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Extreme Measures:

A National Descriptive Analysis of Closure and Restructuring of Traditional Public, Charter, and Private Schools

Douglas N. Harris, Tulane University
Valentina Martinez-Pabon, Tulane University

Technical Report

Updated July 8, 2022
Published May 22, 2022

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A National Descriptive Analysis of Closure and Restructuring of Traditional Public, Charter, and Private Schools[1]

Douglas N. Harris
Valentina Martinez-Pabon[2]

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Abstract: We describe the levels, trends, and patterns of school closure and restructuring in the United States from 1991 to 2019 across all sectors using a near census of K-12 schools. Focusing on the years with the best available data, 2014-2018, we find that the annual closure rate of charter, private, and traditional public schools (TPS) were 5.1, 2.9, and 0.9 percent respectively. The annual restructuring rates are 2.0 percent for charter schools and 0.6 percent for TPS. Regression analysis shows that these differences in closure and restructuring rates by sector drop slightly after controlling for student and school characteristics. The strongest predictor of increased closures is low student enrollment, especially in private schools. In charter and traditional public schools, achievement measures predict closure and restructuring nearly as strongly as enrollment. While racial and income composition are weaker predictors of closure/restructuring, that they predict at all, after controlling for many other factors, raises some equity concerns. We also discuss ways in which the forces behind closure/restructuring may be difficult to uncover with this type of quantitative analysis.

Key words: education policy, school closure, school sanctions
JEL Classification: I21, I28

[1] Acknowledgements: This project was carried out under the auspices of the National Center for Research on Education Access and Choice (REACH) funded from grant # R305C180025 from the U.S. Department of Education, Institute of Education Sciences. The authors are very grateful to Mark Berends, Josh Cowen, Allen Ruby, Ron Zimmer, and anonymous reviewers for their useful comments and suggestions. We also thank Patrick Keaton, Mark Glander, and Stephen Broughman at the NCES for their comments on earlier drafts and their assistance with the CCD and PSS data files. The National Alliance for Public Charter Schools (NACPS) provided data and valuable input on the analysis. We also thank Santiago Diaz and Jacob Masur for assistance collecting the private schools' operational status and website addresses, and to the Tulane University undergraduate students who collected online private schools' information: Caroline Allen, Chase J. Farha, Jenna Lanzet, Jacob Lehner, Edward Michael Naish, and Matthew Richards.
[2] Douglas N. Harris: Tulane University (e-mail: dharri5@tulane.edu); Valentina Martinez-Pabon: Tulane University (e-mail: vmartinezpabon@tulane.edu).

1. Introduction

Few topics are more contentious, and yet subject to so little research, as school closures. While a growing number of studies have examined the effects of school closure on student outcomes (Engberg et al., 2012; Brummet, 2014; Carlson and Lavertu, 2016; Redding and Nguyen, 2020; Schueler et al., 2020), we still know relatively little about more basic questions of when, where, or why closures occur, especially on a national basis. One reason for our limited understanding of this topic is that the data have not existed to study closures. The federal Common Core of Data (CCD), while partially intended for this purpose, has numerous limitations for studying the closure of traditional public schools (TPS) and charter schools. For private schools, the situation is much worse as there has been no data source that identifies closures.

Even more challenging than the study of closures is the study of traditional public and charter school *restructuring* where the school buildings remain open, but under different educational personnel and/or governance, usually as a result of government intervention. Similar to studies of closure, restructuring effects on student outcomes have been mixed with more positive results in Chicago (Gordon et al., 2018), Boston and New Orleans (Abdulkadiroglu et al., 2016; Bross, Harris, and Liu, 2016) than in Philadelphia (Gill et al., 2007) and Tennessee (Zimmer, Henry, and Kho, 2017). The effects of restructuring policies have also been summarized in two meta-analyses concluding that these policies typically have positive or null effects on student performance (Redding and Nguyen, 2020; Schueler et al., 2020).

In this study, we discuss issues in defining closure and restructuring. We also collected and incorporated new data to describe the trends of school closure and restructuring across the traditional public, charter, and private sectors over the last three decades. In addition, we explore

the predictors of closure and restructuring using a multivariate analysis for the years 2014-2018, during which we have better data and can capture most types of restructuring.

Improving our understanding of school closures and restructuring patterns is important for several reasons. First, closure and restructuring are some of the most extreme events that arise in education. Second, studies of the effects of closure and restructuring have come to widely varying conclusions and a better understanding of the patterns of intervention might aid in interpreting this effect heterogeneity. In particular, prior studies have shown that students benefit academically when they end up in higher-value-added schools (e.g., Engberg et al., 2012; Bross, Harris, and Liu, 2016; Carlson and Lavertu, 2016; Chin et al., 2019). Understanding the degree to which school performance, and other factors, drive these decisions might lead to better outcomes in the future.

Third, though closure and restructuring are extreme and controversial events, they are a regular part of educational practice. As we explain below, closure/restructuring rates have been fairly steady over time, which means the topic will be with us regardless of political winds and policies. The topic began to take on a greater role in educational policy with No Child Left Behind (NCLB), which included a cascade of increasingly intensive interventions, culminating in the closure and restructuring of schools failing to meet Adequate Yearly Progress (AYP) for five consecutive years. Our results suggest that NCLB probably had little impact on closure and restructuring rates. This is noteworthy by itself and for understanding NCLB, but, even with the shift in law from NCLB to the Every Student Succeeds Act (ESSA), the continued steady use of closure and restructuring means that the topic will continue to be relevant, particularly in the coming years, given the COVID-induced enrollment declines in TPS.

A fourth reason that closure and restructuring have taken on renewed interest is the increasing dominance of market-based perspectives and policies in education. One-quarter of

American students now attend a school other than a TPS (Harris, Witte, and Valant, 2017). This more market-driven system could increase competition among schools, force the worst-performers to close, and lead to their closure and replacement over time. This process, what the economist Joseph Schumpeter called "creative destruction," may be increasingly salient as school choice policies expand. Private schools have been a noteworthy part of the landscape since the nation's founding. More recently, charter schools have created an additional avenue for choice. Publicly funded but privately operated, charter schools create competition for public and private schools (Imberman, 2011; Gill and Booker, 2012; Epple, Romano and Zimmer, 2016; Chakrabarti and Roy, 2016; Slungaard Mumma, 2022). In the latter case, charter schools have the potential to create alternative schooling options without tuition costs, thus reducing private school market share (Glomm, Harris, and Lo, 2005).

But schooling does not satisfy the usual conditions for well-functioning markets (Betts, 2010; Harris, 2020), which could mean market forces do not improve efficiency, i.e., that the closure and replacement of schools are primarily "destructive" of school quality, not "creative." Publicly funded schools might close not because of poor quality, but because their constituents—students, parents, and neighborhood groups—have less political power to keep their schools open. Locally elected school boards make decisions about TPS while government-appointed charter authorizers are mainly responsible for charter school interventions.[3] These government agencies are subject to interest-group politics and local boards are known for their extremely low voter turnout rates, which limits who is involved in these decisions (Chubb and Moe, 1990; Allen and Plank, 2005). Also, schools serving people of color and lower-income populations have been more

[3] A plurality of charter schools is authorized by the same locally elected boards that govern traditional public schools. State agencies represent the next most common authorizer type, followed by universities, local governments other than school boards, state boards of education, and assorted others. See Zimmer et al. (2014) for a detailed description of chartering authorities.

likely to close or be restructured even as these communities express lower levels of support for school closures (Good, 2017; Ewing, 2018; Nuamah, 2020; Enoch-Stevens et al., 2022). The closure/restructuring process may be driven more by politics than markets or quality. Our analysis of the patterns of closure and restructuring provide additional evidence on this issue.

Our study is one of the first to explore closure and restructuring trends and predictors across sectors, at the national level, in a regression framework that considers multiple factors. The one other national analysis of TPS and charter school closure uses a univariate analysis with information from 26 states between 2007 to 2013 and finds that schools with higher test levels are less likely to close, while schools in urban areas, with low enrollments, more students of color, and higher poverty levels are more likely to close (CREDO, 2017a). These findings suggest that many underlying forces may be at work in closure/restructuring decisions. However, all of the factors they consider are correlated and, without a regression framework that controls for the various factors, it is difficult to interpret the results or identify the key factors.

We build on this prior work in several ways. First, we attempt to clarify the concepts of closure and restructuring in a way that can apply to TPS, charter, and private schools alike and that focuses more on the substantive changes in schools rather than legal language. We also define sub-types of closure and restructuring, which are useful for connecting our definitions to common datasets and policy language.

Second, with clear definitions, we can measure closure and restructuring and identify measurement problems with existing data. A key implication of this study is the need to change how state and federal data systems track school closures and restructuring. To even carry out this relatively simple descriptive analysis of closure and restructuring, we had to carry out extensive manual data collection for private schools and make assumptions within a complex coding process

for TPS and charter schools. We briefly discuss potential solutions to these data problems in the concluding section.

Third, we expand the sample of schools included. CREDO (2017a) included 26 states and was limited to publicly funded schools. We include essentially all TPS, charter, and private schools in all 50 states and the District of Columbia. We find that, between 2014 and 2018, the annual closure rate of charter, private, and TPS are 5.1, 2.9, and 0.9 percent respectively. (We focus on the trends from 2014-2018, excluding pre-2014 and 2019, because these are the years that data have the highest quality and completeness.)

Fourth, we expand the work beyond closures to include restructuring, which we define to include conversions, reconstitutions, restarts, and takeovers. We find that, between 2014 and 2018, charter schools and TPS were restructured at an annual rate of 2.0 and 0.6 percent, respectively.

Fifth, especially with TPS and charter schools, we are able to describe the trends in school closure and restructuring rates going back several decades. For example, TPS had a somewhat higher closure rate (1.3 percent) in the early 1990s, but that rate has dropped and remained steady at about one percent since then, except for two temporary upward spikes after NCLB became law. Across all sectors, closure rates have been declining in recent years.

Sixth, we advance understanding of the separate roles played by various predictors of school closure and restructuring. While most of our predictor variables were also analyzed in CREDO (2017a), we do this in a regression framework that takes a step toward isolating the roles of financial, academic, and political factors influencing these decisions using a larger set of measures. We find that low enrollment is one of the stronger predictors of school closures in TPS and charter schools and the strongest predictor of closure among private schools, as expected given their financial dependence on tuition revenue.

The other strong predictor of closure/restructuring is school quality. While we include achievement *levels*, as in CREDO (2017a), prior evidence that closure/restructuring is effective when the schools involved have low-value-added (Bross, Harris, and Liu, 2016; Chin et al., 2019), leading us to focus more on achievement *growth*. We also include GreatSchools.org's user reviews because these capture a wider range of school characteristics that families value and because this is the only quality measure available for private schools. Our results suggest that closure and restructuring are generally less likely when these school quality measures are high, consistent with results in certain individual cities (Kemple, 2015; Gordon et al., 2018; Steinberg and MacDonald, 2019). Overall, our results suggest that factors associated with financial/academic explanations are the strongest predictors of school closure/restructuring, but the smaller role for student race and income may still signal inequitable decision-making.

The next section defines closure and restructuring and describes our data. Section 3 summarizes what these data tell us about trends in school closure and restructuring by sector. This is followed, in Section 4, by a description of data regarding the predictors of school closure and restructuring. In Section 5, we present our descriptive method, the results of which are discussed in Section 6. The final section summarizes our main conclusions and caveats, including the limits of this type of analysis for understanding the role of student race and income.

2. Data

2.1 Closure and Restructuring Definitions

The purpose of this study is to better understand school closures and restructuring. As these terms can apply to a wide range of circumstances and sometimes involve legal language, we begin by outlining what how we define these two types of events.

We define *closure* as cases where buildings cease to function as schools. This includes situations where buildings are boarded up, torn down, used for other educational purposes or non-educational purposes (e.g., school district administration or commercial use). In a subset of these cases, school personnel and leadership may have simply moved to another location. While these moves might not fit the usual notion of closure, we note that the neighborhood where the building is closed may experience hardship in ways similar to other types of closure. For this reason, along with the general difficulty of identifying closures of this type with publicly available data, we include closures with personnel moves in the above broad definition of closure.

We define *restructuring* as cases where significant and involuntary changes are made in personnel, management, and/or governance—that is, they reflect changes in who has decision-making authority in schools. One reason for defining restructuring this way is the growing recognition in the literature that teachers and school leaders are critical to school success (e.g., Chetty, Friedman, and Rockoff, 2014; Herman et al., 2017) and that the various forms of restructuring are more effective when there are significant changes in personnel (de la Torre et al., 2012; Ahn and Vigdor, 2014; Bross, Harris, and Liu, 2016). Schueler et al. (2020), similarly, describe restructuring as an umbrella term including state takeover, conversions, reconstitution, and any other major reorganization. The term's implied expansiveness is useful here because we are trying to identify all situations where schools are forced to make significant changes, short of closing the building. However, we are defining it more precisely.

Restarts, reconstitutions, conversions, turnarounds, and takeovers generally fit within this definition of restructuring. Restarts involve changing the management of the school (generally a TPS). Reconstitutions arise when a large percentage of teachers are required to leave a school,

usually along with a change in school principal and as a response to low performance.[4] Some might question whether takeovers fit the restructuring definition because they do not always include changes in teachers or school principals, but they do include changes in governance and, therefore, in school decision-making authority. This also means that our definition of restructuring excludes more modest changes, such as transformations, which usually only include changes in curriculum and programs, perhaps under the guidance of an outside consultant.

We note two additional clarifications about the above definition. In contrast to both definitions of closure, students are almost always allowed to continue attending the same school building under restructuring.[5] Also, the word "involuntary" is important to the restructuring definition because some schools experience high teacher and leader turnover, which is generally voluntary. More generally, we mean that these interventions are forced by some authority outside the school, such as a school district or state government.[6]

The above discussion of common terms leads to some ambiguity in the meaning of restructuring with respect to charter schools. Conversions involve turning TPS over to charter organizations (or vice versa), i.e., a change in management.[7] Also, just as school boards force TPS into reconstitutions or restarts, charter authorizers can force changes in charter management organizations. Since these examples involved forced changes in management, we include them in our definition of restructuring, reinforcing that our definition can be applied to all school types.

[4] The Department of Education formally defines a reconstitution as an "indication that the school was restructured, transformed, or otherwise changed as a consequence of the state's accountability system under ESEA or as a result of School Improvement Grants (SIG), but is not recognized as a new school for CCD purposes." U.S. Department of Education (2017).
[5] In some cases, charter schools prefer to start over with a new enrollment process. Also, some closures involve "phase-outs" in which no new students are added, and current students are allowed to finish through the last grade.
[6] While it seems implied, we also mean to exclude changes that are forced by family decisions to exit schools, which might lead schools to close or experience restructuring because of market-based pressures.
[7] Some charter schools are authorized by school districts, so the governing body is unchanged, but we consider this to be a change in management and this still fits within the restructuring definition.

This definition of restructuring has many advantages. It is simple, describes changes in schools we know to be important (e.g., changes in personnel), and applies across school sectors. The closure/restructuring categories are also mutually exclusive and comprehensive; each school is either closed, restructured, or remains open with minimal or more modest changes. Finally, our definition comports with the general meaning of the term restructuring[8] and the occasional use of the term in the context of schooling (Harvey and Crandall, 1988; Brand, 1993; Conley, 1993).

Notable for their absence in these definitions are the reasons behind the closures and restructuring. For example, restructuring policies often specify factors that lead to this action, such as low performance. We omit the reasons for closure/restructuring from their definitions because, as the subsequent analysis shows, the actual reasons are often difficult to identify. More generally, it is difficult to define any action in terms of its reason, so it is best to treat the action and its reason separately.

While we have tried to clearly distinguish closures and restructuring in these definitions, we note some remaining ambiguities. For example, it is common for school districts to replace principals, but otherwise leave schools unchanged. While this is a change in management, we do not consider it to be a form of restructuring because individual staff changes are examples of regular personnel management. Also, it is possible for one charter authorizer to take control from another authorizer. While some states have charter authorizer accountability that could require such changes, these moves are likely semi-voluntary (i.e., charter school leadership decides that it would prefer a new authorizer). In what follows, we have included charter authorizer changes as cases of restructuring.

[8] Several definitions we found used "reorganization" as part of the definition of restructuring.

We summarize our conceptions of closure and restructuring in Table 1. While some might disagree with our definitions, we note that, by specifying the sub-types, this approach allows readers to re-arrange them and see how this affects the frequency of closure/restructuring. For example, if one does not wish to include changes in charter authorizers as restructuring, then this sub-type could be moved to a different column or treated as a school that is still open. Table 1 also includes additional information about the measurement of closure/restructuring that we discuss in the next section.

[Table 1]

2.2 The National Longitudinal School Database (NLSD)

To measure closure and restructuring, we use the National Longitudinal School Database (NLSD), an annual near census of all schools in the country from 1991 to 2019 created by the authors and a team of researchers at the National Center for Research on Education Access and Choice (REACH).[9] The NLSD integrates multiple public and proprietary data sets. We focus on those elements of the NLSD that we use in the present analysis: the federal Common Core of Data (CCD), the federal Private School Survey (PSS), data on student achievement from the Stanford Education Data Archive (SEDA) (Reardon et al., 2019a), data from the non-profit organization GreatSchools.org, and additional data on private schools that we collected manually.

The CCD is the U.S. Department of Education's primary database on publicly funded elementary and secondary education. The survey is collected annually for schools and school districts (LEAs). The school's survey includes a broad range of school characteristics, including contact information, operational status, charter status, enrollment by grade, and student

[9] For brevity, henceforth, we refer to school years 1990-91 as "1991", 1991-92 as "1992", and so on.

demographics. Additionally, each school and LEA has unique NCES identifiers. Below, and in Appendix A, we provide additional details on the most relevant aspects of the CCD.

The Private School Survey (PSS) is the U.S. Department of Education's primary database on private education. Every two years, NCES also collects information on the universe of private schools from state departments of education and local advocacy groups representing private schools. These schools are then contacted to fill out the PSS to collect additional information. Unlike the CCD, responding to the PSS is not mandatory; rather, as the name implies, it is a survey with a response rate of 75.7 percent in its most recent round. The PSS includes information similar to that reported in the CCD, including a unique school identifier, but it does not include information about the school's operational status.

2.3. Closure and Restructuring Variables

These data only allow us to capture our constructs of closure and restructuring with some degree of measurement error. Below, we describe our closure and restructuring measures and discuss potential errors.

2.3.1. Closure and Restructuring of TPS and Charter Schools

We begin the identification of closures with the CCD's operational status variable, which is captured as of October 1st of each school year and has eight categories, including open (if it was operational), closed (if it was not operational), new (if it was newly created or its levels/programs were completely modified), added (if it was operational and previously overlooked), changed LEA (if it was operational in the prior year, but under a different LEA), inactive (if it was temporarily closed but expected to reopen), future (if was scheduled to be operational within two years), or

reopened (if was operational but reported as closed in the previous year).[10] Since these codes do not perfectly map into our definition of closure, we use the process described below to create our measure.

We start with the complete data in the CCD and create a unique NLSD identifier based on the NCES identifier to track schools over time.[11] We then drop the following: schools in U.S. territories, schools housed in correctional institutions, detention centers, or hospitals, schools coded in their operational status as *future* (only in the years they are listed as such), and schools listed as closed that repeat that operational status in consecutive years.

We code as open those schools reported by CCD as open, new, added, or reopened, and we code as closed those schools reported as closed or inactive for at least one year. In addition, we report as closed those schools that disappear from one year to the next (and remain missing until the end of the data file) and redefined the year of closure as the first year without reported enrollment or enrollment equal to zero. We also code as closed those schools that change location, i.e., changes in street address coupled with either a change in city, name, or enrollment size because many address changes occur due to typos or slight changes in the way addresses are reported.

To identify restructurings, we begin with those TPS or charter schools that report a change in their charter status from TPS to charter or vice versa (i.e., conversions). We also code reconstitutions as restructuring (available in the CCD starting in 2011). To identify situations

[10] Between 1991 and 2019, the operational status variable went from four to eight categories. See Appendix A for additional details.

