0043)	(0.0043)	(0.0047)	(0.0032)	(0.0046)
Default Closure	0.0045	0.0006	-0.0066	-0.0021	-0.0023	-0.0011
	(0.0056)	(0.0045)	(0.0057)	(0.0070)	(0.0030)	(0.0042)
NAPCS						
No Charter Caps	-0.0051	-0.0145	-0.0133	0.0006	-0.0189*	-0.0116
	(0.0108)	(0.0125)	(0.0160)	(0.0125)	(0.0099)	(0.0119)
Performance Based Contracts	0.0083	0.0099	0.0161	0.0193	0.0114	0.0181
	(0.0144)	(0.0152)	(0.0220)	(0.0249)	(0.0138)	(0.0133)
Process for Renewal	-0.0004	0.0126	-0.0157	-0.0293	-0.0101	-0.0098
	(0.0208)	(0.0227)	(0.0263)	(0.0230)	(0.0106)	(0.0132)
Exemption from Laws	-0.0109	0.0024	0.0074	-0.0101	-0.0088	-0.0138
	(0.0165)	(0.0134)	(0.0198)	(0.0175)	(0.0087)	(0.0119)
Equitable Operational Funding	-0.0023	-0.0303	-0.0016	0.0305	-0.0063	-0.0057
	(0.0167)	(0.0194)	(0.0203)	(0.0224)	(0.0098)	(0.0129)
CER						
Independent Authorizers	-0.0017	0.0021	0.0014	-0.0023	-0.0005	-0.0009
	(0.0024)	(0.0022)	(0.0035)	(0.0053)	(0.0032)	(0.0045)
Number of Schools Allowed	-0.0041	-0.0059	-0.0019	-0.0016	-0.0069*	-0.0053
	(0.0030)	(0.0039)	(0.0048)	(0.0066)	(0.0035)	(0.0040)
100% Funding	-0.0001	-0.0069	0.0129	0.0216	0.0125	0.0105
	(0.0065)	(0.0093)	(0.0102)	(0.0130)	(0.0081)	(0.0112)
Observations	25	25	26	26	30	30
Controls	NO	YES	NO	YES	NO	YES

Note: This table is the same as Table 3, except that the policy variables switch from rankings to ratings.

Table E3: Regression of Closure of Bottom-Third Charters on State Policy Rankings

	(1)	(2)	(3)	(4)
Dep. Var. Mean	*0.1231*	*0.1231*	*0.1231*	*0.1231*
NACSA	0.0015	0.0016	0.0001	0.0008
	(0.0061)	(0.0056)	(0.0052)	(0.0057)
NAPCS	0.0004	0.0011	0.0010	0.0010
	(0.0011)	(0.0007)	(0.0008)	(0.0009)
CER	0.0010	0.0045	0.0037	0.0046
	(0.0034)	(0.0027)	(0.0028)	(0.0038)
NACSA				
Alternate Authorizer	-0.0172	-0.0138	-0.0194	-0.0307*
	(0.0202)	(0.0168)	(0.0166)	(0.0152)
Renewal Standard	0.0041	0.0058	0.0034	0.0086
	(0.0069)	(0.0054)	(0.0064)	(0.0058)
Default Closure	0.0119	0.0094	0.0071	0.0029
	(0.0109)	(0.0094)	(0.0082)	(0.0060)
NAPCS				
No Charter Caps	0.0434	0.0491	0.0692	0.0978**
	(0.0597)	(0.0437)	(0.0399)	(0.0362)
Performance Based Contracts	-0.0393	-0.0136	-0.0171	0.0112
	(0.0414)	(0.0362)	(0.0356)	(0.0473)
Process for Renewal	0.0873*	0.0733*	0.0598	0.0094
	(0.0501)	(0.0400)	(0.0400)	(0.0424)
Exemption from Laws	-0.0471	-0.0036	-0.0163	-0.0169
	(0.0378)	(0.0244)	(0.0240)	(0.0233)
Equitable Operational Funding	-0.0396	-0.0265	-0.0142	0.0442
	(0.0436)	(0.0364)	(0.0366)	(0.0412)
CER				
Independent Authorizers	-0.0159	-0.0129	-0.0159	-0.0164
	(0.0188)	(0.0129)	(0.0138)	(0.0118)
Number of Schools Allowed	0.0150	0.0262**	0.0190*	0.0153
	(0.0169)	(0.0118)	(0.0106)	(0.0135)
100% Funding	0.0120	0.0200	0.0239	0.0339*
	(0.0232)	(0.0176)	(0.0171)	(0.0173)
Observations	1,349	1,349	1,349	1,348
Controls	NO	YES	YES	YES
FE	NO	NO	STATE	GEO. DISTRICT

