Policy Analysis

The Impact of Charter Schools on Public and Private School Enrollments

by Richard Buddin

Executive Summary

Charter schools are publicly funded schools that have considerable independence from public school districts in their curriculum development and staffing decisions, and their enrollments have increased substantially over the past two decades.

Charter schools are changing public and private school enrollment patterns across the United States. This study analyzes district-level enrollment patterns for all states with charter schools, isolating how charter schools affect traditional public and private school enrollments after controlling for changes for the socioeconomic, demographic, and economic conditions in each district.

While most students are drawn from traditional public schools, charter schools are pulling large numbers of students from the private education market and present a potentially devastating impact on the private education market, as well as a serious increase in the financial burden on taxpayers.

Private school enrollments are much more sensitive to charters in urban districts than in non-urban districts. Overall, about 8 percent of charter elementary students and 11 percent of middle and high school students are drawn from private schools. In highly urban districts, private schools contribute 32, 23, and 15 percent of charter elementary, middle, and high school enrollments, respectively. Catholic schools seem particularly vulnerable, especially for elementary students in large metropolitan areas.

The flow of private-school students into charters has important fiscal implications for districts and states. When charters draw students from private schools, demands for tax revenue increase. If governments increase educational spending, tax revenues must be increased or spending in other areas reduced, or else districts may face pressures to reduce educational services. The shift of students from private to public schools represents a significant shift in the financial burdens for education from the private to the public sector.

For an overview of this study, see Adam B. Schaeffer's companion article, "The Charter School Paradox," online at http://www.cato.org/pubs/pas/Charter-School-Paradox.pdf.

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Introduction

An important change in the composition of primary and secondary education (K–12) in the United States has been the emergence of charter schools. The first charter school was started in 1992 in Minnesota, and now charters have spread to 40 states and the District of Columbia. This rapid growth means that charters enrolled 1.7 million students in nearly 5,400 schools in 2010.

Charter schools are publicly funded schools that have considerable independence from school districts in their curriculum development and staffing decisions. Each charter is responsible for meeting statewide accountability standards, but they have more flexibility than traditional public schools (TPSs) in managing day-to-day operations. A key feature of charter schools is that they are open to all students as compared with TPSs, which typically draw their enrollment from a district-defined neighborhood.

The purpose of this study is to examine changes in enrollment across different types of schools with particular emphasis on the growing charter school sector. This paper addresses several questions:

- Are charter schools drawing students from private as well as traditional public schools?
- How does charter competition with other schools differ by school location (i.e., from state to state or across levels of urbanicity)?
- Are charters equally attractive to students in Catholic, other religious, and nonsectarian schools?
- How has the decline in Catholic schools affected enrollments in other sectors?
- How does charter competition differ across elementary, middle, and high schools?
- What are the financial implications of these enrollment trends for public schools?

These types of enrollment questions have received little attention in the charter literature. Rather, most research has focused on whether charters improve student test scores, whether charter competition improves achievement at nearby TPSs, whether charters increase the isolation of racial/ethnic groups, or whether charters attract students of high ability of high socioeconomic status.[1] While these issues are important, this paper addresses the issue of how and where charter schools are competing for students with traditional public and private schools.

Charters are drawing students from both traditional public and private schools. They draw a much larger share of their enrollments from private schools in large urban districts than from other districts. The flow of private school students into charters has important fiscal implications for districts and states. When charters draw students from private schools, public revenue growth may not keep pace with public enrollments, and districts may face pressures to reduce education services available to students. Alternatively, as parents move their children from private to public schools, these parents might become a stronger voice for public education financing.