[11] Unlike the NCES identifier, the NLSD identifier allows for tracking a school longitudinally even if the school changed the LEA to which it was affiliated. That is, since the school NCES identifier is a twelve-digit code that combines information from the state (2 digits), the LEA (5 digits), and the school (5 digits), any change in LEA implies a new NCES identifier (White, 2019). Not until 2017 can the NCES identifier be used to track individual schools. Other cases that lead to changes in the NCES identifier include when: (a) the grade span of the school changes by more than three grades (not including pre-kindergarten/kindergarten as grades), (b) the school's physical location changed, and the attendance area changed significantly, (c) two schools of about the same size, or with different grade spans, merge.

where charter schools change management organization or governance, we also code as restructured those charters that have both a change in LEA and a change in school name; and those charters that change authorizer (available in the CCD starting in 2014). Finally, we define as restructured those schools reported as closed where another school is reported as new in the same location during the same or following school year.

See Table 1 for a comparison between our definitions and measures by sub-types and Appendix B for a point-by-point description of our coding. Though we believe our method minimizes error with the available data, our measures are likely to under-count restructuring and, to a lesser extent, closures. For example, we lack data specifically identifying state takeovers, which will be undercounted unless they fall into one of our other categories of restructuring (e.g., charter conversion). Also, prior to 2011, our restructuring measure does not capture reconstitutions and, prior to 2014, the data cannot identify a type of restructuring in which a charter school is turned over to another authorizer. Therefore, we report multiple versions of the restructuring measure based on the different year ranges.

Some important patterns emerge in Table 1 for publicly funded schools. The first two columns provide different sub-types of closure, but also indicate that the data do not allow us to distinguish them empirically. Also, as noted earlier, no data are available to measure closures under the narrower definition that involves movements of personnel and organizations to other locations. We can make more fine-grained distinctions with restructuring, especially in the more recent data. Almost all the TPS restructurings we can identify are reconstitutions (starting in 2011 and included in the "2014 version" of the data), while the remaining 8.6 percent of restructurings are TPS-to-charter conversions. For charter schools, the majority of restructurings are changes in authorizers (50.6 percent), followed by reconstitution (27.2 percent), charter-to-TPS conversion (17.1

percent), and changes in management organizations (4.7 percent). So, while part of our objective is to operationalize definitions that apply across sectors, the frequency of different sub-types differs between sectors with TPS interventions dominated by restructuring and charter school interventions dominated by changes in governance. This is not especially surprising since some of the core differences between charter schools and TPS generally involve their modes of governance and management.

2.3.2. Closure of Private Schools

For private schools, we start with data from the 37,730 private schools in the PSS from 2008 to 2018.[12] We first limited the analysis to the 27,277 regular schools with an average of 20 or more students per year to narrow down the list of schools that required manual data collection. Limiting the sample to regular schools means excluding alternative, career/technical education, and special education schools, as well as child-care centers.[13]

Unlike the CCD, the PSS is a sample and does not include the operational status variable. Instead, we identified as potentially closed those schools that appeared and never reappeared in later years based on their PSS identifier. This would be a substantial over-count of closures because some private schools might have remained open without filling out the survey, which would tend to over-state closures. Also, schools disappearing from the PSS during the most recent years have fewer opportunities to reappear, so that mismeasurement of closure is uneven over time. In short, while it is reasonable to assume that schools continually in the PSS are open, this is not a reasonable assumption for the large numbers of schools that stop reporting in the PSS.

[12] Although the PSS is available for earlier years, we focus only on 2008 and beyond when the relevant variables (including school name and address) were available.

[13] As we describe in Section 3, to make the TPS/Charter sample comparable to the private sample, we also limit the analysis of TPS and charter schools to regular schools with an average of 20 or more students per year.

To address this problem, we complement the PSS data with information from manual online searches.[14] We start with schools in the PSS during the years 2008 to 2018 to identify closures of private schools. Of the 27,277 regular private schools available in that step, we identified for manual data collection 11,287 schools that were in the PSS at some point and later dropped out. We then carried out the following process: (1) for all schools, enter school name and address into the Google Maps Application Programming Interface (API) to request the school's operational status and web address;[15] (2) manually check the accuracy of the website for the 6,934 schools with an associated website; (3) if the school has a functioning and recently updated website or the school does not have a website, but is listed as open by Google Maps, or the online searches yield other clear evidence of ongoing operation, code the school as open (6,414 schools); (4) if we find explicit text that a school has closed (Google Maps, news, among other), we code it as closed (3,438 schools); and (5) code all remaining 1,435 schools, for which we have no information, as closed. When the school was coded as closed, we report the year of closure as the year the school disappeared from the PSS.

As with TPS and charter schools, every private school is either open or closed. In the case of private schools, the main limitation of our closure measure compared to the ideal measure is that ours may be more likely to over-count closures as it identifies as closed the cases of schools for which no online information is found. As an alternate closing measure, we code schools as open if they dropped from the PSS but had no information in the manual search.

We also considered a different approach rooted not in the PSS sample but in the PSS-*universe*, i.e., the list of all private schools obtained from states, all of which are sent surveys. We

[14] Data collection based on online searches was carried out between May 20th and August 6th, 2021, and between January 17th and January 19th, 2022.
[15] We did not explicitly limit the internet search to particular years because the sometimes-sparse nature of internet data on private schools means that the news of a closure might arise during that time frame.

obtained the PSS-universe from the U.S. Department of Education, but did not make use of this source in our data analysis because the PSS-universe only includes the name, identifier, and address of the school. This creates two problems: (a) we do not have the data necessary to identify and limit the PSS-universe to the regular K-12 schools that are of primary interest; and (b) without covariates, the regression analysis would still drop the observations in the PSS-universe not included in the PSS. An alternative would be to include all schools regardless of size and grades served (e.g., schools with very few students that stop in kindergarten), but this set of schools is of less interest, in part because relatively few students attend these schools. This may mean that we are under-stating the closure rates of regular private schools, though we show below that our results for Catholic schools are corroborated by some other evidence on this subgroup.

As shown in Table 1, we can make fewer distinctions in the types of interventions that arise with private schools. In addition to their being no logical form of restructuring (because government agencies have minimal authority over private schools), the table makes clear that we cannot distinguish between the different sub-types of closure.

3. Trends in Closure and Restructuring

Our estimates of the closure rate, shown in Panel (a) in Figure 1, suggest that the average annual closure rates for charters, private, and TPS are 5.1, 2.9, and 0.9 percent, respectively between 2014 and 2018. After the creation and expansion of charter schools from 1991 to 1994, there was a sharp increase in the closure rate of charter schools from 1996 to 2000, which seems to reflect that some of the earliest charter schools were not well-positioned to succeed. The charter closure rate declines somewhat after 2000 and then stabilizes. The steady closure rate after 2000 is noteworthy, given the continued expansion of charter schools during this period. This could reflect several factors: the improvement in charter authorization processes if authorizers are

learning to better identify potentially-high-performing charter schools (Ruble and Harris, 2014); the shift to larger charter and education management organizations (CMOs and EMOs) which have greater management and fiscal capacity and academic growth (CREDO, 2017b); that support systems for charter schools, such as industry advocacy groups, were starting to expand during this period; and/or a declining capacity of charter authorizers to hold charter schools accountable (Loveless, 2003).[16]

A report from the National Alliance for Public Charter Schools (White and Hieronimus, 2022) suggests a charter school closure rate of 3.2 percent between 2014 and 2018, versus our 5.1 percent over the same period. We have identified two likely reasons for this: First, they define charter closures in terms of whether the organization ceases to operate a school (i.e., the narrow definition discussed earlier), whereas we focus on whether the building continues to operate as a school. There is no one correct way to define closure and we have focused on the use of the building in part because of what this means for the local community. A second difference is that NAPCS collected additional data from their constituent educational organizations to address errors in the way in which charter schools are identified in federal data, which might inflate our closure numbers in the charter sector to an unknown degree.

[Figure 1]

For private schools, the closure rate is relatively steady from 2008 to 2012 but has declined since then. This recent decline aligns with a report from the National Council of Catholic Education (McDonald and Schultz, 2019), which suggests that the closure of Catholic schools went from 2.5 percent in 2010 to 1.8 percent in 2019. The same pattern is observed for all types of private schools (Catholic, other religious, and non-sectarian) and when using the alternate closure measures (see

[16] This steady closure rate is similar for charters in which the LEA is the same authorizer than for charters in which the LEA and authorizer are different (see Figure C1 in the Appendix C).

Figure C2 in Appendix C). We estimate a closure rate for Catholic schools in 2018 of 2.0 percent, which is close the McDonald and Schultz (2019) number.

The closure trend for TPS has been much smoother, likely because of the larger sample of schools involved and the general stability of governance in this sector.[17] We also see slight peaks in the early 1990s and in the 2006 and 2010 school years. It is noteworthy that the number of closures increased slightly after NCLB became law. Provisions of that law required states and districts to close or restructure schools that were persistently failing.[18]

The estimates of the restructuring rate, shown in Panel (b) in Figure 1, reinforce the idea that the charter restructuring rate is significantly higher than the TPS restructuring rate. Between 2014 and 2018, when most types of restructuring are captured in our measures, the average annual restructuring rates for charters and TPS are 2.0 and 0.6 percent, respectively. We report the results separately for TPS and charters in Figure C3 in Appendix C so that the details of the two versions of the restructuring measure are more visible. The higher rates of restructuring from the "2014 version" of the data reflect the undercounting of restructuring in the "all years" version (i.e., the limited data on reconstitutions before 2014).

Overall, we find that: (a) charter schools have the highest rate of closure, followed by private schools and then TPS; and (b) charter schools also have a higher restructuring rate than TPS. The reasons behind these differences are unclear. For example, the higher intervention rates for charter schools could reflect their locations in urban areas and their enrollment of racial/ethnic minorities and low-income students. In the next section, we consider various potential explanations and provide some tests for the various theories on why closures and restructuring arise.

[17] Unlike charter schools, where governing structures, such as authorizers, have only been created in recent years, the vast majority of school districts have existed for many decades and often more than a half-century.
[18] In related work using these same data, Martinez-Pabon (2022) finds a null effect of the accountability measures implemented under NCLB on school closure rates.

4. Data for Predictors of Closure and Restructuring

In this section, we discuss the data we use to measure various types of predictors of school closure/restructuring: student demographics, school characteristics, school quality, and competitive pressures. We focus especially on the quality measures as these involve more complex issues than the other predictors.

4.1 SEDA Measures

Achievement levels and growth measures are created by the Stanford Education Data Archive (SEDA) based on mathematics and English/Language Arts (ELA) standardized test scores administered in 3rd through 8th grade in TPS and charter schools between 2009 and 2016. Achievement levels and growth measures are standardized to a mean of zero and standard deviation of one (*z*-scores) by grade level. The growth measures are based on changes in school-level average performance across years within a cohort (e.g., 4th grade achievement in 2010 minus 3rd grade achievement in 2009). The main disadvantage of this approach is differential attrition, i.e., that some of the students whose scores are reflected in the 4th grade average were not in the 3rd grade cohort, and some of the 3rd graders will have left for other schools. Given this problem, we refer to them as "pseudo-growth" measures, to distinguish them from traditional growth and value-added measures (Harris, 2011). We find that average test score levels of charter schools are below the TPS average. In contrast, average growth rates for charter schools are slightly higher than for TPS (Table D1 in Appendix D). This result coincides with CREDO (2015), which finds that, on average, charter schools (in urban areas) achieve slightly higher growth in performance than TPS.

The pseudo-growth measures could be biased by non-random student mobility across schools. Reardon et al. (2019b) also warn about the charter school measures, based on validity

checks that compare the pseudo-growth measures to value-added measures calculated using student-level data. The authors suggest that, because of systematic differences in student mobility between charter schools and TPS, the pseudo-growth measures tend to be overestimated for charter schools but not for TPS.

However, whether biased pseudo-growth measures yield biased estimates of the *relationship* between closure/restructuring and quality by sector depends on whether the probability of closure is correlated with the degree of bias in the quality measures. This condition is not directly testable. To test potential bias rooted in schools pushing out low-performing students, we analyze non-random mobility using the degree to which enrollment drops from grade to grade (from grade *g* in year *t* to grade *g+1* in year *t+1*) within schools. The logic of this approach is that schools might push out low-performing or disruptive students and then avoid replacing those students with new ones (a process sometimes called "backfilling").[19] We find that between 2009 and 2016 (the period in which the SEDA measures are based) the grade-to-grade enrollment size between 3rd through 8th grade decreases on average 3.73 percent in charter schools that were always open during the period and 6.85 percent in charter schools that eventually closed or were restructured. This suggests that the quality of charter schools that close (those with available SEDA measures) may be disproportionately biased upwards, which would tend to under-state the role that school quality plays with charter schools.[20]

Another limitation is that the SEDA measures are missing for many schools. A disproportionate share of the schools that are eventually closed or restructured do not have SEDA measures available and the availability of SEDA measures is not uniform between sectors (Table

[19] Anecdotally, schools might not back-fill because students transferring in from other schools may have unobservable discipline or academic issues, and/or may not be accustomed to the distinctive rules and norms of charter schools, which often differ from TPS.

[20] The reduction on grade-to-grade enrollment size in TPS was 5.66 and 5.68 percent, respectively.

D2 in Appendix D). Among TPS that were always opened, the number of schools with SEDA measures is more than double the number of schools without SEDA measures. In contrast, of the charters schools that were always opened, the number of schools with SEDA measures is half the number of schools without SEDA measures, meaning that these measures were much more likely to be missing for charter schools.

The missingness of SEDA measures is correlated with whether a school is in the charter sector, has a larger share of racial/ethnic minority and low-income students, and/or is located in an urban area (see Table D3 in Appendix D). The missingness of SEDA measures in charter schools may be because schools with few assessment outcomes were removed from the estimation of SEDA measures, and charter schools are smaller in size than TPS (Reardon et al., 2019a); also, charter schools are more likely to be new and have insufficient data to make these calculations. In section 6.4, we present different robustness checks to explore this potential bias.

4.2 Great Schools Data

The "star" community rating from GreatSchools.org (GS) is useful because it is available for all school sectors and grades. The community rating, henceforth the GS rating, is based on a 1 to 5 rating that parents, students, teachers, among others, report directly in the GS portal. As a broad indicator of satisfaction, the GS rating accounts for a broad range of factors that are important to families. However, the GS rating suffers from very high rates of missingness. Some schools have no ratings at all and, among those that do, the number of reviews per school is small. These forms of missingness may be correlated with perceived quality. The GS rating's missingness is common in private schools and less likely in schools with higher enrollment and in urban locations (see Table D3 in Appendix D).

For each school, the GS rating is the average rating reported by parents and community between 2008 and 2010. A disproportionate number of reviewers give high ratings (Table D1 in Appendix D). Importantly, this skewed distribution mirrors parent surveys about school quality from representative samples (Chingos, Henderson and West, 2010); therefore, it does not appear that the distribution of GS measures differs from the population. Whether any bias is different for schools that eventually close, is much more challenging to test.[21]

The results also show that only 67 percent of the schools during this period have a GS rating. Moreover, the ratio of schools with GS ratings to schools without GS ratings varies significantly between sectors and operational status. Again, even in the schools that do have ratings, the ratings are based on a very small number of reviews.

In summary, there is no single measure of school quality that provides information for all sectors and at the same time captures most schools without suffering from measurement problems. Since our analysis suggests that each of the various school quality measures is flawed in different ways, we draw conclusions later in the study based on those patterns that are consistent across the various measures.[22] Furthermore, to deal with this problem in the regression analysis, we carry out various robustness checks in section 6.4.

[21] Figure D1 in Appendix D presents the distribution of the GS rating for total schools and by sector. This shows, among other things, that the distribution is similar between schools that eventually closed or were taken over and those that were always open.

[22] We considered adding a Principal Component Analysis (PCA), but decided against this for several reasons: (1) The correlations between the measures are low (the correlation between GS rating and the average test score is 0.14; the correlation between GS rating and the average growth rate is 0.006; and the correlation between average test score and average growth rate is 0.10.), so the components are already largely independent of one another, which makes the PCA less useful; (2) we see each of the measures as capturing fairly different conceptual dimensions of quality (as distinct from the empirical dimensions in the PCA); (3) we have missing data issue and many observations are missing a single measure, which would require either dropping a large share of schools or adding unnecessary complexity to the PCA; and (4) PCA results are more difficult to interpret, in contrast to our existing analysis which presents the predictive power in intuitive terms according to the known scales of each separate quality measure.

4.3 Descriptive Statistics

Table 2 presents descriptive statistics for school quality, student demographics, and other characteristics that we use in the analysis. Going forward, we restrict the analysis from 2014 to 2018 for four reasons: (a) the measure that incorporates most types of restructuring is only available starting in 2014, (b) the closure measure for the private sector is only available starting on 2008, (c) the various quality measures were all collected during these years, but not earlier years, and (d) this allows us to focus on the more mature charter sector, as opposed to earlier years where the sector was still in its formative stages. We do not include 2019 in this table because we do not have covariates in that year.

Table 2 shows that most schools are in urban areas with an average of almost five hundred students, of which more than 50 percent received free or reduced-price lunches. These numbers align with data from NCES (De Brey et al., 2021), suggesting that the small number of schools that we drop do not meaningfully affect representativeness of the universe of schools nationally.

[Table 2]

5. Methods for Predictor Analysis

To study the predictors of closure and restructuring, we use Linear Probability Models (LPM), in which we estimate the probability of closure and restructuring as a function of the school characteristics. We explore the predictors for the combined measure of closure and restructuring, rather than examining them separately because, from an educational standpoint, closures and restructuring are both extreme measures and similar factors affect these decisions. Moreover, combining them improves statistical power and allows for a more concise presentation of results. We also discuss results that emerge when separating closure and restructuring. In each case, we estimate equation [1]:

$$Closure/Restructuring_{it} = \beta_0 + \beta_1 Charter_i + \beta_2 Private_i + \beta_3 Quality_i + \beta_4 X_{it} +$$

$$\beta_4(Charter_i \cdot X_i) + \beta_5(Private_i \cdot X_i) + \eta_{it} + \delta_t + \gamma_s + \varepsilon_{it} \quad [1]$$

where $Closure/Restructuring_{it}$ is an indicator of closure and/or restructuring of school *i* in year *t*.[23] $Charter_i$ and $Private_i$ are indicators for the sector of school *i*. $Quality_i$ refers to a vector of quality measures which includes the average GS rating between 2008 and 2010 for TPS, charter and private schools; and adds the average test score and pseudo-growth rate from SEDA when private schools are excluded. X_{it} is a vector of student and school characteristics including enrollment size, percentage of students of color, percentage of students receiving free or reduced-price lunches (FRL), and geographic area. Urbanicity is also included as a covariate, given that prior research has focused on closure in urban locations and urban political forms may be different from other locations. Moreover, as we discuss below, we include a vector of missing indicators to avoid losing data due to the missingness of quality measures. We also include a full set of interactions between sector, X_{it}, and $Quality_i$.[24] The parameter η_{it} is a vector of indicators for each grade that the school offers, while δ_t and γ_s are year and state fixed effects.[25]

The state fixed effects are included (in some specifications) to test whether predictive power of each measure reflects the characteristics of the schools or that of the states in which schools reside. These can be difficult to isolate because the demographics of schools are correlated with the demographics of their states. We also considered adding district fixed effects; however, the sample of schools would drop by roughly 50 percent since most school districts from the analysis do not include three, or even two, sectors. Nevertheless, conclusions based on district fixed effect results are qualitatively similar (see these results in Tables E1 and E2 in Appendix E).

[23] Note that the school is not included in the database after it is reported as closed.
[24] We do not show the interactions between quality and sector separately in equation [1] for conciseness.
[25] This type of analysis also lends itself to survival analysis. We therefore also estimate a hazard model of closure and takeover as a function of the school characteristics. For conciseness, we leave these results to Appendix H.

We are interested in all the coefficients in equation [1], including the interaction between school quality and sector. If the market is working as intended, we should see that low-performing schools are more likely to close than higher-performing ones. Also, given that the theory of charter and private schools are to inject stronger market forces, we might expect these sectors to be driven more by financial and quality measures.

6. Results

6.1. Demographics

Table 3 presents the LPM estimates of closure and restructuring for TPS, charter and private schools from 2014 to 2018. Columns (1) to (4) present the regression estimates for the sector, demographic characteristics, and quality measure separately. Column (5) adds school controls and quality measures to the Column (1) model. Column (6) adds indicators for each grade that schools offer and missing quality measures to the Column (5) model. Column (7) includes a full set of charter and private interaction terms. Column (8) adds year and state fixed effects. Results in Tables 3 and 4 are estimated using a balanced panel in which, for the GS rating, we assign the lowest possible value to schools with missing data, and we add a separate indicator variable of missingness.[26]

[Table 3]

Table 3 reinforces the earlier finding that charter schools have the highest closure/restructuring rate of all the sectors, followed by private schools and TPS. This is true even after controlling for student demographics and year and state fixed effects. Schools also close/restructure more frequently when they have lower enrollments or higher proportions of

[26] Results based on an unbalanced panel of schools and results using a multiple imputation method to assign values to schools missing quality measures lead to similar conclusions to those from the main results (see Tables G1-G2 in Appendix G and Table J4 in Appendix J).

students of color. The role of enrollment is especially strong for private schools, while the role of race is especially strong in charter schools.