Note: This table is the same as Table 4, except that the policy variables switch from rankings to ratings.

Table E4: Regression of Charter School Openings in Bottom-Third Performing Geographic Districts on State Policy Rankings

	Percent of *schools* that are new charters			Percent of *districts* with a new charter		
	(1)	(2)	(3)	(4)	(5)	(6)
Dep. Var. Mean	*0.5464*	*0.5464*	*0.5464*	*0.0525*	*0.0525*	*0.0525*
NACSA	-0.0182	-0.0198*	-0.0039	0.0001	-0.0002	0.0009
	(0.0119)	(0.0113)	(0.0099)	(0.0012)	(0.0011)	(0.0009)
NAPCS	0.0114*	0.0096**	0.0012	0.0011***	0.0008***	0.0004
	(0.0064)	(0.0046)	(0.0049)	(0.0004)	(0.0002)	(0.0002)
CER	0.0326**	0.0294**	0.0198**	0.0024*	0.0021***	0.0018**
	(0.0156)	(0.0111)	(0.0083)	(0.0012)	(0.0007)	(0.0009)
NACSA						
Alternate Authorizer	0.0262	0.0197	-0.0278	0.0123*	0.0094	0.0057
	(0.0512)	(0.0416)	(0.0551)	(0.0066)	(0.0060)	(0.0056)
Renewal Standard	0.0691	0.0589	0.0291	0.0036	0.0023	0.0014
	(0.0507)	(0.0384)	(0.0280)	(0.0041)	(0.0031)	(0.0028)
Default Closure	-0.0952*	-0.0924**	-0.0285	-0.0078	-0.0065	-0.0021
	(0.0520)	(0.0444)	(0.0310)	(0.0059)	(0.0046)	(0.0043)
NAPCS						
No Charter Caps	0.2237*	0.2138*	0.0824	0.0021	-0.0051	-0.0150
	(0.1118)	(0.1126)	(0.1050)	(0.0138)	(0.0137)	(0.0136)
Performance Based Contracts	-0.2798**	-0.2655**	-0.0628	-0.0053	-0.0060	0.0028
	(0.1131)	(0.1183)	(0.1175)	(0.0117)	(0.0108)	(0.0097)
Process for Renewal	0.0219	0.0291	-0.0974	0.0071	-0.0005	-0.0088
	(0.1227)	(0.1004)	(0.1737)	(0.0157)	(0.0119)	(0.0122)
Exemption from Laws	0.0723	0.0646	-0.0057	-0.0012	-0.0013	-0.0094
	(0.1034)	(0.0977)	(0.0847)	(0.0112)	(0.0102)	(0.0090)
Equitable Operational Funding	0.2203**	0.2035**	0.0898	0.0211*	0.0203***	0.0135*
	(0.0869)	(0.0749)	(0.1046)	(0.0105)	(0.0074)	(0.0076)
CER						
Independent Authorizers	0.0193	0.0182	0.0157	0.0050	0.0047**	0.0047*
	(0.0336)	(0.0278)	(0.0222)	(0.0032)	(0.0022)	(0.0024)
Number of Schools Allowed	0.0819**	0.0649*	0.0420	0.0018	-0.0017	-0.0021
	(0.0354)	(0.0324)	(0.0270)	(0.0033)	(0.0027)	(0.0023)
100% Funding	0.0993	0.0815	0.0512	0.0054	0.0047	0.0042
	(0.0756)	(0.0579)	(0.0317)	(0.0053)	(0.0038)	(0.0030)
Observations (Geographic Districts)	8,730	8,730	8,730	8,730	8,730	8,730
Controls	NO	YES	YES	NO	YES	YES
State FE	NO	NO	YES	NO	NO	YES

Note: This table is the same as Table 5, except that the policy variables switch from rankings to ratings.