Enrollment Trends

K–12 enrollments grew by about 1.1 percent per year between 2000 and 2008 (see Table 1).[2] The share of students in public schools increased from 89.5 to 90.8 percent. Enrollments in traditional public schools have not kept pace with school-age population growth, however, and the primary growth in public enrollments has been in charter schools. Since 2000, charter enrollments grew by about 17 percent per year.[3]

Private enrollments of K–12 students have also changed dramatically in recent years. The share of private enrollments declined from 10.5 to 9.2 percent between 2000 and 2008 (see Table 1). In 2000, Catho-

lic enrollments were the majority of private enrollments, but these enrollments fell at a rate of about 1.6 percent per year. About 50 percent of Catholic students enrolled in a Catholic elementary school in 1965, as compared with only about 15 percent in 2009.[4] This decline has been attributed to the rising cost of private education and changing demographics of the Catholic population.[5] Enrollments declined in many urban Catholic schools, while many young families moved to suburban areas with few nearby Catholic schools. Hispanic populations grew in many of these urban areas, but only about 3 percent of these Catholic students attended Catholic schools. The financial and enrollment struggles of Catholic schools have been exacerbated by the sex-abuse scandals of the past decade.[6]

The enrollment shares for other religious and nonsectarian schools shifted between 2000 and 2008. Enrollments in other religious schools grew slower than the youth population, so the other religious share fell. In contrast, nonsectarian enrollments grew at 1.7 percent per year, so whilte the nonsec-tarian share has grown, the overall rate remains small at 1.5 percent.

The trends in enrollment patterns varied considerably across schools in urban and non-urban areas. The National Center for Education Studies (NCES) defines a large city as the central city of a metropolitan statistical area (MSA) or a consolidated metropolitan statistical area (CMSA) with a population of 250,000 or more. Table 2 replicates Table 1 for three groups of schools—schools with no students living in large cities (non-urban counties), schools in counties with fewer than 50 percent of students in large cities (some urban counties), and schools in counties where at least half of enrollments are in urban counties (highly urban counties).

In non-urban areas, enrollment growth was about 1 percent per year—essentially the same growth rate as for national enrollments. Charter growth was 16 percent for these schools, but the share of charter enrollments was only about 1.5 percent in 2008. Private enrollments grew slowly for non-urban schools, but private enrollments

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Table 1
Changes in School Type and Enrollments (2000–2008)

	2000	2008	Annual Growth (%)
All Students	47,366,741	52,433,618	1.14
Traditional Public Schools (%)	88.83	88.39	1.08
Charter (%)	0.64	2.39	17.03
Private (%)	10.52	9.23	-0.33
Catholic (%)	5.26	4.09	-1.65
Other Religious (%)	3.81	3.60	0.51
Nonsectarian (%)	1.46	1.54	1.73

Source: Author calculations from Common Core of Data and Private School Universe Survey for 1999–2000 and 2007–2008.

Table 2
Changes in School Type by Urban Enrollment Status (2000–2008)

	2000	2008	Annual Growth (%)
Schools Not in Urban Areas			
All Students	32,264,112	35,329,551	1.01
Traditional Public Schools (%)	90.81	90.41	0.96
Charter (%)	0.42	1.47	16.11
Private (%)	8.77	8.11	0.14
Catholic (%)	4.16	3.52	-0.84
Other Religious (%)	3.40	3.30	0.68
Nonsectarian (%)	1.21	1.29	1.74
Schools with Some Urban Students			
All Students	7,559,539	11,599,604	4.87
Traditional Public Schools (%)	85.36	85.72	4.92
Charter (%)	1.26	4.13	19.66
Private (%)	13.38	10.15	1.70
Catholic (%)	6.94	4.57	0.10
Other Religious (%)	4.41	3.73	2.94
Nonsectarian (%)	2.03	1.86	3.85
Schools in Highly Urban Areas			
All Students	7,543,090	5,504,464	-3.44
Traditional Public Schools (%)	83.87	80.99	-3.81
Charter (%)	0.96	4.56	14.76
Private (%)	15.16	14.46	-3.95
Catholic (%)	8.25	6.73	-5.59
Other Religious (%)	4.97	5.28	-2.79
Nonsectarian (%)	1.95	2.45	-0.97

Source: Author calculations from Common Core of Data and Private School Universe Survey for 1999–2000 and 2007–2008.

were a smaller share of total enrollments than in urban areas.