Table 4 adds achievement predictors from SEDA and, as a result, omits private schools. Again, schools with lower enrollment and more students of color are more likely to be closed or restructured. However, the coefficient on the percentage of students of color is now smaller than in Table 3. This is mainly because of the omission of achievement measures in Table 3, combined with the fact that achievement levels are correlated with student demographics, so that the coefficients on demographics in Table 3 partly absorbed the role of achievement.

[Table 4]

6.2 School Quality

Table 3 suggests that schools with higher GS ratings are less prone to closure/restructuring, especially among charter schools. In addition, Table 4 suggests that elementary/middle schools with higher achievement levels and pseudo-growth are less likely to experience closure/restructuring.[27] We note that both of these findings might be partially driven by the missing data issues discussed earlier and we provide additional tests for bias in section 6.4.

Similar conclusions are drawn from the LPM estimates when the outcome variable separates closures from restructuring (see Tables F1-F3 of Appendix F). Overall, our results suggest that enrollment size and quality measures predict school closure and restructuring in similar ways.

Since all the coefficients in the above analysis are usually statistically significant, additional analysis is necessary to determine which predictors play a stronger role. The challenge in making this comparison is that the predictors are on different scales, so the coefficient

[27] 95 percent of charter schools that closed do not have the GS rating, and 91 percent do not have the SEDA measures.

magnitudes cannot be directly compared. To address this problem, we re-estimated the models, translating all the coefficients into effect sizes or *z*-scores (Tables F4 to F6 in Appendix F). That is, we divided each variable by its school/year standard deviation across all TPS, charter, and private schools.[28] The resulting regression coefficients can be viewed as the "relative predictive power" of each covariate (i.e., relative to the overall variation that exists in the population on that variable).[29]

That higher enrollment predicts lower closure/restructuring is clear from the earlier results, but these additional results also indicate that enrollment is one of the strongest predictors. This is especially true in private schools, likely reflecting the heavy dependence of private schools on tuition revenue. By this same reasoning, we expect to see the same result in charter schools, but several factors more strongly predict charter closure/restructuring. Race/ethnicity and income also predict closure/restructuring, including in private schools. Given that private schools decisions are made outside of immediate political processes, this might suggest that whatever factors are driving the race-intervention correlation might not be related to the political power of these groups. Still, it is also possible that the underlying reasons behind the predictive power of demographics vary across sectors in ways that make this cross-sector comparison uninformative.

We established above that higher quality is associated with lower closure/restructuring rates across all measures and sectors. Our analysis of relative predictive power shows achievement levels are more strongly predictive than any other measure, including non-quality measures (in

[28] Test score levels were already in z-score form from the underlying SEDA data, although this resulted in a slight change because our sample is not exactly the same as that in SEDA.

[29] We also conducted pairwise comparisons to test whether the coefficients on the various predictors are different from one another within sectors when we standardize to the school-level standard deviation (see Appendix Table F6). These results (available upon request) show that the coefficients are different in the majority of cases, except in the charter sector where many of the coefficients are of very similar magnitudes and where we have less precision because of the smaller sample. With private schools, each pairwise comparison is significant except minority-urban. With TPS, each pairwise comparison is significant except enrollment-achievement growth and minority-FRL.

TPS and charter schools). This is perhaps unsurprising, given the focus of most accountability systems on test levels. Perhaps more surprising is that achievement growth has any predictive power as this is rarely observed directly by families or policymakers, though there is some evidence that parents value high-value-added schools (Harris and Larsen, 2015; Beuermann and Jackson, 2018). The GS ratings tend to play a small role in predicting closure/restructuring, except in charter schools.

Overall, the results suggest that both financial and academic factors mainly drive closure/restructuring decisions, more so than demographics. But the situation is more complex than it might seem. The results do suggest that race and income predict closure/restructuring, even after controlling for other factors, which creates some concern about whether these decisions are equitable. The voices of families of color and those with low incomes may not be heard by policymakers and may reflect their diminished political power in influencing these decisions (Good, 2017; Ewing, 2018; Enoch-Stevens et al., 2022). However, we cannot fully examine the dynamics of political power without additional data (e.g., demographics of elected officials), and the role of these race and income-based inequities may be understated here. For example, the academic and financial considerations that are stronger predictors of closure/restructuring are driven partly by histories of racial and class-based inequity that this type of analysis cannot address. More generally, while studying the predictors of closure and restructuring quantitatively is one of the few ways to understand the factors involved on a national basis, this approach does have limits that we leave for future research.

6.3 Competition Across Sectors

In addition to the above school quality measures and student demographics, we also explore the relationship between school closure/restructuring and the extent of competition across

schools. We did not include measures of competition in the earlier analyses because of the complex relationship between closure, enrollment, and competition. Theory suggests that one of the main ways in which competition might increase closure is through reduced enrollment, as students switch to other schools.[30] Therefore, simply adding measures of competition makes it difficult to interpret the relationship between enrollment and closure/restructuring.

We measure competition as the number of schools in each sector that are located near each school.[31] The focus on nearby schools is owed to the strong role that distance to school plays in school assignments and choices (Glazerman and Dotter, 2017; Harris and Larsen, 2019). While the results are somewhat sensitive to specification (zip code vs. school district), we do find consistently that increased local presence of charter schools is associated with higher closure of private schools and higher closure/restructuring of TPS; in contrast, the number of private schools is almost never associated with the closure/restructuring of charters or TPS (Tables I1-I2 in Appendix I).[32,33] That private school closure seems related to the number of nearby private and charter schools, but that TPS school closure does not seem related to the number of nearby private schools may be indicative of some level of market segmentation.[34] More generally, each sector's closure/restructuring outcomes seem related to the presence of one or two other sector, but no

[30] Another potential mechanism is that the students who are highest-performing or least-costly to serve will leave, making it difficult for a school to function even apart from enrollment levels (see Kho, Zimmer, and McEachin, 2020). However, since we cannot observe achievement or other information at the student level on a national basis, this is not testable with these data.

[31] We use two definitions of nearby schools: those schools within the same zip code and those schools within the same school district. However, given the geography of schooling and the strong role distance plays in parent preferences, the zip code approach might be preferable to measure competition than a broader level.

[32] We find similar results when we measure competition alternatively as the enrollment shares in each sector that are located near each school (see Tables I3 in Appendix I).

[33] Surprisingly, charter schools are less likely to close or be restructured when there are more nearby TPS. This may reflect the initial (endogenous) charter school locations. For example, charter schools may be more likely to open near TPS because these locations offer more potential students to recruit into charter schools (Glomm, Harris, and Lo, 2005).

[34] Market segmentation, in this setting, refers to the idea that certain groups of families only consider certain types of schools. Thus, if markets were completely segmented, we would not expect private school closure to be related to TPS and charter schools.

sector is responsive to all three. These results complement causal analyses in particular states examining the effects of charter and private school entry on the prior schools that remain open (Gill and Booker, 2012; Epple, Romano and Zimmer, 2016; Chakrabarti and Roy, 2016; Chen and Harris, 2022; Slungaard Mumma, 2022).

6.4 Robustness Checks and Potential Bias

We have identified two key issues with the data: (i) issues with the quality measures and (ii) issues with the closure measures. Below, we describe various robustness checks meant to address these issues and test the robustness of the conclusions drawn from the main results.

Regarding the quality measures, we tested for relevant bias in the SEDA measures due to the non-random mobility of students, which, for example, would inflate the achievement growth measures of schools that push out lower-performing students. We find that our main conclusions of the relationship between quality and closure/restructuring do not change when we control for changes in school enrollment (i.e., the difference between the current year and the previous year) (Table J1 in Appendix J).

To address missingness in the GS measures, we re-estimated the models using: (a) only those states where the ratio of schools missing the GS rating to schools with the GS rating is low and similar across sectors;[35] and (b) a multiple imputation method to assign values to the quality measures to those schools missing their quality measures.[36] In both cases, the results yield similar

[35] We focus on those states with at least 20 charter schools with a non-missing GS and where the ratio of schools with GS rating to schools without GS rating (within 40 percent of the state average ratio). The list of states in the selected sample includes Arizona, California, Florida, Georgia, Hawaii, Maryland, New Jersey, New Mexico, Ohio, Oregon, South Carolina, Texas, and Washington D.C.

[36] The multiple imputation method assumes that missingness on the quality measures is uncorrelated with the unobserved value of the quality measures but associated with observed variables in the model. In this case, we find that enrollment size is the variable with a high correlation with the missingness of the quality measures. Here, the method completes the missing data with ten (10) simulated values, and the estimated results are the arithmetic mean of the estimation of each of the ten models.

conclusions, although the estimates are less precise than the results in Tables 3 and 4 (Tables J2 to J4 in Appendix J).

To deal with the issues with the closure measures, we re-estimated the results for private schools using an alternate measure in which we define as open those private schools without verified operational status through online searches instead of defining them as closed as in the preferred measure. The alternate closure rate is lower than the preferred one as expected (see Figure C1(c) in Appendix C), but the predictors using this alternate closure measure are similar to those in Table 3 (Table J5 in Appendix J).

We also re-estimated the predictors of closure using an alternate closure measure for charter schools from the NAPCS and our closure measure for TPS and private schools. As we described earlier, NAPCS defined and measured closure differently and in way that might lead to over-counting of charter closures in our data. We find that when we identified closed schools in the charter sector using the NAPCS measure, the predictions about school closure are similar to those estimated using our closure definitions and measures (Tables J9-J10 in Appendix J).

Lastly, we address the above data issues with microdata from the State of Louisiana from 2013 to 2014. The Louisiana microdata traces individual students and links them over time to the specific public schools that students attend.[37] With this microdata, we can create versions of the same measures that we used in the national analysis, but without some of the problems we observe in the NLSD. In particular, when the data source is the Louisiana microdata, instead of using the SEDA measures, we include a school value-added measure based on student-level data described in Harris et al. (2019), which is less likely to suffer from bias from student mobility.

[37] The universe of public schools in the state is approximately 1,500 schools.

The LPM estimates of closure and restructuring for charter and TPS schools in Louisiana, given that they are only for a single state, are less precise but still useful as they allow us to observe whether the coefficients are similar between the Louisiana microdata and the Louisiana NLSD. We find that the estimates for all publicly funded schools are qualitatively similar between Louisiana microdata and Louisiana NLSD (see Table J8 in Appendix J). As in the national analysis, higher GS ratings and achievement levels and growth are associated with lower rates of closure/restructuring in the Louisiana microdata. Higher enrollment also continues to predict less frequent closure/restructuring.

In summary, our robustness checks reinforce our main findings that the charter closure/restructuring rate is higher than the private and TPS rates, even after controlling for other covariates; that low-enrollment schools are more likely to close; and that closure is negatively correlated with the quality measures.[38]

7. Conclusion

These results provide new evidence about the frequency and trends of closure and restructuring, the factors driving these decisions, and the differences across sectors. We note six main contributions: (1) clarifying and defining the concepts of closure and restructuring and their sub-types; (2) proposing ways to measure closure and restructuring according to these definitions; (3) expanding the sample of schools used in prior studies to include essentially all schools in the United States; (4) expanding the work beyond closures to include school restructuring; (5) documenting the levels and trends in closures and restructuring going back many decades; and (6)

[38] As discussed in Appendix A, we also identified some issues with the charter measure in the CCD. In particular, while it might seem that the charter indicator should be accurate in the CCD, our analyses using external data suggest some issues affecting the variable. To deal with this issue, we replace the charter variable in the NLSD (originally from the CCD) with the one based on the NAPCS data (see Appendix A for a detailed discussion of the charter measure in the NAPCS). We find that estimates using the NAPCS-based charter status are similar to those presented in the main tables (Tables J6 and J7 in Appendix J).

exploring the role of wider variety of predictors in a regression framework and therefore informing theories about why these decisions are made.

The second contribution—measurement of closure/restructuring—forces us to see the limitations of existing data and points to several directions for state and federal policymakers and research agencies. The data problem is most evident with private schools where it has been virtually impossible to calculate closure rates with existing data because the PSS is not mandatory and does not incorporate information regarding closed schools. Our internet-based search method addresses this problem and points to a way forward to improved data for future research.

The data for TPS and charter schools have improved over time with the addition of reconstitutions and charter authorizer identifiers in the CCD. However, we still have no data regarding state takeovers and are forced to indirectly identify changes in charter management organizations (and therefore likely with some error). We propose the collection of three additional variables in future data collection: (a) new variables indicating whether an involuntary change in school leader and/or instructional staff above some threshold (e.g., 50 percent of the total); (b) new variables indicating the name and identifier of charter schools' management organization each year; and (c) a new variable indicating closure/restructuring/renewal decisions of charter schools made by their authorizers each year. In addition to providing better data for analysis of closures and restructuring, these changes would better align the information available for charter schools to that available for TPS. With TPS, we know the name of the government body and manager (i.e., the school district), but we lack this information for charter schools.[39]

While not an especially popular policy, school closure and restructuring are likely to be with us well into the future. Schools have historically been closed and restructured at a steady rate.

[39] Adding the CMO and EMO information would not only help flag takeovers but allow for better analysis of different types of charter schools (e.g., for-profit versus non-profit).

The question seems to be not, “should we close or restructure schools?” but rather, “when and in which schools should these extreme measures be taken?” A first step toward answering that question is collecting data, and providing more analysis, to better understand how often these difficult steps are taken, how these decisions are made currently, and how they affect students. This study is a step forward toward these aims.

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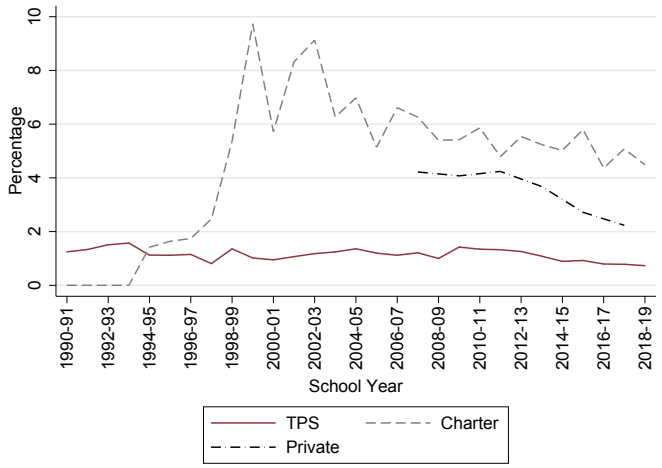
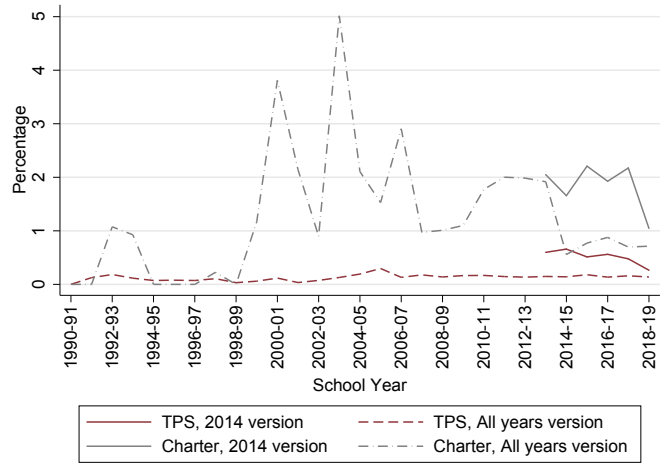
Main Text Figures and Tables

Figure 1 Closed and Restructured Schools as Percentage of All Schools, by Sector

Panel (a) Closed Schools as Percentage of All Schools, by Sector



Panel (b) Restructured Schools as Percentage of All Schools, by Sector



Notes: Figures include regular schools with an average of 20 or more students. See Table 1 for details about the closure measure by sector.
Source: Author's calculations based on NLSD.

Table 1 Defining Closure, Restructuring, and Sub-Types
(Measurement of sub-types in italics)

Closure		*Restructuring*	
TPS and Charter	*Private*	*TPS*	*Charter*
Building is boarded up • *All years version: i) Close flag in CCD [59.4 percent of closures between 2014-2018] (or) ii) school no longer reports to the CCD and was never reported as closed [7.6 percent of closures between 2014-2018] (or) iii) address changes along with either: (a) change in city (b) change in name; or (c) drop in enrollment >25% (absolute value)* [33.0 percent of closures between 2014-2018]*	Building is boarded up • *2008 version: No longer reports to the PSS and was identified as closed in the manual online search [100 percent of closures between 2014-2018]*	TPS turned into charter • *All years version: Charter flag in CCD turns on [8.6 percent of TPS restructuring between 2014-2018]*	Charter turned into TPS • *All years version: Charter flag in CCD turns off [17.1 percent of charter restructuring between 2014-2018]*
Building is torn down and/or replaced with new building • *All years version: Same as above (cannot distinguish)*	Building is torn down and/or replaced with new building • *2008 version: Same as above (cannot distinguish)*	State takeover • *All years version: No identifier available*	Charter turned over to another authorizer • *2014 version: Charter authorizer identifier changes [50.6 percent of charter restructuring between 2014-2018]*** • *All years version: No identifier available*
Building is closed because of a merger with an existing school • *All years version: Same as above (cannot distinguish)*	Building is closed because of a merger with an existing school • *2008 version: Same as above (cannot distinguish)*	Reconstitution • *2014 version: i) Reconstitution flag in CCD turns on [72.9 percent of TPS restructuring between 2014-2018]** or ii) a new school opens in the location of a closed school [18.5 percent of TPS restructuring between 2014-2018]* • *All years version: No identifier available*	Reconstitution • *2014 version: i) Reconstitution flag in CCD turns on [9.1 percent of TPS restructuring between 2014-2018]** or ii) a new school opens in the location of a closed school [18.1 percent of charter restructuring between 2014-2018]* • *All years version: No identifier available*
Building is re-purposed for school admin/support • *All years version: Same as above (cannot distinguish)*	Building is re-purposed for school admin/support • *2008 version: Same as above (cannot distinguish)*		Change in management organization • *All years version: LEA identifier change and name change [4.7 percent of charter restructuring between 2014-2018]*
Building is sold for non-educational purposes • *All years version: Same as above (cannot distinguish)*	Building is sold for non-educational purposes • *2008 version: Same as above (cannot distinguish)*		

Notes: The tables lists multiple versions of the closure/restructuring measures, which pertain to different years. The "all years version" is used in all years, 1990-2018. The "2008 version" and "2014 version" cover 2008-2018 and 2014-2018, respectively. The statistics in brackets indicate the percent of closure or restructuring in the given column that fall into that sub-type cell during 2014-2018, the years where data quality is highest. See text for additional details.

* The address changes are coupled with other changes because many address changes seem to occur because of typos or slight changes in the way addresses are reported.
** Reconstitution data are available starting in 2011 and changes in charter authorizer are available starting in 2014. This is the “2014 version” of the restructuring measure, which aligns with these two improvements in the data.

Table 2 Summary statistics of schools, 2014-2018

Variables	All	TPS	Charter	Private
Panel (a) Outcome Variables				
Closed	0.014	0.009	0.051	0.029
Closed or Restructured	0.020	0.015	0.071	0.029
Panel (b) Control Variables				
Charter	0.059			
Private	0.121			
Urban	0.723	0.700	0.893	0.797
Enrollment size	521	573	438	209
% Students of color	0.446	0.449	0.662	0.323
% FRPL	0.527	0.527	0.560	0.373
GS rating	4.000	3.985	4.027	4.117
Number of reports in the rating	4.812	4.586	10.617	4.671
Missing GS rating	0.333	0.295	0.593	0.461
Average test score	-0.010	-0.007	-0.096	.
Average growth rate	0.010	0.010	0.025	.
Missing SEDA scores	0.353	0.232	0.703	1.000
Missing GS rating or SEDA scores	0.549	0.462	0.830	1.000
Number of TPS by zip code	6.188	6.254	6.355	5.659
Number of charter schools by zip code	0.630	0.459	3.107	0.576
Number of private schools by zip code	1.260	0.839	1.181	4.138
No. of observations	479,507	392,911	28,369	58,227
No. of unique schools	109,128	80,597	6,798	21,970

Notes: Mean values. The unit of observation is the school year from 2014 to 2018. Regular schools with an average of 20 or more students. FRPL= Free/Reduced Price Lunch. Average GS rating of the school between 2008 and 2010. SEDA measures not available for private schools.
Source: Author's calculations based on NLSD.