Appendix F: Robustness Checks with Thresholds for School Performance

Table F1: Regression of Closure of Bottom-Half Charters on State Policy Rankings

	(1)	(2)	(3)	(4)
Dep. Var. Mean	*.1231*	*0.1231*	*0.1231*	*0.1231*
NACSA	0.0025	0.0037	0.0022	0.0026
	(0.0031)	(0.0030)	(0.0027)	(0.0033)
NAPCS	0.0017	0.0029	0.0021	0.0028
	(0.0022)	(0.0017)	(0.0018)	(0.0021)
CER	0.0011	0.0024	0.0022	0.0032
	(0.0023)	(0.0020)	(0.0020)	(0.0023)
NACSA				
Alternate Authorizer	-0.0020	-0.0005	-0.0019	-0.0037**
	(0.0020)	(0.0021)	(0.0018)	(0.0017)
Renewal Standard	0.0006	0.0005	-0.0006	0.0002
	(0.0016)	(0.0012)	(0.0014)	(0.0014)
Default Closure	0.0031*	0.0042**	0.0040***	0.0030***
	(0.0018)	(0.0018)	(0.0013)	(0.0010)
NAPCS				
No Charter Caps	0.0002	0.0011	0.0029	0.0048
	(0.0038)	(0.0027)	(0.0026)	(0.0030)
Performance Based Contracts	0.0010	0.0028*	0.0018	0.0023
	(0.0020)	(0.0015)	(0.0014)	(0.0022)
Process for Renewal	0.0048	0.0043*	0.0031	0.0001
	(0.0032)	(0.0022)	(0.0023)	(0.0027)
Exemption from Laws	-0.0012	0.0024	0.0004	-0.0004
	(0.0027)	(0.0016)	(0.0017)	(0.0020)
Equitable Operational Funding	-0.0017	-0.0019	-0.0007	0.0035
	(0.0026)	(0.0021)	(0.0021)	(0.0025)
CER				
Independent Authorizers	-0.0040*	-0.0025	-0.0045***	-0.0048**
	(0.0022)	(0.0015)	(0.0015)	(0.0017)
Number of Schools Allowed	0.0026	0.0057***	0.0047***	0.0029
	(0.0023)	(0.0015)	(0.0013)	(0.0019)
100% Funding	0.0022	0.0021	0.0029**	0.0044**
	(0.0021)	(0.0018)	(0.0013)	(0.0016)
Observations	1,349	1,349	1,349	1,348
Controls	NO	YES	YES	YES
FE	NO	NO	STATE	GEO. DISTRICT

Note: This table is the same as Table 4 in the main text, except changing the threshold from bottom-third to bottom-half.

Table F2: Regression of Charter School Openings in Bottom-Half Performing Geographic Districts on State Policy Rankings