Enrollments grew rapidly for areas with some urban schools. The growth rate was 4.9 percent per year for these schools—or nearly five times the growth in the national K–12 population. Charter enrollment growth increased at 19.7 percent, while private enrollments grew much more slowly than public enrollments in areas with some

urban schools. Catholic enrollments grew by only 0.1 percent per year over the eight-year period.

Enrollments in highly urban areas have declined sharply in recent years, dropping by 3.8 percent per year in traditional public schools. However, charter enrollments increased by 14.8 percent per year over the same period. Private enrollments declined for all types of schools, led by a 5.6 percent annual decline in Catholic school enrollments.

Table 3 shows that the growth rate for charters remains high, while TPS enrollment has been stagnant or declining.[7] Traditional public school enrollments have fallen in four of the past five years. At the same time, charter enrollments increased by about 12 percent per year. Over the past 10 years, the charter share of public school enrollments rose from 1.0 percent to 3.7 percent.

Charter schools are likely to have their most direct effects on traditional and private schools with students in similar grades. A new charter elementary school is likely to have a more direct effect on enrollments at nearby traditional and private elementary schools, but charter competition may also have indirect effects on other schools as well. For example, the success of an elementary school charter may encourage groups to start charters at the middle or high school level. Similarly, if charters are deemed successful in one community, then parents might promote new charters in their own community.

Literature Review

Over the past decade, numerous studies have examined charter schools. This section reviews the findings of this literature and

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Table 3
Trends in Charter and Traditional Public School Enrollments (2000–2011)

Year	Charters		Traditional Public Schools		Charter Share of Public
	Enrollment	Growth (%)	Enrollment	Growth (%)	
2000	349,714		46,499,272		0.7
2001	458,664	31.2	46,722,569	0.5	1.0
2002	580,029	26.5	47,058,307	0.7	1.2
2003	660,038	13.8	47,418,959	0.8	1.4
2004	789,479	19.6	47,682,107	0.6	1.6
2005	897,643	13.7	47,752,370	0.1	1.8
2006	1,019,620	13.6	48,000,998	0.5	2.1
2007	1,165,200	14.3	47,960,920	-0.1	2.4
2008	1,293,560	11.0	47,666,386	-0.6	2.6
2009	1,445,954	11.8	47,707,540	0.1	2.9
2010	1,627,403	12.5	47,556,003	-0.3	3.3
2011	1,825,233	12.2	47,419,489	-0.3	3.7

Source: National Alliance for Public Charter Schools, http://dashboard.publiccharters.org/dashboard/students/.

then focuses on how charter schools are affecting enrollment patterns in traditional public and private schools.

Student Achievement

The primary focus of charter school research has been on whether charter schools improved the educational achievement of students enrolled in them. A broad range of studies used longitudinal student-level data to examine achievement growth before and after students switched to (or from) charter schools. The studies relied on student fixed effects to adjust for heterogeneity in the characteristics of students switching schools

These studies generally found that charter students were keeping pace with their peers in traditional public schools, but charter schools were generally not having a direct effect of improving student achievement. Hanuskek, Kain, and Rivkin found that students switching to charter schools did worse than if they had remained at a TPS.[8] Most of this negative effect was attributed to new charters, however, and students at established charters (schools in operation for five or more years) kept pace with students at TPSs. Buddin and Zimmer found that California charter students kept pace with their counterparts in traditional schools, but they did not have achievement gains in either reading or math.[9] Bifulco and Ladd found that students in North Carolina had smaller achievement gains than the same students had previously experienced at their TPS.[10] Similarly, Sass found that Florida students switching to charters had smaller learning gains than in their previous traditional public school, but those at established charters did keep pace with traditional students.[11] Finally, Zimmer et al. found that in eight different states, students switching to charters generally did no better than they would have done if they had remained at their traditional public school.[12]

Several other studies have relied on lottery data to examine how charters affect student achievement. When charter schools are oversubscribed, students are frequent-ly admitted based on a random lottery of school applicants. The fixed-effects studies relied on statistical controls to isolate how charters affect achievement, but the lottery studies enabled direct comparisons of the student achievement of lottery winners in charter schools with the achievement of lottery losers in traditional public schools.[13]