Table 3 Predictors of Closure/Restructuring for All Schools (LPM), 2014-2018

Variables	Closure/Restructuring rate							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Charter	0.0624***				0.0483***	0.0493***	0.0950***	0.0499***
	(0.0032)				(0.0032)	(0.0034)	(0.0227)	(0.0107)
Private	0.0249***				0.0170***	0.0220***	0.0423***	0.0249***
	(0.0012)				(0.0013)	(0.0017)	(0.0071)	(0.0046)
Enrollment size		-0.0309***			-0.0251***	-0.0285***	-0.0231***	-0.0170***
		(0.0011)			(0.0011)	(0.0013)	(0.0012)	(0.0007)
Charter x Enrollment size							-0.0091	0.0046
							(0.0076)	(0.0041)
Private x Enrollment size							-0.0641***	-0.0423***
							(0.0054)	(0.0037)
% Students of color			0.0256***		0.0290***	0.0308***	0.0269***	0.0261***
			(0.0013)		(0.0013)	(0.0013)	(0.0014)	(0.0011)
Charter x % Students of color							0.0280***	0.0191***
							(0.0104)	(0.0056)
Private x % Students of color							0.0023	-0.0044
							(0.0040)	(0.0029)
Urban			-0.0041***		0.0006	0.0011	0.0006	0.0002
			(0.0009)		(0.0010)	(0.0010)	(0.0011)	(0.0006)
Charter x Urban							-0.0201	-0.0063
							(0.0123)	(0.0055)
Private x Urban							0.0089***	0.0085***
							(0.0031)	(0.0020)
GS rating				-0.1083***	-0.1526***	-0.0949**	-0.0383	-0.0531**
				(0.0394)	(0.0388)	(0.0390)	(0.0394)	(0.0230)
Charter x GS rating							-1.4711***	-0.6063***
							(0.4738)	(0.2183)
Private x GS rating							-0.1327	-0.0657
							(0.1453)	(0.0927)
Constant	0.0211***	0.0439***	0.0201***	0.0239***	0.0224***	0.0315***	0.0260***	0.0189***
	(0.0004)	(0.0007)	(0.0007)	(0.0017)	(0.0019)	(0.0024)	(0.0024)	(0.0020)
No. of observations	466,726	466,513	465,869	466,726	465,869	465,869	465,869	465,869
No. of unique schools	102,823	102,777	102,762	102,823	102,762	102,762	102,762	102,762
Controls for missing quality measures	No	No	No	Yes	Yes	Yes	Yes	Yes
Controls for grades offered	No	No	No	No	No	Yes	Yes	Yes
Year Fixed Effects	No	No	No	No	No	No	No	Yes
State Fixed Effects	No	No	No	No	No	No	No	Yes

Notes: The unit of observation is the school-year from 2014 to 2018. New openings after 2014 are excluded. Robust standard errors in parenthesis. School enrollment size is in thousands. The GS rating is re-scaled to be 0-100 and we use the average GS rating of the school between 2008 and 2010. GS rating equals the lowest possible value for schools without the reported quality measure. When GS rating is included, we replace the missing values with the lowest possible value and add missing indicators (with interactions).
Statistical significance: * $p<0.10$, ** $p<0.05$, *** $p<0.01$.
Source: Author's calculations based on NLSD.

Table 4 Predictors of Closure/Restructuring for TPS and Charter Schools (LPM), 2014-2018

Variables	Closure/Restructuring rate							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Charter	0.0592***				0.0242***	0.0211***	0.0380*	0.0299*
	(0.0029)				(0.0033)	(0.0036)	(0.0210)	(0.0154)
Enrollment size		-0.0358***			-0.0304***	-0.0303***	-0.0314***	-0.0328***
		(0.0023)			(0.0023)	(0.0024)	(0.0019)	(0.0015)
Charter x Enrollment size							0.0065	0.0138**
							(0.0070)	(0.0057)
% Students of color			0.0179***		0.0093***	0.0087***	0.0062***	0.0088***
			(0.0017)		(0.0018)	(0.0018)	(0.0018)	(0.0017)
Charter x % Students of color							0.0342***	0.0261***
							(0.0120)	(0.0098)
% FRPL			0.0148***		0.0040**	0.0038*	0.0062***	0.0001
			(0.0017)		(0.0020)	(0.0020)	(0.0017)	(0.0017)
Charter x % FRPL							-0.0205*	-0.0082
							(0.0108)	(0.0097)
Urban			-0.0068***		0.0034***	0.0028**	0.0034***	0.0045***
			(0.0010)		(0.0011)	(0.0012)	(0.0011)	(0.0009)
Charter x Urban							-0.0139	-0.0095
							(0.0110)	(0.0079)
GS rating				0.0028	-0.0519	-0.0321	-0.0007	-0.0047
				(0.0399)	(0.0398)	(0.0397)	(0.0396)	(0.0318)
Charter x GS rating							-0.9640**	-0.7393**
							(0.4158)	(0.3043)
Average test score				-0.0259***	-0.0183***	-0.0187***	-0.0173***	-0.0203***
				(0.0011)	(0.0016)	(0.0016)	(0.0016)	(0.0014)
Charter x Average test score							-0.0370***	-0.0336***
							(0.0122)	(0.0086)
Average growth rate				-0.0369***	-0.0327***	-0.0432***	-0.0417***	-0.0442***
				(0.0019)	(0.0019)	(0.0025)	(0.0024)	(0.0022)
Charter x Average growth rate							-0.0298	-0.0082
							(0.0195)	(0.0142)
Constant	0.0205***	0.0419***	0.0122***	0.0070***	0.0169***	0.0139***	0.0132***	0.0099***
	(0.0004)	(0.0013)	(0.0010)	(0.0017)	(0.0023)	(0.0033)	(0.0031)	(0.0034)
No. of observations	339,038	338,875	331,905	339,038	331,905	331,905	331,905	331,905
No. of unique schools	70,081	70,048	69,977	70,081	69,977	69,977	69,977	69,977
Controls for missing quality measures	No	No	No	Yes	Yes	Yes	Yes	Yes
Controls for grades offered	No	No	No	No	No	Yes	Yes	Yes
Year Fixed Effects	No	No	No	No	No	No	No	Yes
State Fixed Effects	No	No	No	No	No	No	No	Yes

Notes: The unit of observation is the school year from 2014 to 2018. New openings after 2014 are excluded. Because of the inclusion of test scores, the sample is limited to elementary and middle schools, which comprise the vast majority of all schools. Robust standard errors are in parenthesis. School enrollment size is in thousands. FRPL= Free/Reduced Price Lunch. The GS rating is converted to a 0-100 scale and limited to average for years 2008-2010. When GS rating and SEDA measures are included, we replace the missing values with the lowest possible value and add missing indicators (and interactions).
Statistical significance: * $p<0.10$, ** $p<0.05$, *** $p<0.01$.
Source: Author's calculations based on NLSD.

Appendix of
Extreme Measures:
A National Descriptive Analysis of Closure and Restructuring of Traditional Public, Charter, and Private Schools

Douglas N. Harris
Valentina Martinez Pabon[1]

Appendix A: Details on CCD Files

A1. Data files

States submit their initial data files from January to May of the given school year, but can update prior years for up to two afterward. The first release of the CCD universe files is based on the submissions and resubmissions received through January and is designated as "1a" in file names. Re-releases of these data files will be designated with an incremented release number (e.g., "2a"). Nevertheless, resubmissions of the period 1999-00 to 2003-04 are not included in the publication.

After the school year 2015–16, collection of data is processed completely through EDFacts' Partner Support Center (PSC) and the Data Management System (DMS). The PSC uses the DMS to reach out States and resolve data issues and to ask for resubmissions when errors in data are found. The steps taken to validate the data submitted before of 1a version publication include:

[1] Douglas N. Harris: Tulane University (e-mail: dharri5@tulane.edu); Valentina Martinez-Pabon: Tulane University (e-mail: vmartinezpabon@tulane.edu).

- Format and validation edits on files: (a) check for the uniqueness of each reported school (matching entities reported in the current year collection with those reported in the prior year), (b) check for error reports using the online system DMS, (c) test for unlikely data (multi-year edits and data suppressions).
- Post-review process: (a) clean the data so that they are consistent (e.g., schools with no 12th grade must have zero enrollment for 12th grade), (b) impute missing values for certain variables, suppress data that might compromise confidentiality, (c) growth rate / prior years' imputation at the state level data.

A2. Operational status

The number of categories of the school's operational status has increased progressively from four in 1990-91 to eight in 2018-19. As Table A1 shows, from 1990-91 to 1997-98 each school was categorized as open, closed, new or added. In 1998-99, a new category was added: changed in LEA. In 2002-03, two categories were included: inactive and future. And finally, in 2005-06, USDOE added reopened.

Table A1 Categories of CCD's Operational Status

Category	Available since…	Description
Open	1990-91	• In previous school year was operational • In current school year is in operation and is affiliated with the same LEA as the previous school year
Closed	1990-91	• In previous school year was operational • In current school year is not in operation and is not expected to be in operation in the future
New	1990-91	• In previous school year was not in operation or was reported as future • In current school year is in operation or is newly created or its levels/programs were completely modified
Added	1990-91	• In previous school year was not reported even though it was in operation • In current school year is in operation
Changed LEA affiliation	1998-99	• In previous school year was reported with any operational status • In current school year is in operation but affiliated to a different LEA
Inactive	2002-03	• In previous school year was reported with any operational status • In current school year is temporarily closed but expected to reopen
Future	2002-03	• In previous school year was not reported

Category	Available since…	Description
		• In current school year is not operational but is scheduled to be operational within 2 years
Reopened	2005-06	• In previous school year was reported as closed • In current school year is operational

Source: Author's based on the documentation of the CCD files.

NCES links the operational status to October 1st of the school year, but, if a school changes its operational status during the school year, then the state reports an updated status and an effective date for that status change is updated in the database. In case the effective date is not specified for the updated status, the file process date is used as the effective date. Only after the school year 2014-15 the "updated operational status" is included as an additional variable.[2]

NCES has rules for transition between categories: (a) schools previously reported as future that never opened must be reported as closed; (b) schools reported as inactive must eventually be reported as closed or open; (c) schools previously reported as closed and later as reopened must be reported as reopened with the identifiers it had before being reported as closed; (d) schools should be reported as new in the first school year that the school is operational; (e) schools temporarily closed and expected to reopen should be reported as inactive; (f) schools not yet in operation should be reported as future; (g) operational status added is only for schools that were previously overlooked; (h) schools with operational status open, closed, changed LEA, inactive or future can repeat that operational status in consecutive years, but schools with operational status new, added or reopen, cannot.

A3. Charter Indicator

In our initial data cleaning, we identified some issues with the charter indicator. First, since the CCD does not include the charter indicator from 1991 to 1998, we imputed the charter status

[2] The number of schools that updated status in each school year after the creation of this variable are: 13 in 2014-15, 10 in 2015-16, 22 in 2016-17 and 26 in 2017-18.

backwards in time from when the charter indicators first became available and using the years when state charter laws begin and the school name (e.g., whether the word "charter" or "academy" is used).[3] Second, we checked for coding errors during the entire period of data and assumed that a school reported as a charter (TPS) in one year but TPS (charters) is both adjacent years is a coding error and we recode the middle year with the adjacent year value.

Finally, we compare the CCD and the National Alliance for Public Charter Schools (NAPCS) microdata from 2006 to 2018. The NAPCS goes through its own cleaning procedure and has alternative sources of data. However, when we looked at the correlation between the charter indicators year by year, we saw large numbers of discrepancies between our cleaned CCD data and NAPCS. In the period from 2006 to 2018, there were 1,523 school-by-year discrepancies of a total of 79,000 charter school-by-year observations in the period. In the vast majority of cases (1,224), the discrepancy was only for a single year. Almost half of the discrepancies involve the TPS-charter (or vice versa) restructuring occurring one year earlier or later in one of the data sources; that is, both data sources show a restructure happening, but one source shows it happening one year and the other data source has the restructure happening the next year. In the other half of the cases, we find that in the NAPCS, when a charter school closes, the charter indicator often turns off in the last year of a school's existence, just before the closure/restructuring occurs. Based on these findings, for the CCD's charter indicator, we use the CCD timing in our main analyses because these coincide with the change in the school's LEA ID.

Of the remaining discrepancies, we find 64 school-years where the CCD's charter indicator was inaccurate based on the school's name (e.g., the school was reported as a TPS but the word

[3] The backwards imputation involved both the 1999 and 2000 NCES charter indictors and lists published by the Center for Educational Reform during 1992-2013. The CER list is available at://edreform.com/in-the-states/know-your-choices/find-a-charter-school/

"charter" was included in the school's name). In these cases, we used the NAPCS coding to clean the CCD's charter indicator.

As robustness check of our results, we re-run the analysis with the NAPCS indicator (see Tables J6 and J7 in Appendix J).

Appendix B: Coding and Definition of Closure/Restructuring

B1. Coding of Closure for TPS and Charter Schools

We started with the universe of schools included in the CCD, and then we implement the following steps:

- Create the NLSD identifier, based on NCES identifier, to track a school longitudinally even if the school changed the LEA with which it was affiliated.
- Drop schools in U.S. territories.
- Drop schools housed in correctional institutions, detention centers, or hospitals (i.e. reportable programs, schools with "correctional", "hospital", "administrative services" or "central office" in the school or LEA name or "detention center", "juvenile shelter", "JCC", "hospital", "clinic" or "medical" in the school name).
- Drop schools reported as future, only in the years they are listed as such.
- Drop schools reported as closed that were previously reported as future but never opened. This only eliminates the observations in the years they are listed as closed.
- Drop schools reported as closed that were previously reported as inactive but never opened. This only eliminates the observations in the years they are listed as closed.
- Drop schools reported as reopen that close or disappear immediately after being reported as reopen. This only eliminates the observations in the years they are listed as reopen.
- Drop schools that were already reported as closed in the years immediately before. This only eliminates the observations from the second year they are listed as closed.
- Define as open those schools reported as open, new, added or reopen. This is because all schools reported within these categories are operational.

- Define as closed those schools reported as closed or inactive, and drop schools listed as closed (under the new aggrupation) that repeat that operational status in consecutive years. This only eliminates the observations from the second year they are listed as closed.
- In years where schools are reported as closed, and in previous and subsequent years they are reported as open, we recode the school as open.
- For the years from 1991 to 1994, when schools disappear from one year to the next, we assume they are closed even if there is no closure flag. This process allows us to identify all schools that closed in this period, which were removed from the CCD data files.
- For schools identified as closed, redefine the year of the closure as the first year without reported enrollment or enrollment equal to zero.
- Define as closed those schools that change their location. We measure a change in location as a change in address that occurs at the same time with a change in city, name or enrollment (more than 25 percent) relative to the previous year. We found that even after using standardized variables, many address changes seem to occur because of typos or slight changes in the way addresses are reported. By requiring other changes (e.g., in city) at the same time, we minimize the possibility that typos lead to false closure indications.[4]
- Since schools reported as closed in the CCD do not have school characteristics listed in the closed years, we assign to these school-years the value of the year previous to the closure.
- Define as restructured those schools that report a change in their charter status.
- Define as restructured those schools that report that were reconstituted (starting on 2011).

[4] We also cleaned the name and address variables to omit symbols (dots, commas, etc.), use only capital letters (which aligns with the way most are reported), use recoded words to contains all possible derivations of a word (e.g. AVENUE, AVE, AV), omit linking words (e.g. A, AND, TO, FROM, OF), omit specific words that may be not reported in some years (HIGH / MIDDLE SCHOOL, ACADEMY, ROAD), and omit spaces. This process only applies for schools that reported some address information. After the cleaning process, we replaced the missing addresses with the available addresses from adjacent years.

- Define as restructured those charter schools that report both a change in LEA and a change in name.
- Define as restructured those charter schools that report a change in the charter authorizer (starting on 2014).
- Re-define as restructured instead of closed cases of schools reported as closed when a new school is reported in the exact location during the same or following school year.

B2. Coding Closure for Private Schools

We started with the schools included in the PSS-sample, and then we implement the following steps:

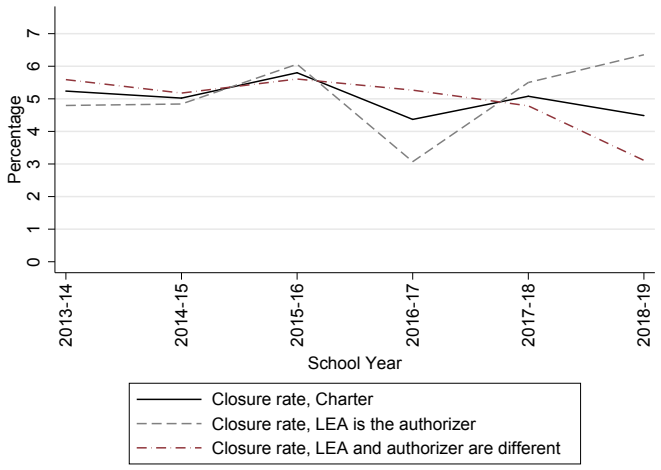
- Keep in the sample regular schools with an average of 20 or more students.
- Identify as possibly closed those schools that appeared in the PSS-sample and never reappeared in later years.
- Define as open those schools that always reported information to the PSS-sample.
- Define as closed the schools in the group of possibly closed that were reported as closed through (programmed and manual) online searches:
    - For the programmed online search, we used the Google Maps Application Programming Interface (API) to request the operational status (operational, temporarily/permanently closed) and web address for each school in the group of possibly closed.
    - If the Google Maps' operational status of the school was temporarily/permanently closed, we code the school as closed.
    - If the Google Maps' operational status of the school was open or missing, we did additional manual online searches. In these steps, we received help from

undergraduate coders who checked the accuracy of the linked website and searched for relevant information regarding the operational status of the schools using their name and address. Some information in this case included news, State Department of Education websites, and GreatSchools.org, among others.

- For the preferred measure, define as closed those schools without a verified operational status through online searches.
- For the alternate measure, define as open those schools without verified operational status through online searches.

Appendix C: Trends on School Closure and Restructuring by Sector

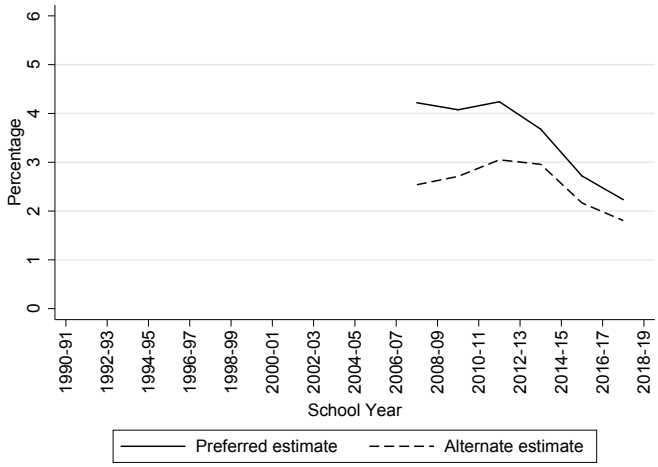
Figure C1 Closed Schools as Percentage of All Schools, by Charter Authorizer



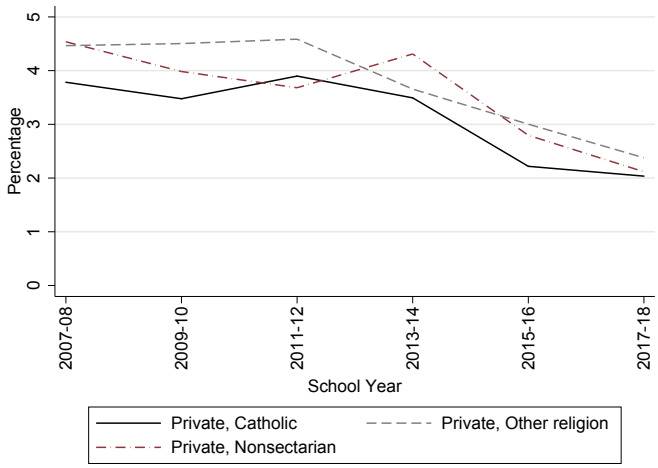
Notes: See Table 1 for details about the closure measure by sector.
Source: Author's calculations based on NLSD.