	Percent of *schools* that are new charters			Percent of *districts* with a new charter		
	(1)	(2)	(3)	(4)	(5)	(6)
Dep. Var. Mean	*0.5464*	*0.5464*	*0.5464*	*0.0525*	*0.0525*	*0.0525*
NACSA	-0.0110	-0.0115	-0.0029	-0.0002	-0.0003	0.0002
	(0.0079)	(0.0086)	(0.0075)	(0.0007)	(0.0008)	(0.0007)
NAPCS	0.0261***	0.0203***	0.0033	0.0022***	0.0013**	0.0003
	(0.0089)	(0.0067)	(0.0069)	(0.0007)	(0.0006)	(0.0006)
CER	0.0192**	0.0165**	0.0120*	0.0012*	0.0010*	0.0010
	(0.0076)	(0.0061)	(0.0062)	(0.0007)	(0.0005)	(0.0006)
NACSA						
Alternate Authorizer	0.0080	0.0079	0.0031	0.0012	0.0010	0.0010
	(0.0074)	(0.0088)	(0.0092)	(0.0009)	(0.0010)	(0.0010)
Renewal Standard	0.0080	0.0047	-0.0015	0.0004	0.0000	-0.0002
	(0.0112)	(0.0084)	(0.0062)	(0.0010)	(0.0008)	(0.0007)
Default Closure	-0.0204*	-0.0188*	-0.0045	-0.0016	-0.0012	-0.0006
	(0.0117)	(0.0110)	(0.0093)	(0.0014)	(0.0013)	(0.0012)
NAPCS						
No Charter Caps	0.0089	0.0058	-0.0046	-0.0002	-0.0011	-0.0019*
	(0.0108)	(0.0105)	(0.0096)	(0.0011)	(0.0010)	(0.0011)
Performance Based Contracts	-0.0104	-0.0075	0.0110	-0.0006	-0.0004	0.0002
	(0.0081)	(0.0090)	(0.0103)	(0.0007)	(0.0008)	(0.0009)
Process for Renewal	0.0037	0.0038	0.0004	0.0006	0.0002	-0.0005
	(0.0087)	(0.0075)	(0.0095)	(0.0011)	(0.0009)	(0.0010)
Exemption from Laws	-0.0034	-0.0057	-0.0144	-0.0006	-0.0007	-0.0015
	(0.0121)	(0.0116)	(0.0090)	(0.0010)	(0.0009)	(0.0009)
Equitable Operational Funding	0.0107	0.0069	-0.0075	0.0013*	0.0008	0.0002
	(0.0068)	(0.0066)	(0.0093)	(0.0007)	(0.0006)	(0.0007)
CER						
Independent Authorizers	0.0156**	0.0157**	0.0165**	0.0013	0.0012*	0.0016**
	(0.0071)	(0.0069)	(0.0071)	(0.0008)	(0.0007)	(0.0007)
Number of Schools Allowed	0.0132**	0.0080	0.0061	0.0008	-0.0003	-0.0004
	(0.0056)	(0.0057)	(0.0059)	(0.0007)	(0.0007)	(0.0007)
100% Funding	0.0018	-0.0019	-0.0063	0.0003	0.0001	-0.0002
	(0.0103)	(0.0069)	(0.0048)	(0.0009)	(0.0006)	(0.0005)
Observations (Geographic Districts)	8,730	8.73	8,730	8,730	8,730	8,730
Controls	NO	YES	YES	NO	YES	YES
State FE	NO	NO	YES	NO	NO	YES

Note: This table is the same as Table 5 in the main text except for changing the threshold for geographic districts from the bottom third to the bottom half.

Appendix G: Robustness Checks for Defining Low-Performing Schools in Achievement Levels

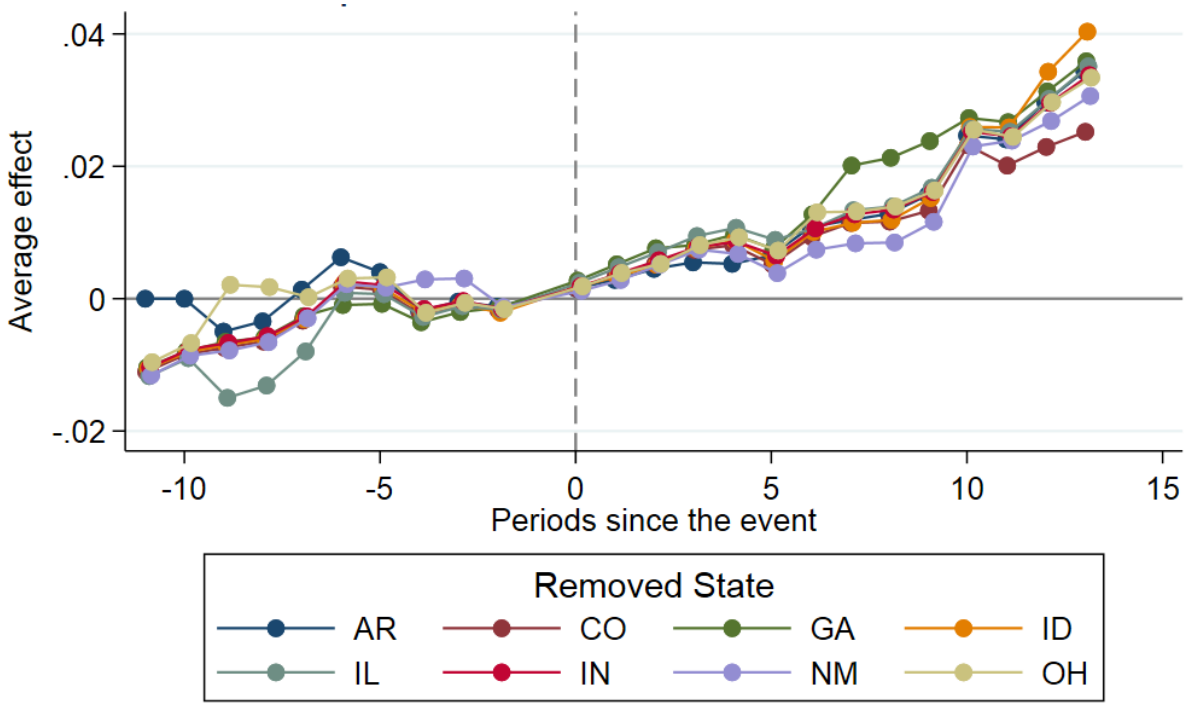
Table G4: Regression of Closure of Bottom-Third Charters on State Policy Rankings