The lottery approach has strengths and weaknesses relative to the fixed-effects approach. A critical issue for fixed-effects studies is that charter students may differ in some systematic and unobservable way from students that do not apply to charters. For example, charter parents may be more motivated or resourceful than other parents. These unobserved factors could bias the results from fixed-effects studies. Lottery studies inherently balance all characteristics of lottery winners and losers, so the results reflect the contributions of charters for the group of students who apply to each charter with a lottery. An important limitation of the lottery studies is that they only apply to oversubscribed charter schools. These schools may be higher quality or substantially different than charters that are not oversubscribed. Indeed, they may attract extra students because they are observed by parents to be a much better alternative than traditional, private, and other charter schools.

Lottery studies have strong internal validity in the sense that they provide strong evidence for how charter lottery winners perform relative to lottery losers, but they have limited external validity in the sense that they tell us little about the performance of charters without lotteries or the potential charter performance of students that do not apply to oversubscribed charters. Fixed-effects studies have broader external validity across a wide range of charters, but these studies may be biased by unobserved factors that affect the learning trajectories of charter students.

Several recent lottery studies have found positive effects of charters on student achievement. Hoxby and Rockoff examined the student achievement of elementary char-

ter students at three oversubscribed charter schools.[14] They found that students in kindergarten through third grade did better in charters than other students who lost the charter lottery and attended traditional public schools. In contrast, they found no difference between lottery winners and losers for higher grade levels. Abdulkadiroglu et al. found that Boston charter students did much better in middle and high school than comparable charter applicants that lost the charter lottery and attended a traditional public school.[15] English Language Arts scores were 0.09 to 0.17 standard deviations higher per year in charters than in TPSs and math effects were about two times as large at those in English.[16] Hoxby, Murarka, and Kang found that charter students in New York City had better achievement than students who applied to a charter school and lost the charter lottery.[17] The charter students scored about 0.10 standard deviations higher per year in reading and math than did comparable students in TPSs. Gleason et al. looked at middle school lotteries in several states and found no positive effect for charter attendees.[18]

The Center for Research on Education Outcomes (CREDO) examined charter schools by matching charter school students with a "virtual comparison student" at the feeder TPS for each charter.[19] The students were matched on a variety of student demographic and background characteristics. Using these comparisons, they found that half of New York City charters were outperforming their corresponding TPSs in math and 30 percent were doing better in reading. These results were generally consistent with those of Hoxby, Murarka, and Kang, but the two studies used different research methodologies.[20]

The research evidence is frustrating because it is unclear whether the divergence of results is based on research method (i.e., lottery versus fixed effects on students who switched) or on difference in charter success in different places. While fixed-effects studies have often included evidence from entire states, the lottery methods have been based on modest numbers of oversubscribed charter schools in relatively few cities. CREDO has pioneered the virtual comparison approach, but this method has not been used widely by other researchers.

Angrist, Pathak, and Walters suggested that the different findings may reflect differences in the performance of urban and non-urban charter schools.[21] Using lottery data, they found that Boston charter schools improve middle and high school achievement by about 0.2 and 0.3 standard deviations in English and math, respectively. In contrast, they found that non-urban charter schools in Massachusetts had no effect on student achievement. This finding is reinforced by results from Gleason et al., who found that urban charters improved middle school performance, but that students in non-urban charters did not perform better than counterparts in TPSs.[22]

In summary, the direct effects of charters on student achievement are ambiguous. While several lottery studies show positive results for urban areas, it is unclear whether these results will be replicated in other places or in schools that are not oversubscribed.

Competitive Effects on Traditional Public Schools

If charters succeed in drawing students away from traditional public schools and private schools, then charter presence might indirectly encourage reforms and improvements at existing schools. Several studies have looked at the indirect effects of charters on student achievement at TPSs. Achievement data are rarely available for private schools, so researchers have not examined how charters affect private school achievement.