Figure C2 Closed Private Schools as Percentage of All Private Schools

Panel (a) Alternate versus preferred estimates



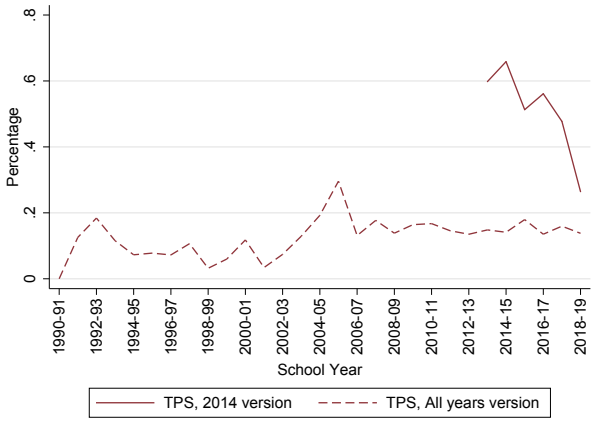
Panel (b) By Religious Affiliation



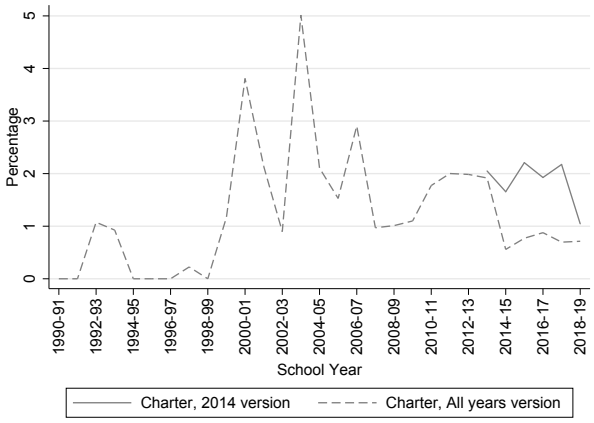
Notes: Regular schools with an average of 20 or more students. See Table 1 for details about the closure measure by sector.
Source: Author's calculations based on NLSD.

Figure C3 Restructured Schools as Percentage of All Schools, by Sector

Panel (a) TPS



Panel (b) Charter schools

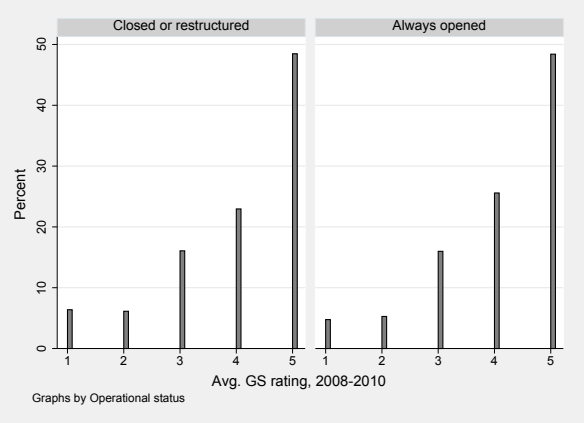


Notes: See Table 1 for details about the takeover measure by sector. For TPS, the large differences can be attributed to the addition of reconstitution data in 2014.
Source: Author's calculations based on NLSD.

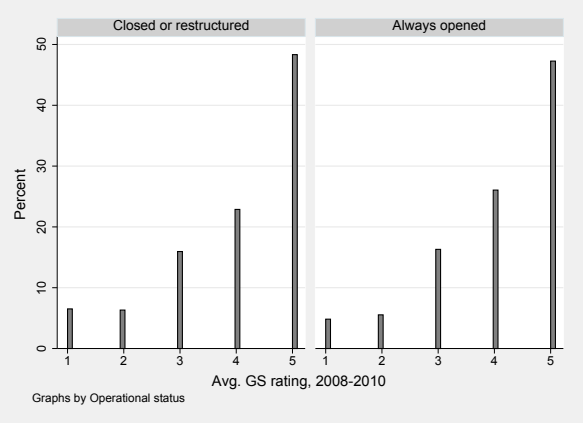
Appendix D: Missingness and Validity of Quality Measures

Figure D1 Distribution of the GS Rating

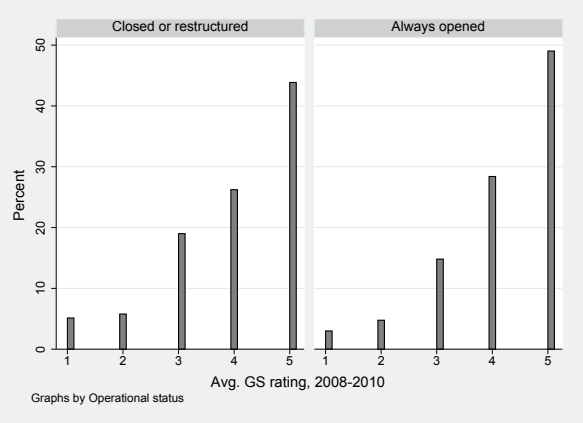
Panel (a) All schools



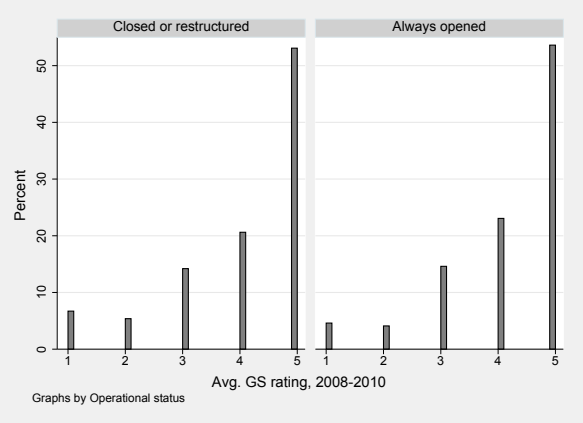
Panel (b) TPS



Panel (c) Charter schools



Panel (d) Private schools



Notes: Average GS rating of the school between 2008 and 2010.
Source: Author's calculations based on NLSD.

Table D1 Summary Statistics of School Quality Measures

Variable		Total	TPS	Charter	Private
Panel (a) SEDA Measures					
Average test score	Mean	-0.02	-0.01	-0.12	NA
	Median	-0.01	-0.01	-0.12	NA
	S.D.	0.42	0.42	0.48	NA
	Minimum	-2.50	-2.50	-1.73	NA
	Maximum	2.16	2.16	1.41	NA
	Number of schools	63,779	61,778	1,643	NA
Average growth rate	Mean	0.01	0.01	0.03	NA
	Median	0.01	0.01	0.03	NA
	S.D.	0.07	0.07	0.08	NA
	Minimum	-0.49	-0.49	-0.40	NA
	Maximum	0.58	0.58	0.32	NA
	Number of schools	63,779	61,778	1,643	NA
Panel (b) Great Schools Rating					
GS rating	Mean	4.0	4.0	4.0	4.1
	Median	4.3	4.3	4.3	4.5
	S.D.	1.1	1.1	1.1	1.1
	Minimum	1	1	1	1
	Maximum	5	5	5	5
	Number of schools	72,679	58,031	2,462	12,186

Notes: The unit of observation is the school with information on the quality measure. S.D.=Standard Deviation. SEDA measures are not available for private schools.
Source: Author's calculations based on NLSD.

Table D2 Number of Schools by Sector, Closure/Restructuring Status, and Missing Quality Measures

Category	Always opened during 2014 to 2018	Opened in 2014 but closed or restructured after
Panel (a) SEDA Measures		
TPS w/ SEDA measures	57,691	3,656
Charters w/ SEDA measures	1,343	478
TPS w/o SEDA measures	16,516	1,225
Charters w/o SEDA measures	2,311	1,203
Ratio of "TPS w/" to "TPS w/o"	3.5	3.0
Ratio of "Chartes w/" to "Charters w/o"	0.6	0.4
Total schools	84,423	
Panel (b) Great Schools Rating		
TPS w/ GS rating	53,367	2,617
Charter w/ GS rating	1,871	606
Private w/ GS rating	9,683	837
TPS w/o GS rating	20,840	2,264
Charter w/o GS rating	1,783	1,075
Private w/o GS rating	7,374	731
Ratio of "TPS w/" to "TPS w/o"	2.6	1.2
Ratio of "Chartes w/" to "Charters w/o"	1.0	0.6
Ratio of "Privates w/" to "Privates w/o"	1.3	1.1
Total schools	103,048	

Notes: The unit of observation is the school is the schools. New openings after 2014 are excluded. SEDA measures are not available for private schools.
Source: Author's calculations based on NLSD.

Table D3 Predictors of Missingness of Quality Measures (LPM), 2014-2018

Variables	Missing SEDA measures	Missing GS rating	Missing SEDA measures and GS ratings	Missing GS rating
	(1)	(2)	(3)	(4)
Charter	0.1348***	0.0513***	0.0402***	0.0448***
	(0.0149)	(0.0117)	(0.0111)	(0.0115)
Private				0.5295***
				(0.0030)
Enrollment size	0.0345***	-0.0175***	0.0065**	0.0078**
	(0.0056)	(0.0044)	(0.0031)	(0.0030)
% Students of color	0.0115***	-0.0095**	0.0004	0.0004
	(0.0037)	(0.0038)	(0.0029)	(0.0017)
% FRPL	-0.0056***	-0.0022**	-0.0018**	
	(0.0010)	(0.0010)	(0.0007)	
Urban	0.0068***	-0.0196***	-0.0086***	-0.0091***
	(0.0022)	(0.0018)	(0.0016)	(0.0015)
Constant	0.2827***	0.3198***	0.4997***	0.4817***
	(0.0069)	(0.0069)	(0.0064)	(0.0052)
No. of observations	411,260	411,260	411,260	465,869
No. of unique schools	87,187	87,187	87,187	102,762
Controls for grades offered	Yes	Yes	Yes	Yes

Notes: The unit of observation is the school year from 2014 to 2018. New openings after 2014 are excluded. Robust standard errors in parenthesis. School enrollment size in thousand. FRPL= Free/Reduced Price Lunch.
Statistical significance: * $p<0.10$, ** $p<0.05$, *** $p<0.01$.
Source: Author's calculations based on NLSD.

Appendix E: Predictors of Closure/Restructuring based on District FE

Table E1 Predictors of Closure/Restructuring for All Schools Based on District FE (LPM), 2014-2018

Variables	Closure/Restructuring rate				
	(1)	(2)	(3)	(4)	(5)
Charter	0.0570***	0.0405***	0.0342***	0.0593**	0.0429***
	(0.0034)	(0.0035)	(0.0039)	(0.0248)	(0.0133)
Private	0.0255***	0.0168***	0.0127***	0.0444***	0.0334***
	(0.0018)	(0.0021)	(0.0029)	(0.0115)	(0.0084)
Enrollment size		-0.0287***	-0.0397***	-0.0360***	-0.0259***
		(0.0018)	(0.0025)	(0.0020)	(0.0015)
Charter x Enrollment size				0.0018	0.0066
				(0.0083)	(0.0053)
Private x Enrollment size				-0.0679***	-0.0507***
				(0.0065)	(0.0050)
% Students of color		0.0385***	0.0401***	0.0375***	0.0386***
		(0.0021)	(0.0021)	(0.0024)	(0.0028)
Charter x % Students of color				0.0249**	0.0144**
				(0.0108)	(0.0065)
Private x % Students of color				-0.0099*	-0.0161***
				(0.0054)	(0.0044)
Urban		-0.0002	0.0018	0.0015	-0.0012
		(0.0022)	(0.0022)	(0.0023)	(0.0015)
Charter x Urban				-0.0080	-0.0021
				(0.0133)	(0.0072)
Private x Urban				0.0085	0.0077
				(0.0065)	(0.0048)
GS rating		-0.2978***	-0.1927***	-0.0535	-0.0368
		(0.0691)	(0.0690)	(0.0733)	(0.0494)
Charter x GS rating				-1.2887***	-0.7272***
				(0.4987)	(0.2581)
Private x GS rating				-0.3023	-0.1856
				(0.2064)	(0.1480)
Constant	0.0255***	0.0276***	0.0400***	0.0316***	0.0178***
	(0.0007)	(0.0040)	(0.0046)	(0.0047)	(0.0068)
No. of observations	197,429	196,826	196,826	196,826	196,826
No. of unique schools	44,639	44,600	44,600	44,600	44,600
Controls for missing quality measures	No	Yes	Yes	Yes	Yes
Controls for grades offered	No	No	Yes	Yes	Yes
Year Fixed Effects	No	No	No	No	Yes
School District Fixed Effects	No	No	No	No	Yes

Notes: Only includes school districts with all three sectors (TPS, charter, and private). See notes to Table 3.
Statistical significance: * $p<0.10$, ** $p<0.05$, *** $p<0.01$.

Table E2 Predictors of Closure/Restructuring for TPS and Charter Schools Based on District FE (LPM), 2014-2018

Variables	Closure/Restructuring rate				
	(1)	(2)	(3)	(4)	(5)
Charter	0.0586***	0.0149***	0.0065	0.0247	0.0147
	(0.0030)	(0.0037)	(0.0044)	(0.0220)	(0.0154)
Enrollment size		-0.0353***	-0.0363***	-0.0384***	-0.0336***
		(0.0023)	(0.0025)	(0.0021)	(0.0019)
Charter x Enrollment size				0.0098	0.0135**
				(0.0074)	(0.0058)
% Students of color		0.0279***	0.0284***	0.0236***	0.0254***
		(0.0030)	(0.0030)	(0.0029)	(0.0044)
Charter x % Students of color				0.0258**	0.0227**
				(0.0118)	(0.0096)
% FRPL		0.0027	0.0033	0.0071***	0.0034
		(0.0031)	(0.0031)	(0.0026)	(0.0030)
Charter x % FRPL				-0.0172*	-0.0093
				(0.0103)	(0.0092)
Urban		0.0029	0.0031	0.0039*	0.0004
		(0.0021)	(0.0021)	(0.0021)	(0.0016)
Charter x Urban				-0.0077	-0.0008
				(0.0114)	(0.0081)
GS rating		-0.1107*	-0.0612	0.0226	0.0128
		(0.0654)	(0.0653)	(0.0664)	(0.0526)
Charter x GS rating				-1.0489**	-0.6317**
				(0.4120)	(0.2862)
Average test score		-0.0171***	-0.0152***	-0.0137***	-0.0180***
		(0.0023)	(0.0024)	(0.0024)	(0.0024)
Charter x Average test score				-0.0307**	-0.0273***
				(0.0128)	(0.0086)
Average growth rate		-0.0432***	-0.0482***	-0.0437***	-0.0513***
		(0.0037)	(0.0043)	(0.0043)	(0.0044)
Charter x Average growth rate				-0.0386*	0.0001
				(0.0207)	(0.0146)
Constant	0.0242***	0.0135***	0.0079	0.0075	0.0068
	(0.0006)	(0.0040)	(0.0051)	(0.0050)	(0.0083)
No. of observations	169,075	164,898	164,898	164,898	164,898
No. of unique schools	34,568	34,507	34,507	34,507	34,507
Controls for missing quality measures	No	Yes	Yes	Yes	Yes
Controls for grades offered	No	No	Yes	Yes	Yes
Year Fixed Effects	No	No	No	No	Yes
School District Fixed Effects	No	No	No	No	Yes

Notes: Only includes school districts with all three sectors (TPS, charter, and private). See notes to Table 4.
Statistical significance: * $p<0.10$, ** $p<0.05$, *** $p<0.01$.

Appendix F: Predictors of Closure or Restructuring

Table F1 Predictors of Closure for All Schools (LPM), 2014-2018

Variables	Closure rate				
	(1)	(2)	(3)	(4)	(5)
Charter	0.0540***	0.0437***	0.0456***	0.0620***	0.0307***
	(0.0024)	(0.0024)	(0.0025)	(0.0175)	(0.0087)
Private	0.0324***	0.0240***	0.0303***	0.0407***	0.0256***
	(0.0013)	(0.0014)	(0.0017)	(0.0073)	(0.0044)
Enrollment size		-0.0273***	-0.0300***	-0.0241***	-0.0145***
		(0.0012)	(0.0014)	(0.0010)	(0.0005)
Charter x Enrollment size				-0.0110	-0.0012
				(0.0080)	(0.0042)
Private x Enrollment size				-0.0646***	-0.0443***
				(0.0055)	(0.0036)
% Students of color		0.0207***	0.0222***	0.0157***	0.0103***
		(0.0012)	(0.0013)	(0.0012)	(0.0007)
Charter x % Students of color				0.0371***	0.0140***
				(0.0088)	(0.0046)
Private x % Students of color				0.0139***	0.0110***
				(0.0040)	(0.0028)
Urban		-0.0016	-0.0016	-0.0019*	-0.0007
		(0.0010)	(0.0011)	(0.0011)	(0.0004)
Charter x Urban				-0.0237*	-0.0021
				(0.0123)	(0.0047)
Private x Urban				0.0111***	0.0082***
				(0.0032)	(0.0020)
GS rating		-0.1413***	-0.0936***	-0.0606**	-0.0137
		(0.0336)	(0.0338)	(0.0304)	(0.0151)
Charter x GS rating				-0.6027*	-0.3084*
				(0.3170)	(0.1729)
Private x GS rating				-0.1241	-0.0965
				(0.1509)	(0.0899)
Constant	0.0160***	0.0257***	0.0358***	0.0318***	0.0230***
	(0.0003)	(0.0017)	(0.0021)	(0.0020)	(0.0017)
No. of observations	466,726	465,869	465,869	465,869	465,869
No. of unique schools	102,823	102,762	102,762	102,762	102,762
Controls for missing quality measures	No	Yes	Yes	Yes	Yes
Controls for grades offered	No	No	Yes	Yes	Yes
Year Fixed Effects	No	No	No	No	Yes
State Fixed Effects	No	No	No	No	Yes

Notes: See notes to Table 3.
Statistical significance: * $p<0.10$, ** $p<0.05$, *** $p<0.01$.

Table F2 Predictors of Closure for TPS and Charter Schools (LPM), 2014-2018

Variables	Closure rate				
	(1)	(2)	(3)	(4)	(5)
Charter	0.0488***	0.0325***	0.0319***	0.0161	0.0103
	(0.0024)	(0.0024)	(0.0025)	(0.0166)	(0.0127)
Enrollment size		-0.0305***	-0.0310***	-0.0321***	-0.0310***
		(0.0023)	(0.0025)	(0.0018)	(0.0013)
Charter x Enrollment size				0.0063	0.0112**
				(0.0069)	(0.0053)
% Students of color		0.0035**	0.0038**	0.0019	0.0041***
		(0.0016)	(0.0017)	(0.0015)	(0.0015)
Charter x % Students of color				0.0238**	0.0076
				(0.0102)	(0.0081)
% FRPL		0.0040***	0.0040***	0.0015	0.0010
		(0.0015)	(0.0015)	(0.0014)	(0.0014)
Charter x % FRPL				0.0171**	0.0161**
				(0.0072)	(0.0069)
Urban		0.0012	0.0007	0.0015	0.0019**
		(0.0012)	(0.0012)	(0.0011)	(0.0008)
Charter x Urban				-0.0183*	-0.0050
				(0.0111)	(0.0073)
GS rating		-0.0674**	-0.0478	-0.0362	-0.0269
		(0.0331)	(0.0332)	(0.0326)	(0.0254)
Charter x GS rating				-0.3741	-0.3046
				(0.3135)	(0.2483)
Average test score		-0.0128***	-0.0126***	-0.0132***	-0.0092***
		(0.0013)	(0.0013)	(0.0012)	(0.0011)
Charter x Average test score				-0.0253***	-0.0297***
				(0.0086)	(0.0072)
Average growth rate		-0.0349***	-0.0432***	-0.0409***	-0.0380***
		(0.0017)	(0.0023)	(0.0022)	(0.0019)
Charter x Average growth rate				-0.0506***	-0.0384***
				(0.0145)	(0.0122)
Constant	0.0155***	0.0203***	0.0199***	0.0221***	0.0208***
	(0.0003)	(0.0020)	(0.0028)	(0.0026)	(0.0031)
No. of observations	339,038	331,905	331,905	331,905	331,905
No. of unique schools	70,081	69,977	69,977	69,977	69,977
Controls for missing quality measures	No	Yes	Yes	Yes	Yes
Controls for grades offered	No	No	Yes	Yes	Yes
Year Fixed Effects	No	No	No	No	Yes
State Fixed Effects	No	No	No	No	Yes

Notes: See notes to Table 4.
Statistical significance: * $p<0.10$, ** $p<0.05$, *** $p<0.01$.