	(1)	(2)	(3)	(4)
Dep. Var. Mean	*0.1637*	*0.1637*	*0.1637*	*0.1638*
NACSA	0.0016	0.0018	0.0035	0.0017
	(0.0041)	(0.0023)	(0.0028)	(0.0040)
NAPCS	-0.0006	0.0020	0.0022	0.0001
	(0.0024)	(0.0013)	(0.0017)	(0.0024)
CER	0.0020	0.0022	0.0021	0.0022
	(0.0034)	(0.0016)	(0.0020)	(0.0029)
NACSA				
Alternate Authorizer	-0.0063**	0.0011	0.0020	-0.0022
	(0.0025)	(0.0019)	(0.0023)	(0.0035)
Renewal Standard	-0.0027	0.0011	0.0028	0.0014
	(0.0016)	(0.0011)	(0.0017)	(0.0021)
Default Closure	0.0084***	0.0038**	0.0036*	0.0040
	(0.0022)	(0.0017)	(0.0018)	(0.0025)
NAPCS				
No Charter Caps	0.0088**	0.0068***	0.0058*	0.0064
	(0.0037)	(0.0021)	(0.0031)	(0.0044)
Performance Based Contracts	0.0048	0.0028**	0.0038***	0.0029
	(0.0032)	(0.0010)	(0.0013)	(0.0019)
Process for Renewal	-0.0081**	-0.0050***	-0.0041**	-0.0060***
	(0.0035)	(0.0015)	(0.0016)	(0.0021)
Exemption from Laws	-0.0007	0.0036**	0.0043*	0.0015
	(0.0026)	(0.0013)	(0.0020)	(0.0045)
Equitable Operational Funding	0.0082***	0.0051***	0.0044*	0.0057
	(0.0025)	(0.0018)	(0.0021)	(0.0046)
CER				
Independent Authorizers	-0.0078**	-0.0012	-0.0021	-0.0063**
	(0.0031)	(0.0020)	(0.0021)	(0.0028)
Number of Schools Allowed	0.0074**	0.0044**	0.0037	0.0012
	(0.0032)	(0.0015)	(0.0023)	(0.0023)
100% Funding	0.0035	0.0016	0.0018	0.0052
	(0.0035)	(0.0018)	(0.0024)	(0.0031)
Observations	1,955	1,955	1,955	1,954
Controls	NO	YES	YES	YES
FE	NO	NO	STATE	GEO. DISTRIC

Note: This table is the same as Table 4 except for redefining school performance from achievement growth to achievement *levels*.

Appendix H: Leave-One-Out Analysis

Figure H1: The Effect of Expanding Charter Authorizing to a Statewide Body on the Percent of Schools that are Charters (Leave-one-out estimates; TWFE)



Notes: These figures show the impact of a statewide charter authorizer expansion on the percent of schools that are charters, based on equation (4) under the same specification shown in Figure 2b (using C2 and T2 with no controls), but leaving out each one of our treatment states from the analysis.