Two recent studies used school-level data to examine how Michigan charters affected TPSs. Hoxby examined how the enrollment share in a school district affected test scores at TPSs, and found that charter competition had a positive effect on them.[23] Bettinger used distance to the nearest charter as a measure of charter competition in Michigan

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districts.[24] He used an instrumental variable approach to account for the endogeneity of a nearby charter and found that charter presence has little or no effect on test scores in TPSs.

Several studies use longitudinal student-level data to track achievement at TPSs that might be affected by charter competition. Bifulco and Ladd found no evidence that achievement at TPSs were affected by the distance to the nearest charter.[25] Sass found that charter competition was having a small effect on Florida TPSs.[26]

Buddin and Zimmer examined competitive effects using both principal surveys and student-level test score data in California.[27] The survey results showed that traditional school principals felt little pressure from charters to improve performance or modify school practices. The student achievement analysis used an array of alternative measures for school competition, including distance to charter, charter share, and number of nearby charters. The research showed no evidence that charter competition was improving the test score performance of students in nearby TPSs.

Zimmer et al. examined the effects of charter competition on TPS student achievement across jurisdictions in seven different states.[28] Charter effects might vary considerably from place to place, since states have different policies toward charter schools and the quality of both charter and traditional public schools might vary. The study used distance to the nearest charter and the share of charter students within 2.5 miles of a traditional school as measures of competition. In separate analyses of Chicago, Denver, Milwaukee, Philadelphia, San Diego, Ohio, and Texas, they found positive effects of charter school competition only in Texas.

Winters analyzed charter competition in New York City middle schools.[29] Competition was measured as the share of students lost by each TPS to charters in the previous year. He found small improvements in reading and math for TPSs faced with charter competition.

Current research finds little evidence that charters are having a competitive effect on student achievement in TPSs. Competitive effects may be mitigated by the small market share of charters in most markets. In addition, charters may have little consequence for TPSs in areas with growing enrollments. Anecdotal evidence suggests that the current budget pressure may force districts to reform TPSs to reduce the competition from charter schools.

In addition to the charter literature, several studies have examined how school vouchers have affected public school performance. The studies have focused primarily on private school voucher programs in Milwaukee and Florida. Milwaukee's voucher program was substantially expanded in 1998, when the courts allowed vouchers to be used for religious schools. Hoxby, Carnoy et al., as well as Chakrabarti, examined whether greater competition from the expanded-choice program increased student achievement at TPSs.[30] The researchers found improved achievement at TPSs, and the gains were larger at schools with more low-income students eligible for the voucher program. Barrow and Rouse argued that this evidence should be interpreted cautiously because resources may have changed in unmeasured ways between treated and control schools.[31]

Florida's Opportunity Scholarship program provided vouchers to students who attend low-performing schools as determined by the state's school accountability system. If TPSs are low-performing over several years, then their students become voucher-eligible under the Opportunity Scholarship program. Several authors, including Figlio and Rouse, West and Peterson, Chaing, and Rouse et al., have examined whether the threat of a low-performing school becoming voucher-eligible was an incentive for the school to improve student achievement.[32] All of the studies found that improved student achievement at schools followed a school's receipt of a failing score. While these findings are interesting, Barrow and Rouse argued that the achievement gains may re-

flect a "stigma effect" of a failing grade and not necessarily a competitive response to voucher eligibility.[33]

Distribution by Race/Ethnicity, Aptitude, and Mobility

A concern about charters is that they might disproportionately attract high-aptitude or white students. If so, this might increase the isolation of at-risk minority students in TPSs or reduce the numbers of high-aptitude students at those schools.

Booker, Zimmer, and Buddin examined this issue using longitudinal data from California and Texas.[34] They focused on specific students who switched to charters from a TPS and compared the mix of students at the charter with that at the previous TPS. Black students in both states switched to charters with higher concentrations of blacks than in their previous TPS. White students switched to charters with higher concentrations of white students in Texas, but white students switched to more ethnically diverse schools in California. In both states, Hispanic charter students switched to schools with a smaller proportion of Hispanics than at their previous TPS. Lower-ability students (as measured by test scores) were more likely to switch to charters from TPSs in both California and Texas.