Table F3 Predictors of Restructuring for TPS and Charter Schools (LPM), 2014-2018

Variables	Restructuring rate				
	(1)	(2)	(3)	(4)	(5)
Charter	0.0144***	0.0024	0.0008	0.0269***	0.0209**
	(0.0012)	(0.0014)	(0.0016)	(0.0097)	(0.0096)
Enrollment size		-0.0004	-0.0001	-0.0002	-0.0024***
		(0.0007)	(0.0007)	(0.0008)	(0.0008)
Charter x Enrollment size				0.0002	0.0028
				(0.0020)	(0.0020)
% Students of color		0.0059***	0.0053***	0.0041***	0.0048***
		(0.0008)	(0.0009)	(0.0008)	(0.0009)
Charter x % Students of color				0.0186***	0.0189***
				(0.0060)	(0.0060)
% FRPL		0.0001	-0.0001	0.0026***	-0.0014
		(0.0011)	(0.0011)	(0.0009)	(0.0010)
Charter x % FRPL				-0.0256***	-0.0207***
				(0.0068)	(0.0067)
Urban		0.0015***	0.0013***	0.0017***	0.0026***
		(0.0005)	(0.0005)	(0.0005)	(0.0005)
Charter x Urban				-0.0040	-0.0061
				(0.0040)	(0.0039)
GS rating		-0.0223	-0.0189	-0.0024	0.0162
		(0.0211)	(0.0211)	(0.0209)	(0.0199)
Charter x GS rating				-0.4541**	-0.4170**
				(0.1919)	(0.1887)
Average test score		-0.0078***	-0.0083***	-0.0075***	-0.0120***
		(0.0008)	(0.0008)	(0.0008)	(0.0010)
Charter x Average test score				-0.0022	-0.0027
				(0.0044)	(0.0044)
Average growth rate		-0.0011	-0.0021**	-0.0028***	-0.0072***
		(0.0008)	(0.0010)	(0.0010)	(0.0012)
Charter x Average growth rate				0.0226***	0.0302***
				(0.0069)	(0.0068)
Constant	0.0057***	0.0006	-0.0001	-0.0020	-0.0098***
	(0.0002)	(0.0012)	(0.0015)	(0.0015)	(0.0016)
No. of observations	339,038	331,905	331,905	331,905	331,905
No. of unique schools	70,081	69,977	69,977	69,977	69,977
Controls for missing quality measures	No	Yes	Yes	Yes	Yes
Controls for grades offered	No	No	Yes	Yes	Yes
Year Fixed Effects	No	No	No	No	Yes
State Fixed Effects	No	No	No	No	Yes

Notes: See notes to Table 4.
Statistical significance: * $p<0.10$, ** $p<0.05$, *** $p<0.01$.

Table F4 Predictors of Closure/Restructuring for All Schools Using S.D. Form Variables (LPM), 2014-2018

Variables	Closure/Restructuring rate				
	(1)	(2)	(3)	(4)	(5)
Charter	0.0624***	0.0483***	0.0493***	0.0950***	0.0499***
	(0.0032)	(0.0032)	(0.0034)	(0.0227)	(0.0107)
Private	0.0249***	0.0170***	0.0220***	0.0423***	0.0249***
	(0.0012)	(0.0013)	(0.0017)	(0.0071)	(0.0046)
Enrollment size		-0.0111***	-0.0126***	-0.0102***	-0.0075***
		(0.0005)	(0.0006)	(0.0005)	(0.0003)
Charter x Enrollment size				-0.0040	0.0020
				(0.0034)	(0.0018)
Private x Enrollment size				-0.0283***	-0.0187***
				(0.0024)	(0.0016)
% Students of color		0.0097***	0.0103***	0.0090***	0.0087***
		(0.0004)	(0.0004)	(0.0005)	(0.0004)
Charter x % Students of color				0.0094***	0.0064***
				(0.0035)	(0.0019)
Private x % Students of color				0.0008	-0.0015
				(0.0014)	(0.0010)
Urban		0.0006	0.0011	0.0006	0.0002
		(0.0010)	(0.0010)	(0.0011)	(0.0006)
Charter x Urban				-0.0201	-0.0063
				(0.0123)	(0.0055)
Private x Urban				0.0089***	0.0085***
				(0.0031)	(0.0020)
GS rating		-0.0026***	-0.0016**	-0.0006	-0.0009**
		(0.0006)	(0.0007)	(0.0007)	(0.0004)
Charter x GS rating				-0.0247***	-0.0102***
				(0.0079)	(0.0037)
Private x GS rating				-0.0022	-0.0011
				(0.0024)	(0.0016)
Constant	0.0211***	0.0224***	0.0315***	0.0260***	0.0189***
	(0.0004)	(0.0019)	(0.0024)	(0.0024)	(0.0020)
No. of observations	466,726	465,869	465,869	465,869	465,869
No. of unique schools	102,823	102,762	102,762	102,762	102,762
Controls for missing quality measures	No	Yes	Yes	Yes	Yes
Controls for grades offered	No	No	Yes	Yes	Yes
Year Fixed Effects	No	No	No	No	Yes
State Fixed Effects	No	No	No	No	Yes

Notes: Continuous variables in standard deviation form. See notes to Table 3.
Statistical significance: * $p<0.10$, ** $p<0.05$, *** $p<0.01$.

Table F5 Predictors of Closure/Restructuring for TPS and Charter Schools Using S.D. Form Variables (LPM), 2014-2018

Variables	Closure/Restructuring rate				
	(1)	(2)	(3)	(4)	(5)
Charter	0.0592***	0.0242***	0.0211***	0.0380*	0.0299*
	(0.0029)	(0.0033)	(0.0036)	(0.0210)	(0.0154)
Enrollment size		-0.0094***	-0.0093***	-0.0097***	-0.0101***
		(0.0007)	(0.0008)	(0.0006)	(0.0005)
Charter x Enrollment size				0.0020	0.0042**
				(0.0022)	(0.0017)
% Students of color		0.0031***	0.0029***	0.0020***	0.0029***
		(0.0006)	(0.0006)	(0.0006)	(0.0006)
Charter x % Students of color				0.0114***	0.0087***
				(0.0040)	(0.0033)
% FRPL		0.0011**	0.0011*	0.0017***	0.0000
		(0.0006)	(0.0006)	(0.0005)	(0.0005)
Charter x % FRPL				-0.0058*	-0.0023
				(0.0030)	(0.0027)
Urban		0.0034***	0.0028**	0.0034***	0.0045***
		(0.0011)	(0.0012)	(0.0011)	(0.0009)
Charter x Urban				-0.0139	-0.0095
				(0.0110)	(0.0079)
GS rating		-0.0009	-0.0005	-0.0000	-0.0001
		(0.0007)	(0.0007)	(0.0007)	(0.0005)
Charter x GS rating				-0.0163**	-0.0125**
				(0.0070)	(0.0051)
Average test score		-0.0150***	-0.0153***	-0.0142***	-0.0166***
		(0.0013)	(0.0013)	(0.0013)	(0.0012)
Charter x Average test score				-0.0303***	-0.0276***
				(0.0100)	(0.0071)
Average growth rate		-0.0080***	-0.0106***	-0.0102***	-0.0108***
		(0.0005)	(0.0006)	(0.0006)	(0.0005)
Charter x Average growth rate				-0.0073	-0.0020
				(0.0048)	(0.0035)
Constant	0.0205***	0.0169***	0.0139***	0.0132***	0.0099***
	(0.0004)	(0.0023)	(0.0033)	(0.0031)	(0.0034)
No. of observations	339,038	331,905	331,905	331,905	331,905
No. of unique schools	70,081	69,977	69,977	69,977	69,977
Controls for missing quality measures	No	Yes	Yes	Yes	Yes
Controls for grades offered	No	No	Yes	Yes	Yes
Year Fixed Effects	No	No	No	No	Yes
State Fixed Effects	No	No	No	No	Yes

Notes: Continuous variables in standard deviation form. See notes to Table 4.
Statistical significance: * $p<0.10$, ** $p<0.05$, *** $p<0.01$.

Table F6 Predictors of Closure/Restructuring by Sector Using S.D. Form Variables (LPM), 2014-2018

Variables	Closure/Restructuring rate				
	TPS	Charter	Private	TPS	Charter
	(1)	(2)	(3)	(4)	(5)
Enrollment size	-0.0099***	-0.0119***	-0.0401***	-0.0097***	-0.0068***
	(0.0005)	(0.0027)	(0.0026)	(0.0006)	(0.0019)
% Students of color	0.0087***	0.0186***	0.0099***	0.0017***	0.0144***
	(0.0004)	(0.0024)	(0.0013)	(0.0006)	(0.0035)
% FRPL				0.0017***	-0.0020
				(0.0005)	(0.0028)
Urban	0.0000	-0.0139*	0.0088***	0.0030**	-0.0078
	(0.0010)	(0.0084)	(0.0032)	(0.0012)	(0.0085)
GS rating	-0.0011*	-0.0165***	-0.0032	-0.0001	-0.0148***
	(0.0006)	(0.0053)	(0.0026)	(0.0007)	(0.0055)
Average test score				-0.0151***	-0.0373***
				(0.0013)	(0.0074)
Average growth rate				-0.0109***	-0.0106***
				(0.0006)	(0.0037)
Constant	0.0290***	0.0982***	0.0756***	0.0135***	0.0704***
	(0.0024)	(0.0178)	(0.0085)	(0.0032)	(0.0200)
No. of observations	388,489	24,459	52,921	312,730	19,175
No. of unique schools	79,037	5,323	18,625	65,697	4,453
Controls for missing quality measures	Yes	Yes	Yes	Yes	Yes
Controls for grades offered	Yes	Yes	Yes	Yes	Yes
Grades	All	All	All	3rd to 8th	3rd to 8th

Notes: Continuous variables in standard deviation form. See notes to Table 4.
Statistical significance: * $p<0.10$, ** $p<0.05$, *** $p<0.01$.

Appendix G: Predictors of Closure/Restructuring with an Unbalanced Panel

Table G1 Predictors of Closure/Restructuring for All Schools with an Unbalanced Panel (LPM), 2014-2018

Variables	Closure/Restructuring rate				
	(1)	(2)	(3)	(4)	(5)
Charter	0.0624***	0.0311***	0.0341***	0.0815***	0.0575***
	(0.0032)	(0.0048)	(0.0051)	(0.0254)	(0.0135)
Private	0.0249***	0.0239***	0.0301***	0.0408***	0.0308***
	(0.0012)	(0.0017)	(0.0021)	(0.0079)	(0.0059)
Enrollment size		-0.0213***	-0.0243***	-0.0213***	-0.0166***
		(0.0011)	(0.0014)	(0.0012)	(0.0008)
Charter x Enrollment size				0.0052	0.0065
				(0.0063)	(0.0043)
Private x Enrollment size				-0.0795***	-0.0622***
				(0.0054)	(0.0042)
% Students of color		0.0262***	0.0281***	0.0252***	0.0274***
		(0.0015)	(0.0015)	(0.0016)	(0.0013)
Charter x % Students of color				0.0217	0.0187**
				(0.0159)	(0.0084)
Private x % Students of color				0.0036	0.0003
				(0.0051)	(0.0043)
Urban		-0.0016	-0.0014	-0.0018	-0.0017**
		(0.0011)	(0.0012)	(0.0012)	(0.0008)
Charter x Urban				0.0005	-0.0025
				(0.0171)	(0.0078)
Private x Urban				0.0138***	0.0131***
				(0.0046)	(0.0034)
GS rating		-0.2052***	-0.1618***	-0.0989***	-0.0644**
		(0.0357)	(0.0360)	(0.0364)	(0.0259)
Charter x GS rating				-1.6018***	-0.8118***
				(0.4542)	(0.2573)
Private x GS rating				-0.0913	-0.0860
				(0.1469)	(0.1085)
Constant	0.0211***	0.0267***	0.0372***	0.0328***	0.0252***
	(0.0004)	(0.0018)	(0.0023)	(0.0023)	(0.0025)
No. of observations	466,726	317,828	317,828	317,828	317,828
No. of unique schools	102,823	68,994	68,994	68,994	68,994
Controls for grades offered	No	No	Yes	Yes	Yes
Year Fixed Effects	No	No	No	No	Yes
State Fixed Effects	No	No	No	No	Yes

Notes: The unit of observation is the school year from 2014 to 2018. New openings after 2014 are excluded. Robust standard errors in parenthesis.
Statistical significance: * $p<0.10$, ** $p<0.05$, *** $p<0.01$.
Source: Author's calculations based on NLSD.

Table G2 Predictors of Closure/Restructuring for TPS and Charter Schools with an Unbalanced Panel (LPM), 2014-2018

Variables	Closure/Restructuring rate				
	(1)	(2)	(3)	(4)	(5)
Charter	0.0592***	0.0190***	0.0184***	0.0428	0.0444**
	(0.0029)	(0.0057)	(0.0059)	(0.0303)	(0.0219)
Enrollment size		-0.0170***	-0.0201***	-0.0234***	-0.0225***
		(0.0022)	(0.0025)	(0.0021)	(0.0019)
Charter x Enrollment size				0.0233***	0.0242***
				(0.0083)	(0.0069)
% Students of color		0.0019	0.0036**	0.0057***	0.0079***
		(0.0017)	(0.0017)	(0.0017)	(0.0017)
Charter x % Students of color				-0.0443*	-0.0453***
				(0.0242)	(0.0175)
% FRPL		0.0019	0.0024	0.0025	-0.0047**
		(0.0020)	(0.0020)	(0.0020)	(0.0021)
Charter x % FRPL				0.0044	0.0158
				(0.0255)	(0.0198)
Urban		0.0026**	0.0029**	0.0023**	0.0027***
		(0.0011)	(0.0012)	(0.0012)	(0.0010)
Charter x Urban				0.0342*	0.0250**
				(0.0184)	(0.0119)
GS rating		-0.1192***	-0.0948**	-0.0769**	-0.0250
		(0.0373)	(0.0373)	(0.0380)	(0.0329)
Charter x GS rating				-1.1062**	-0.8729**
				(0.5639)	(0.4051)
Average test score		-0.0167***	-0.0153***	-0.0131***	-0.0194***
		(0.0015)	(0.0015)	(0.0016)	(0.0017)
Charter x Average test score				-0.0598***	-0.0492***
				(0.0159)	(0.0110)
Average growth rate		-0.0287***	-0.0316***	-0.0325***	-0.0123**
		(0.0054)	(0.0055)	(0.0056)	(0.0050)
Charter x Average growth rate				-0.0267	-0.0184
				(0.0694)	(0.0483)
Constant	0.0205***	0.0221***	0.0222***	0.0234***	0.0210***
	(0.0004)	(0.0023)	(0.0032)	(0.0030)	(0.0036)
No. of observations	339,038	162,177	162,177	162,177	162,177
No. of unique schools	70,081	33,279	33,279	33,279	33,279
Controls for grades offered	No	No	Yes	Yes	Yes
Year Fixed Effects	No	No	No	No	Yes
State Fixed Effects	No	No	No	No	Yes

Notes: The unit of observation is the school year from 2014 to 2018. New openings after 2014 are excluded. Because of the inclusion of test scores, the sample is limited to elementary and middle schools, which comprise the vast majority of all schools. Robust standard errors in parenthesis.
Statistical significance: * $p<0.10$, ** $p<0.05$, *** $p<0.01$.
Source: Author's calculations based on NLSD.

Appendix H: Survival Analysis

We also estimate a hazard model of closure and restructuring as a function of the school characteristics. Equation [2] presents the model estimated.

$$h_{it} = \frac{1}{1 + e^{-z}}$$

$$z = \beta_t \cdot Period_t + \beta_1 Charter_i + \beta_2 Private_i + \beta_3 Quality_i + X_{it} \quad [2]$$

where h_{it} is the probability that school *i* still exists at the end of year *t*. In the model when we only include TPS and charter schools, $Period_t$ refers to individual years (from 2014 to 2018). When we add private schools, $Period_t$ refers to every two years (the even years from 2014 to 2018 available in the PSS). Our coefficients of interest, β_1 and β_2, present the probability of surviving for charter and private schools. We control for school characteristics including enrollment size, percentage of students of color, percentage of students receiving free or reduced-price lunches, and geographic area. Coefficients are presented as odds ratios, where coefficients higher than one reflect a positive association with the probability of surviving closure, and those lower than one reflect a negative association with the probability of surviving closure.

Table H1 presents the estimated coefficients of survival (non-closure/restructuring), as odds ratios, for several specifications of the hazard function. The estimates of survival for all TPS, charter, and private schools are presented in Columns (1)-(2). Column (1) includes only period indicators and a dummy variable for sectors. Column (2) adds the school characteristics and quality measures to the model in Column (2). Columns (3)-(4) are analogous to Columns (1)-(2), but they limit the sample to elementary/middle TPS and charter schools.

The coefficients on the charter and private indicators suggest that, on average, charter and private schools have a lower probability of surviving than TPS. In addition, as in the LPM, higher quality is related to a higher probability of surviving.

Table H1 Predictors of Closure/Restructuring for All Schools (Hazard Model), 2014-2018

Variables	Surivival			
	(1)	(2)	(3)	(4)
t=1	1.204	0.021**	2.663**	0.020**
	(0.126)	(0.005)	(0.277)	(0.006)
t=2	2.005**	0.031**	3.333**	0.025**
	(0.259)	(0.007)	(0.406)	(0.007)
t=3			3.073**	0.021**
			(0.432)	(0.006)
t=4			2.607**	0.022**
			(0.485)	(0.006)
Charter	146.549**	0.431**	39.680**	0.585**
	(33.587)	(0.059)	(7.896)	(0.070)
Private	1162.876**	1.412**		
	(327.663)	(0.240)		
Enrollment size		4.783**		4.501**
		(1.802)		(1.483)
% Students of color		0.726**		0.500**
		(0.117)		(0.098)
% FRPL				1.160
				(0.199)
Urban		1.006		0.793
		(0.142)		(0.130)
GS rating		5.602**		4.108**
		(1.100)		(1.192)
Average test score		727.868**		112.582**
		(238.352)		(61.938)
Average growth rate				3.257**
				(1.214)
				0.003**
No. of observations				(0.003)
Controls for missing quality measures	14,160	14,160	11,321	10,867
Sector	TPS / Charter / Private	TPS / Charter / Private	TPS / Charter	TPS / Charter

Notes: The unit of observation is the school year from 2014 to 2018. New openings after 2014 are excluded. Coefficients are odds ratios. Coefficients higher (lower) than one reflect a positive (negative) association with the probability of surviving to closure/restructuring. Standard errors clustered at the school level.
Statistical significance: * $p<0.10$, ** $p<0.05$, *** $p<0.01$.
Source: Author's calculations based on NLSD.