Bilfulco and Ladd found that charters were increasing the racial isolation of black and white students in North Carolina. Students with college educated parents were more likely to switch to charters than other students.[35] Black students switched to charters with lower average scores than at their previous schools, but white students switched to charters with higher average scores than at their TPS.

Zimmer et al. found small effects of charters on the racial/ethnic mix of schools in five urban districts and two states.[36] They found that charter schools also had little effect on the ability distribution of students at nearby TPSs. Students switching to charters were generally at or slightly above the average ability at their previous TPS.

Two recent studies have looked at the mobility of charter students. Student mobility often has detrimental effects on student achievement as students adjust to a new school. In addition, school effectiveness is difficult to assess when students are switching into and out of particular schools. Finch et al. examined mobility of middle school students at Indiana charter schools.[37] They found that low-income, minority, and high-ability students were more likely to leave charters than were other students. Nichols-Barrer et al. looked at the mobility of students in the network of Knowledge Is Power Program charter schools, which disproportionately attract black, Hispanic, and low-income students from nearby TPSs.[38] The study found that these disadvantaged groups of students had higher mobility rates than other charter students, but these groups also had higher mobility in nearby TPSs. Both of these studies focused on relatively small subsets of charter students, so more research is needed to understand what factors affect the mobility of charter students relative to the broader population of TPS students.

Charter Funding Levels

Several studies have suggested that charters are underfunded relative to TPSs. Fordham found that charters received about 22 percent less funding per pupil relative to TPSs in their respective school districts.[39] Batdoff, Maloney, and May found that the funding gap was about 19 percent.[40] Both studies found that the funding gap was larger for urban districts than for other types of districts.

Miron and Urschel found a charter revenue gap of about 30 percent.[41] They argued that much of the spending differential was explained by higher spending in TPSs for special education, student support services, transportation, and food services. In addition, much of the funding gap is offset by private contributions to charter schools. The funding formulas are complex for both districts and charters, however, so the true differentials are difficult to identify.

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Hanushek suggested that funding differences from school to school are largely unrelated to student achievement.[42] His analysis was based on an analysis of TPSs, but the results may also apply to charter schools. Coulson found that private contributions to California charters varied widely from school to school, and there was no correlation between student performance and the level of private grant funding to charter schools.[43]

Enrollment Effects

A few studies have examined how a charter-school option affects enrollment patterns. Glomm, Harris, and Lo found that charters were more common in areas that were ethnically diverse, had more private schools, and had large amounts of special education expenditures.[44] Booker, Zimmer, and Buddin argued that lower-performing districts have more charters, and those schools may have satisfied the demands of groups that were not met by traditional schools.[45] Stoddard and Corcoran found that charters were more common in districts with population heterogeneity and low scores on standardized tests.[46]

Two recent studies, both focused on Michigan, examined how charters affect enrollment patterns across public and private schools. Toma, Zimmer, and Jones showed that 17 percent of charter school students were drawn from private schools.[47] Their analysis was based on county-level changes in enrollments in private and public schools during the 1994–95 through 1998–99 school years.

In a similar study, Chakrabarti and Roy examined the effects of charters on district- and school-level enrollment in private schools.[48] They found that about 13 percent of charter students were drawn from private schools, and that most of the negative effect on private schools stemmed from declines in enrollments at religious private schools (especially Catholic schools) as compared with nonsectarian private schools. The analysis was based on school years 1989–90 through 2001–02.[49]

The findings from these two studies have important implications for public education. If charters attract students from private schools or dissuade public students from fleeing to the private sector, then public sector schools might garner broader taxpayer support. In addition, charters may help districts retain more affluent students that improve the learning environment in public schools. These gains may come at a significant cost, however, as shifts from private to public enrollment will significantly increase public school costs at a time when many districts and states are struggling to meet their financial obligations.