Appendix I: Predictors of Closure/Restructuring Using a Measures for Competition

Table I1 Number of Nearby Competing Schools (within the same zip code) as Predictors of Closure/Restructuring (LPM), 2014-2018

Variables	Closure/Restructuring rate									
	TPS	TPS	TPS	TPS	Charter	Charter	Charter	Charter	Private	Private
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Number of nearby TPS	0.0002*	0.0001	0.0003***	0.0003***	-0.0020***	-0.0021***	-0.0017***	-0.0017***	0.0001	0.0002
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0005)	(0.0005)	(0.0005)	(0.0005)	(0.0003)	(0.0003)
Number of nearby charter schools	0.0016***	0.0016***	0.0023***	0.0025***	0.0035***	0.0035***	0.0030***	0.0029**	0.0019**	0.0019**
	(0.0004)	(0.0004)	(0.0004)	(0.0004)	(0.0012)	(0.0012)	(0.0012)	(0.0012)	(0.0009)	(0.0009)
Number of nearby private schools	-0.0001	-0.0001	-0.0001	-0.0001	0.0015	0.0016	0.0008	0.0009	0.0009***	0.0009***
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0010)	(0.0010)	(0.0010)	(0.0010)	(0.0003)	(0.0003)
Enrollment size	-0.0309***	-0.0315***	-0.0172***	-0.0211***	-0.0216***	-0.0220***	-0.0265***	-0.0274***	-0.0916***	-0.0929***
	(0.0018)	(0.0020)	(0.0010)	(0.0012)	(0.0057)	(0.0060)	(0.0059)	(0.0062)	(0.0055)	(0.0059)
% Students of color	0.0037**	0.0034*	0.0133***	0.0156***	0.0393***	0.0405***	0.0453***	0.0472***	0.0289***	0.0281***
	(0.0018)	(0.0019)	(0.0016)	(0.0016)	(0.0105)	(0.0108)	(0.0098)	(0.0100)	(0.0038)	(0.0038)
% FRPL	0.0062***	0.0060***	0.0121***	0.0123***	-0.0072	-0.0073	0.0066	0.0064		
	(0.0017)	(0.0017)	(0.0014)	(0.0014)	(0.0099)	(0.0099)	(0.0089)	(0.0090)		
Urban	0.0029**	0.0024**	-0.0007	-0.0002	-0.0067	-0.0065	-0.0089	-0.0090	0.0091***	0.0080**
	(0.0012)	(0.0012)	(0.0010)	(0.0010)	(0.0085)	(0.0085)	(0.0082)	(0.0083)	(0.0033)	(0.0033)
GS rating	-0.0224	-0.0058	-0.1180***	-0.0557	-0.8613***	-0.8738***	-0.9753***	-0.9743***	-0.1712	-0.1774
	(0.0409)	(0.0407)	(0.0368)	(0.0370)	(0.3250)	(0.3258)	(0.3115)	(0.3120)	(0.1536)	(0.1534)
Average test score	-0.0178***	-0.0181***			-0.0481***	-0.0473***				
	(0.0016)	(0.0016)			(0.0087)	(0.0091)				
Average growth rate	-0.0318***	-0.0441***			-0.0417***	-0.0409***				
	(0.0019)	(0.0025)			(0.0146)	(0.0152)				
Constant	0.0168***	0.0138***	0.0147***	0.0242***	0.0675***	0.0686***	0.0900***	0.0890***	0.0550***	0.0709***
	(0.0023)	(0.0033)	(0.0019)	(0.0025)	(0.0167)	(0.0200)	(0.0157)	(0.0180)	(0.0075)	(0.0086)
No. of observations	312,730	312,730	382,002	382,002	19,175	19,175	23,088	23,088	52,921	52,921
No. of unique schools	65,697	65,697	79,028	79,028	4,453	4,453	5,296	5,296	18,625	18,625
School level	3rd to 8th	3rd to 8th	All	All	3rd to 8th	3rd to 8th	All	All	All	All
Controls for missing quality measures	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls for grades offered	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes

Notes: The unit of observation is the school year from 2014 to 2018. New openings after 2014 are excluded. Robust standard errors in parenthesis. Nearby schools are those schools within the same zip code.
Statistical significance: * $p<0.10$, ** $p<0.05$, *** $p<0.01$.
Source: Author's calculations based on NLSD.

Table I2 Number of Nearby Competing Schools (within the same school district) as Predictors of Closure/Restructuring (LPM), 2014-2018

Variables	Closure/Restructuring rate									
	TPS	TPS	TPS	TPS	Charter	Charter	Charter	Charter	Private	Private
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Number of nearby TPS	0.0001***	0.0001***	0.0001***	0.0001***	0.0000	0.0000	0.0000	0.0000	-0.0000	-0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Number of nearby charter schools	-0.0001***	-0.0001***	-0.0001***	-0.0001***	-0.0001	-0.0001	-0.0000	-0.0000	0.0002**	0.0002**
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Number of nearby private schools	0.0000	0.0000	-0.0000	-0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Enrollment size	-0.0325***	-0.0334***	-0.0177***	-0.0220***	-0.0225***	-0.0226***	-0.0271***	-0.0276***	-0.0925***	-0.0938***
	(0.0018)	(0.0020)	(0.0010)	(0.0012)	(0.0057)	(0.0060)	(0.0060)	(0.0063)	(0.0055)	(0.0060)
% Students of color	0.0007	0.0001	0.0128***	0.0149***	0.0392***	0.0399***	0.0469***	0.0482***	0.0259***	0.0253***
	(0.0018)	(0.0018)	(0.0015)	(0.0016)	(0.0107)	(0.0109)	(0.0099)	(0.0100)	(0.0038)	(0.0038)
% FRPL	0.0055***	0.0053***	0.0122***	0.0124***	-0.0061	-0.0062	0.0073	0.0071		
	(0.0017)	(0.0017)	(0.0014)	(0.0014)	(0.0100)	(0.0100)	(0.0090)	(0.0090)		
Urban	0.0032***	0.0022*	-0.0002	0.0002	-0.0087	-0.0087	-0.0096	-0.0101	0.0081***	0.0071**
	(0.0011)	(0.0012)	(0.0009)	(0.0010)	(0.0085)	(0.0086)	(0.0083)	(0.0083)	(0.0032)	(0.0032)
GS rating	-0.0191	-0.0018	-0.1201***	-0.0555	-0.8767***	-0.8892***	-0.9966***	-0.9973***	-0.1525	-0.1588
	(0.0407)	(0.0405)	(0.0365)	(0.0367)	(0.3284)	(0.3292)	(0.3132)	(0.3136)	(0.1537)	(0.1535)
Average test score	-0.0192***	-0.0196***			-0.0458***	-0.0455***				
	(0.0016)	(0.0016)			(0.0087)	(0.0091)				
Average growth rate	-0.0329***	-0.0447***			-0.0449***	-0.0439***				
	(0.0019)	(0.0025)			(0.0147)	(0.0153)				
Constant	0.0179***	0.0164***	0.0156***	0.0258***	0.0660***	0.0687***	0.0903***	0.0914***	0.0582***	0.0738***
	(0.0022)	(0.0032)	(0.0019)	(0.0024)	(0.0168)	(0.0202)	(0.0157)	(0.0179)	(0.0074)	(0.0085)
No. of observations	312,730	312,730	382,002	382,002	19,175	19,175	23,088	23,088	52,921	52,921
No. of unique schools	65,697	65,697	79,028	79,028	4,453	4,453	5,296	5,296	18,625	18,625
School level	3rd to 8th	3rd to 8th	All	All	3rd to 8th	3rd to 8th	All	All	All	All
Controls for missing quality measures	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls for grades offered	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes

Notes: The unit of observation is the school year from 2014 to 2018. New openings after 2014 are excluded. Robust standard errors in parenthesis. Nearby schools are those schools within the same school district.
Statistical significance: * $p<0.10$, ** $p<0.05$, *** $p<0.01$.
Source: Author's calculations based on NLSD.

Table I3 Charter and Private Enrollment Share as Predictors of Closure/Restructuring (LPM), 2014-2018

Variables	Closure/Restructuring rate									
	TPS	TPS	TPS	TPS	Charter	Charter	Charter	Charter	Private	Private
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
% Charter enrollment in nearby schools	0.0274***	0.0266***	0.0374***	0.0393***	0.0011	0.0013	-0.0018	-0.0019	0.0272**	0.0262**
	(0.0057)	(0.0057)	(0.0056)	(0.0056)	(0.0106)	(0.0107)	(0.0099)	(0.0099)	(0.0126)	(0.0126)
% Private enrollment in nearby schools	0.0006	0.0002	-0.0010	-0.0006	0.0516**	0.0527**	0.0343	0.0355*	-0.0017	-0.0024
	(0.0028)	(0.0028)	(0.0026)	(0.0026)	(0.0234)	(0.0235)	(0.0210)	(0.0211)	(0.0046)	(0.0046)
Enrollment size	-0.0304***	-0.0311***	-0.0166***	-0.0205***	-0.0218***	-0.0217***	-0.0265***	-0.0270***	-0.0894***	-0.0904***
	(0.0018)	(0.0020)	(0.0010)	(0.0011)	(0.0058)	(0.0061)	(0.0060)	(0.0063)	(0.0055)	(0.0059)
% Students of color	0.0044**	0.0037**	0.0144***	0.0167***	0.0410***	0.0416***	0.0472***	0.0485***	0.0287***	0.0279***
	(0.0017)	(0.0018)	(0.0015)	(0.0016)	(0.0102)	(0.0105)	(0.0095)	(0.0096)	(0.0038)	(0.0038)
% FRPL	0.0063***	0.0061***	0.0122***	0.0124***	-0.0055	-0.0056	0.0075	0.0073		
	(0.0017)	(0.0017)	(0.0014)	(0.0014)	(0.0099)	(0.0099)	(0.0089)	(0.0089)		
Urban	0.0033***	0.0025**	0.0000	0.0004	-0.0088	-0.0088	-0.0107	-0.0113	0.0092***	0.0080**
	(0.0011)	(0.0012)	(0.0009)	(0.0010)	(0.0089)	(0.0089)	(0.0085)	(0.0086)	(0.0032)	(0.0032)
GS rating	-0.0202	-0.0044	-0.1133***	-0.0522	-0.8775***	-0.8908***	-1.0028***	-1.0041***	-0.1779	-0.1848
	(0.0409)	(0.0407)	(0.0367)	(0.0369)	(0.3263)	(0.3271)	(0.3122)	(0.3127)	(0.1535)	(0.1534)
Average test score	-0.0176***	-0.0180***			-0.0462***	-0.0460***				
	(0.0016)	(0.0016)			(0.0087)	(0.0091)				
Average growth rate	-0.0317***	-0.0440***			-0.0438***	-0.0424***				
	(0.0019)	(0.0025)			(0.0146)	(0.0152)				
Constant	0.0169***	0.0140***	0.0150***	0.0248***	0.0652***	0.0690***	0.0902***	0.0915***	0.0589***	0.0758***
	(0.0023)	(0.0032)	(0.0019)	(0.0025)	(0.0171)	(0.0204)	(0.0161)	(0.0184)	(0.0075)	(0.0086)
No. of observations	312,728	312,728	381,999	381,999	19,175	19,175	23,088	23,088	52,921	52,921
No. of unique schools	65,697	65,697	79,028	79,028	4,453	4,453	5,296	5,296	18,625	18,625
School level	3rd to 8th	3rd to 8th	All	All	3rd to 8th	3rd to 8th	All	All	All	All
Controls for missing quality measures	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls for grades offered	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes

Notes: The unit of observation is the school year from 2014 to 2018. New openings after 2014 are excluded. Robust standard errors in parenthesis. Nearby schools are those schools within the same zip code.
Statistical significance: * $p<0.10$, ** $p<0.05$, *** $p<0.01$.
Source: Author's calculations based on NLSD.

Appendix J: Robustness Checks

Table J1 Predictors of Closure/Restructuring for TPS and Charter Schools Incorporating Non-Random Mobility (LPM), 2014-2018

Variables	Closure/Restructuring rate				
	(1)	(2)	(3)	(4)	(5)
Charter	0.0592***	0.0241***	0.0216***	0.0332	0.0263*
	(0.0029)	(0.0034)	(0.0037)	(0.0213)	(0.0159)
Enrollment size		-0.0368***	-0.0369***	-0.0412***	-0.0394***
		(0.0027)	(0.0028)	(0.0017)	(0.0015)
Charter x Enrollment size				0.0158**	0.0198***
				(0.0071)	(0.0059)
Enrollment in current year minus		0.0697***	0.0686***	0.1260***	0.1176***
enrollment in the previous year		(0.0160)	(0.0159)	(0.0132)	(0.0130)
Charter x Enrollment in current year				-0.1526***	-0.1466***
enrollment in the previous year				(0.0272)	(0.0271)
% Students of color		0.0107***	0.0102***	0.0085***	0.0100***
		(0.0018)	(0.0019)	(0.0018)	(0.0017)
Charter x % Students of color				0.0304**	0.0242**
				(0.0122)	(0.0102)
% FRPL		0.0036*	0.0034*	0.0057***	0.0001
		(0.0020)	(0.0020)	(0.0017)	(0.0017)
Charter x % FRPL				-0.0194*	-0.0083
				(0.0111)	(0.0100)
Urban		0.0043***	0.0037***	0.0046***	0.0053***
		(0.0011)	(0.0012)	(0.0011)	(0.0009)
Charter x Urban				-0.0139	-0.0097
				(0.0111)	(0.0082)
GS rating		-0.0596	-0.0368	-0.0090	-0.0098
		(0.0401)	(0.0400)	(0.0399)	(0.0324)
Charter x GS rating				-0.9640**	-0.7491**
				(0.4208)	(0.3128)
Average test score		-0.0182***	-0.0185***	-0.0170***	-0.0204***
		(0.0016)	(0.0016)	(0.0016)	(0.0015)
Charter x Average test score				-0.0377***	-0.0347***
				(0.0123)	(0.0089)
Average growth rate		-0.0318***	-0.0412***	-0.0382***	-0.0427***
		(0.0019)	(0.0025)	(0.0024)	(0.0023)
Charter x Average growth rate				-0.0348*	-0.0121
				(0.0197)	(0.0146)
Constant	0.0205***	0.0198***	0.0183***	0.0200***	0.0147***
	(0.0004)	(0.0024)	(0.0034)	(0.0031)	(0.0034)
No. of observations	339,038	331,207	331,207	331,207	331,207
No. of unique schools	70,081	69,967	69,967	69,967	69,967
Controls for missing quality measures	No	Yes	Yes	Yes	Yes
Controls for grades offered	No	No	Yes	Yes	Yes
Year Fixed Effects	No	No	No	No	Yes
State Fixed Effects	No	No	No	No	Yes

Notes: Non-random mobility is measured as the change in total school enrollment from year to year. See notes to Table 4.
Statistical significance: * $p<0.10$, ** $p<0.05$, *** $p<0.01$.

Table J2 Predictors of Closure/Restructuring for All Schools in States with Low Missingness in the GS rating (LPM), 2014-2018

Variables	Closure/Restructuring rate				
	(1)	(2)	(3)	(4)	(5)
Charter	0.0622***	0.0472***	0.0446***	0.1003***	0.0700***
	(0.0039)	(0.0039)	(0.0042)	(0.0260)	(0.0145)
Private	0.0298***	0.0205***	0.0209***	0.0450***	0.0304***
	(0.0020)	(0.0021)	(0.0029)	(0.0120)	(0.0082)
Enrollment size		-0.0246***	-0.0312***	-0.0242***	-0.0196***
		(0.0014)	(0.0019)	(0.0016)	(0.0010)
Charter x Enrollment size				-0.0186*	-0.0075
				(0.0113)	(0.0073)
Private x Enrollment size				-0.0965***	-0.0672***
				(0.0071)	(0.0052)
% Students of color		0.0292***	0.0317***	0.0326***	0.0367***
		(0.0020)	(0.0021)	(0.0022)	(0.0019)
Charter x % Students of color				0.0018	-0.0096
				(0.0134)	(0.0080)
Private x % Students of color				-0.0179***	-0.0230***
				(0.0061)	(0.0046)
Urban		0.0009	0.0033*	0.0005	0.0013
		(0.0018)	(0.0019)	(0.0019)	(0.0012)
Charter x Urban				0.0055	0.0052
				(0.0149)	(0.0074)
Private x Urban				0.0138**	0.0141***
				(0.0062)	(0.0042)
GS rating		-0.2466***	-0.1605***	-0.0822	-0.1067**
		(0.0616)	(0.0622)	(0.0621)	(0.0445)
Charter x GS rating				-1.7720***	-0.7813***
				(0.5127)	(0.2866)
Private x GS rating				0.0611	0.0686
				(0.2297)	(0.1581)
Constant	0.0213***	0.0244***	0.0311***	0.0225***	0.0215***
	(0.0006)	(0.0031)	(0.0038)	(0.0037)	(0.0037)
No. of observations	183,629	183,262	183,262	183,262	183,262
No. of unique schools	40,377	40,360	40,360	40,360	40,360
Controls for missing quality measures	No	Yes	Yes	Yes	Yes
Controls for grades offered	No	No	Yes	Yes	Yes
Year Fixed Effects	No	No	No	No	Yes
State Fixed Effects	No	No	No	No	Yes

Notes: We restrict the analysis to the sample of states with at least 20 charter schools with reported GS, and where the ratio of schools with GS rating to schools without GS rating is similar between sectors (within 40 percent of the average ratio). See notes to Table 3.

Statistical significance: * $p<0.10$, ** $p<0.05$, *** $p<0.01$.

Table J3 Predictors of Closure/Restructuring for TPS and Charter Schools in States with Low Missingness in the GS rating (LPM), 2014-2018

Variables	Closure/Restructuring rate				
	(1)	(2)	(3)	(4)	(5)
Charter	0.0634***	0.0256***	0.0202***	0.0543**	0.0429**
	(0.0036)	(0.0042)	(0.0047)	(0.0246)	(0.0201)
Enrollment size		-0.0282***	-0.0285***	-0.0260***	-0.0326***
		(0.0030)	(0.0032)	(0.0027)	(0.0025)
Charter x Enrollment size				-0.0067	0.0032
				(0.0097)	(0.0084)
% Students of color		0.0175***	0.0179***	0.0155***	0.0260***
		(0.0029)	(0.0030)	(0.0028)	(0.0028)
Charter x % Students of color				0.0231	0.0062
				(0.0163)	(0.0139)
% FRPL		-0.0076**	-0.0066*	0.0030	-0.0161***
		(0.0036)	(0.0036)	(0.0030)	(0.0031)
Charter x % FRPL				-0.0458***	-0.0189
				(0.0149)	(0.0135)
Urban		0.0010	0.0015	0.0007	0.0036**
		(0.0019)	(0.0020)	(0.0020)	(0.0017)
Charter x Urban				-0.0001	-0.0011
				(0.0134)	(0.0106)
GS rating		-0.1303**	-0.0997	-0.0586	-0.0361
		(0.0633)	(0.0637)	(0.0629)	(0.0552)
Charter x GS rating				-0.8667*	-0.6458*
				(0.4709)	(0.3883)
Average test score		-0.0237***	-0.0224***	-0.0167***	-0.0274***
		(0.0024)	(0.0024)	(0.0024)	(0.0024)
Charter x Average test score				-0.0475***	-0.0441***
				(0.0126)	(0.0101)
Average growth rate		-0.0428***	-0.0535***	-0.0514***	-0.0472***
		(0.0034)	(0.0044)	(0.0044)	(0.0038)
Charter x Average growth rate				-0.0187	-0.0010
				(0.0213)	(0.0173)
Constant	0.0203***	0.0241***	0.0170***	0.0108**	0.0137**
	(0.0006)	(0.0038)	(0.0053)	(0.0051)	(0.0060)
No. of observations	135,716	133,512	133,512	133,512	133,512
No. of unique schools	27,867	27,826	27,826	27,826	27,826
Controls for missing quality measures	No	Yes	Yes	Yes	Yes
Controls for grades offered	No	No	Yes	Yes	Yes
Year Fixed Effects	No	No	No	No	Yes
State Fixed Effects	No	No	No	No	Yes

Notes: We restrict to the sample of states where there are at least 20 charter schools with reported GS, and where the ratio of schools with GS rating to schools without GS rating is similar between sectors (within 40 percent of the average ratio). See notes to Table 4.

Statistical significance: * $p<0.10$, ** $p<0.05$, *** $p<0.01$.

Table J4 Predictors of Closure/Restructuring Using the Multiple Imputation Model for the Quality Measures (LPM), 2014-2018

Variables	Closure/Restructuring rate							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Charter	0.0482***	0.0492***	0.0417**	0.0339***	0.0243***	0.0237***	0.0032	0.0045
	(0.0032)	(0.0033)	(0.0163)	(0.0099)	(0.0033)	(0.0036)	(0.0182)	(0.0148)
Private	0.0169***	0.0219***	0.0377***	0.0231***				
	(0.0013)	(0.0016)	(0.0065)	(0.0047)				
Enrollment size	-0.0249***	-0.0284***	-0.0231***	-0.0170***	-0.0330***	-0.0344***	-0.0365***	-0.0370***
	(0.0011)	(0.0013)	(0.0011)	(0.0007)	(0.0024)	(0.0026)	(0.0018)	(0.0015)
Charter x Enrollment size			-0.0090	0.0045			0.0101	0.0176**
			(0.0075)	(0.0040)			(0.0073)	(0.0059)
Private x Enrollment size			-0.0639***	-0.0422***				
			(0.0053)	(0.0037)				
% Students of color	0.0291***	0.0308***	0.0269***	0.0261***	0.0110***	0.0116***	0.0083***	0.0103***
	(0.0012)	(0.0013)	(0.0014)	(0.0010)	(0.0019)	(0.0019)	(0.0018)	(0.0017)
Charter x % Students of color			0.0300**	0.0197**			0.0415***	0.0313**
			(0.0103)	(0.0055)			(0.0122)	(0.0099)
Private x % Students of color			0.0024	-0.0043				
			(0.0040)	(0.0029)				
% FRPL					0.0073***	0.0074***	0.0089***	0.0041**
					(0.0019)	(0.0019)	(0.0017)	(0.0017)
Charter x % FRPL							-0.0169	-0.0040
							(0.0107)	(0.0095)
Urban	0.0005	0.0010	0.0005	0.0002	0.0019	0.0012	0.0023**	0.0031***
	(0.0009)	(0.0010)	(0.0010)	(0.0005)	(0.0011)	(0.0011)	(0.0011)	(0.0009)
Charter x Urban			-0.0204	-0.0064			-0.0163	-0.0116
			(0.0122)	(0.0055)			(0.0110)	(0.0079)
Private x Urban			0.0088**	0.0085***				
			(0.0031)	(0.0020)				
GS rating	-0.0363	-0.0207	-0.0067	-0.0341	-0.0052	0.0044	0.0062	0.0009
	(0.0447)	(0.0448)	(0.0391)	(0.0228)	(0.0463)	(0.0463)	(0.0402)	(0.0327)
Charter x GS rating			-0.1693	-0.2182			-0.0266	-0.0799
			(0.2655)	(0.1996)			(0.3496)	(0.2996)
Private x GS rating			-0.0264	-0.0244				
			(0.1296)	(0.0978)				
Average test score					-0.0107***	-0.0106***	-0.0112***	-0.0155***
					(0.0019)	(0.0019)	(0.0018)	(0.0015)
Charter x Average test score							0.0018	0.0004
							(0.0082)	(0.0072)
Average growth rate					-0.0073	-0.0087	-0.0086	-0.0033
					(0.0072)	(0.0073)	(0.0066)	(0.0057)
Charter x Average growth rate							0.0008	0.0021
							(0.0357)	(0.0321)
Constant	0.0176***	0.0285***	0.0246***	0.0181***	0.0186***	0.0243***	0.0257***	0.0234***
	(0.0020)	(0.0025)	(0.0023)	(0.0019)	(0.0024)	(0.0032)	(0.0030)	(0.0032)
No. of observations	465,869	465,869	465,869	465,869	331,905	331,905	331,905	331,905
No. of unique schools	102,762	102,762	102,762	102,762	69,977	69,977	69,977	69,977
Controls for missing quality measures	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls for grades offered	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Year Fixed Effects	No	No	No	Yes	No	No	No	Yes
State Fixed Effects	No	No	No	Yes	No	No	No	Yes

Notes: Instead of adding missing indicators, we estimate via Multiple Imputation Model for the quality measures. The unit of observation is the school year from 2014 to 2018. New openings after 2014 are excluded. Because of the inclusion of test scores in Columns 5 to 8, the sample is limited to elementary and middle schools, which comprise the vast majority of all schools. Robust standard errors in parenthesis.

Statistical significance: * $p<0.10$, ** $p<0.05$, *** $p<0.01$.

Source: Author's calculations based on NLSD.

Table J5 Predictors of Closure/Restructuring for All Schools Using the Private Schools' Alternate Closure Measure (LPM), 2014-2016

Variables	Closure/Restructuring rate				
	(1)	(2)	(3)	(4)	(5)
Charter	0.0626***	0.0491***	0.0497***	0.0930***	0.0568***
	(0.0031)	(0.0031)	(0.0033)	(0.0221)	(0.0118)
Private	0.0159***	0.0081***	0.0125***	0.0253***	0.0151***
	(0.0011)	(0.0012)	(0.0016)	(0.0065)	(0.0046)
Enrollment size		-0.0244***	-0.0278***	-0.0229***	-0.0188***
		(0.0011)	(0.0013)	(0.0012)	(0.0008)
Charter x Enrollment size				-0.0089	0.0026
				(0.0075)	(0.0046)
Private x Enrollment size				-0.0501***	-0.0358***
				(0.0046)	(0.0035)
% Students of color		0.0275***	0.0292***	0.0265***	0.0276***
		(0.0012)	(0.0013)	(0.0014)	(0.0011)
Charter x % Students of color				0.0281***	0.0199***
				(0.0101)	(0.0060)
Private x % Students of color				-0.0030	-0.0073**
				(0.0037)	(0.0029)
Urban		0.0021**	0.0026***	0.0006	0.0001
		(0.0009)	(0.0010)	(0.0010)	(0.0006)
Charter x Urban				-0.0193	-0.0079
				(0.0119)	(0.0061)
Private x Urban				0.0179***	0.0163***
				(0.0026)	(0.0019)
GS rating		-0.1458***	-0.0884**	-0.0435	-0.0538**
		(0.0375)	(0.0377)	(0.0385)	(0.0246)
Charter x GS rating				-1.4315***	-0.7096***
				(0.4589)	(0.2396)
Private x GS rating				-0.0849	-0.0437
				(0.1351)	(0.0954)
Constant	0.0210***	0.0218***	0.0301***	0.0257***	0.0188***
	(0.0004)	(0.0018)	(0.0023)	(0.0023)	(0.0021)
No. of observations	466,726	465,869	465,869	465,869	465,869
No. of unique schools	102,823	102,762	102,762	102,762	102,762
Controls for missing quality measures	No	Yes	Yes	Yes	Yes
Controls for grades offered	No	No	Yes	Yes	Yes
Year Fixed Effects	No	No	No	No	Yes
State Fixed Effects	No	No	No	No	Yes

Notes: Closure status of private schools based on alternate measure. See notes to Table 3.
Statistical significance: * $p<0.10$, ** $p<0.05$, *** $p<0.01$.

Table J6 Predictors of Closure/Restructuring for All Schools Using the NAPCS-Based Charter Status (LPM), 2014-2018

Variables	Closure/Restructuring rate				
	(1)	(2)	(3)	(4)	(5)
Charter	0.0789***	0.0662***	0.0682***	0.1179***	0.0484***
	(0.0031)	(0.0032)	(0.0033)	(0.0230)	(0.0110)
Private	0.0259***	0.0183***	0.0250***	0.0440***	0.0250***
	(0.0012)	(0.0013)	(0.0017)	(0.0071)	(0.0046)
Enrollment size		-0.0244***	-0.0274***	-0.0224***	-0.0169***
		(0.0011)	(0.0013)	(0.0012)	(0.0007)
Charter x Enrollment size				-0.0074	0.0047
				(0.0070)	(0.0040)
Private x Enrollment size				-0.0637***	-0.0422***
				(0.0054)	(0.0037)
% Students of color		0.0276***	0.0293***	0.0253***	0.0259***
		(0.0013)	(0.0013)	(0.0014)	(0.0011)
Charter x % Students of color				0.0312***	0.0210***
				(0.0101)	(0.0056)
Private x % Students of color				0.0038	-0.0041
				(0.0040)	(0.0029)
Urban		-0.0001	-0.0001	-0.0001	0.0002
		(0.0010)	(0.0010)	(0.0010)	(0.0006)
Charter x Urban				-0.0277**	-0.0078
				(0.0121)	(0.0056)
Private x Urban				0.0091***	0.0085***
				(0.0031)	(0.0020)
GS rating		-0.1552***	-0.1034***	-0.0542	-0.0581**
		(0.0388)	(0.0391)	(0.0384)	(0.0230)
Charter x GS rating				-1.2582***	-0.4921**
				(0.4685)	(0.2232)
Private x GS rating				-0.1237	-0.0617
				(0.1451)	(0.0928)
Constant	0.0201***	0.0225***	0.0337***	0.0282***	0.0195***
	(0.0003)	(0.0019)	(0.0024)	(0.0023)	(0.0020)
No. of observations	466,726	465,869	465,869	465,869	465,869
No. of unique schools	102,823	102,762	102,762	102,762	102,762
Controls for missing quality measures	No	Yes	Yes	Yes	Yes
Controls for grades offered	No	No	Yes	Yes	Yes
Year Fixed Effects	No	No	No	No	Yes
State Fixed Effects	No	No	No	No	Yes

Notes: Charter status based on NAPCS data. See notes to Table 3.
Statistical significance: * $p<0.10$, ** $p<0.05$, *** $p<0.01$.

Table J7 Predictors of Closure/Restructuring for TPS and Charter Schools Using the NAPCS Charter Status (LPM), 2014-2018

Variables	Closure/Restructuring rate				
	(1)	(2)	(3)	(4)	(5)
Charter	0.0711***	0.0389***	0.0374***	0.0820***	0.0503***
	(0.0030)	(0.0035)	(0.0038)	(0.0226)	(0.0165)
Enrollment size		-0.0297***	-0.0295***	-0.0315***	-0.0327***
		(0.0023)	(0.0024)	(0.0018)	(0.0015)
Charter x Enrollment size				0.0079	0.0144***
				(0.0066)	(0.0055)
% Students of color		0.0079***	0.0073***	0.0048***	0.0085***
		(0.0018)	(0.0018)	(0.0017)	(0.0017)
Charter x % Students of color				0.0359***	0.0268***
				(0.0121)	(0.0100)
% FRPL		0.0046**	0.0043**	0.0067***	0.0004
		(0.0020)	(0.0020)	(0.0017)	(0.0017)
Charter x % FRPL				-0.0195*	-0.0066
				(0.0108)	(0.0097)
Urban		0.0030***	0.0020*	0.0031***	0.0043***
		(0.0011)	(0.0012)	(0.0011)	(0.0009)
Charter x Urban				-0.0203*	-0.0130
				(0.0110)	(0.0081)
GS rating		-0.0538	-0.0361	-0.0015	-0.0054
		(0.0399)	(0.0398)	(0.0389)	(0.0315)
Charter x GS rating				-1.0633**	-0.7494**
				(0.4367)	(0.3210)
Average test score		-0.0185***	-0.0192***	-0.0177***	-0.0206***
		(0.0016)	(0.0016)	(0.0015)	(0.0014)
Charter x Average test score				-0.0331***	-0.0315***
				(0.0122)	(0.0088)
Average growth rate		-0.0325***	-0.0418***	-0.0419***	-0.0442***
		(0.0019)	(0.0025)	(0.0024)	(0.0022)
Charter x Average growth rate				0.0142	0.0123
				(0.0199)	(0.0145)
Constant	0.0198***	0.0170***	0.0174***	0.0155***	0.0113***
	(0.0004)	(0.0023)	(0.0033)	(0.0031)	(0.0034)
No. of observations	339,038	331,905	331,905	331,905	331,905
No. of unique schools	70,081	69,977	69,977	69,977	69,977
Controls for grades offered	No	No	Yes	Yes	Yes
Controls for missing quality measures	No	No	Yes	Yes	Yes
Year Fixed Effects	No	No	No	No	Yes
State Fixed Effects	No	No	No	No	Yes

Notes: Charter status based on NAPCS. See notes to Table 4.
Statistical significance: * $p<0.10$, ** $p<0.05$, *** $p<0.01$.

Table J8 Comparison of Predictors of Closure/Restructuring for TPS and Charter Schools in Louisiana using Microdata and the NLSD (LPM), 2013-2014

Variables	Closure/Restructuring rate							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Charter	-0.0162	-0.0215*	-0.0935	-0.1094	0.0256	-0.0000	0.4938***	0.4918***
	(0.0117)	(0.0131)	(0.0746)	(0.0811)	(0.0295)	(0.0363)	(0.1270)	(0.1262)
Enrollment size	-0.0590***	-0.0587***	-0.0606***	-0.0590***	-0.0433***	-0.0426***	-0.0403***	-0.0411***
	(0.0124)	(0.0128)	(0.0135)	(0.0130)	(0.0136)	(0.0143)	(0.0144)	(0.0141)
Charter x Enrollment size			0.0428*	0.0355			-0.0510	-0.0663
			(0.0242)	(0.0248)			(0.0761)	(0.0738)
% Students of color	-0.0097	-0.0086	-0.0078	-0.0072	-0.0262	-0.0208	-0.0176	-0.0160
	(0.0193)	(0.0196)	(0.0206)	(0.0199)	(0.0187)	(0.0190)	(0.0190)	(0.0186)
Charter x % Students of color			-0.0413	-0.0478			-0.0723	-0.0886
			(0.0500)	(0.0517)			(0.0693)	(0.0704)
% FRPL	0.0392*	0.0286	0.0326	0.0269	0.0700**	0.0609**	0.0543*	0.0490
	(0.0221)	(0.0238)	(0.0262)	(0.0271)	(0.0295)	(0.0306)	(0.0325)	(0.0326)
Charter x % FRPL			-0.0258	-0.0110			0.0750	0.0813
			(0.0300)	(0.0341)			(0.0923)	(0.0919)
Urban	-0.0037	-0.0027	-0.0028	-0.0024	-0.0026	0.0001	-0.0003	0.0014
	(0.0078)	(0.0079)	(0.0080)	(0.0078)	(0.0085)	(0.0085)	(0.0085)	(0.0081)
Charter x Urban			0.0480	0.0535			0.0215	0.0307
			(0.0473)	(0.0482)			(0.1330)	(0.1321)
GS rating	-0.3227	-0.3350	-0.3441	-0.3256	-0.3953	-0.4026	-0.2097	-0.2023
	(0.3768)	(0.3821)	(0.3874)	(0.3653)	(0.3710)	(0.3700)	(0.3505)	(0.3406)
Charter x GS rating			1.8607	2.1662			-12.1112***	-11.8852***
			(1.7459)	(1.8241)			(3.2648)	(3.2397)
Average test score	-0.0062	-0.0109	-0.0073	-0.0084	-0.0014	-0.0029	-0.0038	-0.0044
	(0.0068)	(0.0090)	(0.0084)	(0.0091)	(0.0157)	(0.0160)	(0.0169)	(0.0166)
Charter x Average test score			-0.0848	-0.0812			-0.0453	-0.0477
			(0.0899)	(0.0848)			(0.0886)	(0.0875)
Average growth rate	0.0005	-0.0001	-0.0117	-0.0124	-0.1188***	-0.1783***	-0.1807***	-0.1774***
	(0.0184)	(0.0196)	(0.0169)	(0.0196)	(0.0303)	(0.0452)	(0.0461)	(0.0449)
Charter x Average growth rate			0.1919	0.1803			0.2311	0.2306
			(0.1815)	(0.1646)			(0.2357)	(0.2339)
Constant	0.0368*	0.0353	0.0349	0.0334	0.0139	-0.0241	-0.0305	-0.0370
	(0.0190)	(0.0230)	(0.0246)	(0.0239)	(0.0222)	(0.0267)	(0.0277)	(0.0263)
No. of observations	2,134	2,134	2,134	2,134	2,153	2,153	2,153	2,153
No. of unique schools	1,083	1,083	1,083	1,083	1,129	1,129	1,129	1,129
Controls for missing quality measures	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls for grades offered	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Year Fixed Effects	No	No	No	Yes	No	No	No	Yes
Data source	Microdata	Microdata	Microdata	Microdata	NLSD	NLSD	NLSD	NLSD

Notes: The unit of observation is the school year from 2013 to 2014. Because of the inclusion of test scores, the sample is limited to elementary and middle schools, which comprise the vast majority of all schools. Robust standard errors in parenthesis.
Statistical significance: * $p<0.10$, ** $p<0.05$, *** $p<0.01$.
Source: Author's calculations based on NLSD, Louisiana Microdata, and Harris et al. (2019).

Table J9 Predictors of Closure for All Schools Using the NAPCS-Based Closure Measure for Charter Schools (LPM), 2014-2018

Variables	Closure rate				
	(1)	(2)	(3)	(4)	(5)
Charter	0.0299***	0.0220***	0.0238***	0.0009	0.0125*
	(0.0022)	(0.0022)	(0.0024)	(0.0145)	(0.0074)
Private	0.0331***	0.0260***	0.0316***	0.0396***	0.0283***
	(0.0013)	(0.0014)	(0.0016)	(0.0073)	(0.0047)
Enrollment size		-0.0239***	-0.0259***	-0.0231***	-0.0155***
		(0.0011)	(0.0013)	(0.0010)	(0.0005)
Charter x Enrollment size				0.0110**	0.0058
				(0.0048)	(0.0038)
Private x Enrollment size				-0.0654***	-0.0466***
				(0.0055)	(0.0038)
% Students of color		0.0185***	0.0198***	0.0146***	0.0082***
		(0.0012)	(0.0012)	(0.0012)	(0.0006)
Charter x % Students of color				0.0198***	0.0121***
				(0.0072)	(0.0037)
Private x % Students of color				0.0151***	0.0129***
				(0.0040)	(0.0029)
Urban		-0.0020**	-0.0022**	-0.0025**	0.0001
		(0.0009)	(0.0010)	(0.0011)	(0.0005)
Charter x Urban				-0.0002	-0.0001
				(0.0054)	(0.0035)
Private x Urban				0.0116***	0.0067***
				(0.0032)	(0.0021)
GS rating		-0.1270***	-0.0899***	-0.0901***	-0.0301*
		(0.0334)	(0.0336)	(0.0307)	(0.0165)
Charter x GS rating				0.2781	-0.1517
				(0.3408)	(0.1537)
Private x GS rating				-0.0946	-0.0952
				(0.1508)	(0.0958)
Constant	0.0152***	0.0242***	0.0332***	0.0322***	0.0225***
	(0.0003)	(0.0016)	(0.0020)	(0.0019)	(0.0011)
No. of observations	466,726	465,869	465,869	465,869	465,869
No. of unique schools	102,823	102,762	102,762	102,762	102,762
Controls for missing quality measures	No	Yes	Yes	Yes	Yes
Controls for grades offered	No	No	Yes	Yes	Yes
Year Fixed Effects	No	No	No	No	Yes
State Fixed Effects	No	No	No	No	Yes

Notes: See notes to Table 3.
Statistical significance: * $p<0.10$, ** $p<0.05$, *** $p<0.01$.

Table J10 Predictors of Closure for TPS and Charter Schools Using the NAPCS-Based Closure Measure for Charter Schools (LPM), 2014-2018

Variables	Closure rate				
	(1)	(2)	(3)	(4)	(5)
Charter	0.0268***	0.0169***	0.0166***	-0.0019	0.0009
	(0.0020)	(0.0024)	(0.0026)	(0.0145)	(0.0109)
Enrollment size		-0.0236***	-0.0241***	-0.0313***	-0.0288***
		(0.0022)	(0.0023)	(0.0017)	(0.0013)
Charter x Enrollment size				0.0252***	0.0223***
				(0.0048)	(0.0042)
% Students of color		0.0017	0.0019	0.0010	-0.0010
		(0.0015)	(0.0015)	(0.0015)	(0.0013)
Charter x % Students of color				0.0325***	0.0248***
				(0.0079)	(0.0066)
% FRPL		0.0014	0.0014	0.0019	0.0039***
		(0.0015)	(0.0015)	(0.0014)	(0.0013)
Charter x % FRPL				-0.0081	-0.0048
				(0.0074)	(0.0066)
Urban		0.0004	-0.0000	0.0013	0.0023***
		(0.0010)	(0.0011)	(0.0011)	(0.0008)
Charter x Urban				-0.0049	-0.0033
				(0.0054)	(0.0045)
GS rating		-0.0597*	-0.0442	-0.0539*	-0.0376
		(0.0325)	(0.0326)	(0.0325)	(0.0266)
Charter x GS rating				0.1009	-0.0886
				(0.3318)	(0.2350)
Average test score		-0.0144***	-0.0141***	-0.0130***	-0.0104***
		(0.0012)	(0.0012)	(0.0012)	(0.0011)
Charter x Average test score				-0.0161	-0.0164**
				(0.0106)	(0.0073)
Average growth rate		-0.0339***	-0.0424***	-0.0408***	-0.0341***
		(0.0017)	(0.0022)	(0.0022)	(0.0018)
Charter x Average growth rate				-0.0115	-0.0092
				(0.0155)	(0.0111)
Constant	0.0148***	0.0198***	0.0187***	0.0220***	0.0179***
	(0.0003)	(0.0019)	(0.0026)	(0.0025)	(0.0020)
No. of observations	339,038	331,905	331,905	331,905	331,905
No. of unique schools	70,081	69,977	69,977	69,977	69,977
Controls for missing quality measures	No	Yes	Yes	Yes	Yes
Controls for grades offered	No	No	Yes	Yes	Yes
Year Fixed Effects	No	No	No	No	Yes
State Fixed Effects	No	No	No	No	Yes

Notes: See notes to Table 4.
Statistical significance: * $p<0.10$, ** $p<0.05$, *** $p<0.01$.