The present study expands upon these earlier efforts and addresses several of their limitations, including:

- **National focus.** As noted above, the previous studies of charter-school effects on enrollment patterns used data from Michigan, which may provide a misleading indication of patterns in other states or large metropolitan areas. Michigan has faced substantial economic problems over the past couple of decades, and the Michigan charter experience in times of stagnant or declining student enrollments may differ dramatically from that of other areas with positive growth, such as California, Florida, or Texas. The present study is thus national in scope.
- **Recent charter growth.** Charter schools grew in enrollment and numbers over the last decade, but both Michigan studies missed this recent growth. This analysis will examine enrollment trends over the past eight years and provide insights into how charters have changed private enrollment trends in different states and settings (e.g., large growth, school locale).
- **Charter environment.** A multistate study is needed to assess how differences in charter policies and practices in different jurisdictions affect competition among private, charter, and

Charter school gains may come at a significant cost as shifts from private to public enrollment will significantly increase public school costs.

traditional public schools. State policies on charter authorization, funding, caps, and teacher collective-bargaining agreements are likely to affect the availability of charter alternatives and the range of choices available for students. This study will examine differences in enrollment patterns in states with differing charter rules and measure whether policy differences are related to enrollment patterns.[50]

- **Urban schools.** In many large metropolitan areas, charter schools have become a potential option for students to escape struggling urban school districts. A portion of this analysis focuses on charter competition in large urban districts (i.e., districts with large shares of students located in large cites) and examines whether charters are drawing more or fewer students from private schools in these settings than in the broader range of mid-sized city, suburban, and rural districts.

Data and Research Approach

Data Issues

This research relies on information from the Private School Universe Survey (PSS) and the Common Core of Data (CCD) maintained by the National Center for Education Studies. The PSS has been collected every two years since school year 1989–90. The CCD has been collected annually during that period, but charter school information was not available until the late 1990s. This analysis merges data from the two files and looks at enrollment patterns across traditional and charter public schools as well as Catholic, other religious, and nonsectarian private schools.

The study estimates a statistical model at a national level, with alternative models for groups of large urban areas and subsets of states. A key issue is identifying how charter availability affects the choices of parents be-

tween alternative types of schools. A nearby charter alternative may create direct competitive pressure on a private or traditional public school because parents have the option of switching to the charter. This pressure may be mitigated, however, if traditional public or private enrollments are rising, so these existing schools face no decline in enrollment or financial support from charter expansion.

The PSS does not have information on the relevant public school district of private schools. Location information is imputed from the district of the nearest public school to each private school. This imputation assumes that private schools primarily draw their students from their nearby public schools.[51] While this assumption may not hold in some urban areas, most private school students would attend a public school in the nearby district area in the absence of private alternatives.

School district definition and size varies dramatically from state to state. In some states, such as Florida, districts encompass entire counties, while in states, such as Texas, counties include numerous districts. District-level analysis of charter competition is likely to be misleading in large districts because many students in these districts are not near a charter school.

The analysis focuses on district-level enrollment patterns. Preliminary analysis examined the model at the county level. An advantage of the county-level analysis relative to finer district analysis is that information on population demographics, wealth, and employment patterns are available at the county level for different years. A disadvantage of the county-level approach is that charters are not evenly dispersed within counties, so some students within the county would have much better charter access than others. Ultimately, the county-level results were similar to the district-level results that are reported here.

In recent years, the Center for Education Reform (CER) has ranked the strength of state charter laws. CER is a strong advo-

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cate for charter schools and believes that states should give organizations substantial latitude to establish and manage charter schools. States are given high grades if there are few restrictions on starting a charter school, the number of charter schools is uncapped in the state, charters are granted by multiple entities (i.e., not just school districts), and charters receive comparable per student funding to traditional public schools. The CER has given the District of Columbia, Minnesota, and California the highest grades (A rating) for the past several years. In addition, about nine other states have received high marks (B ratings) for their charter legislation. While CER rates states each year, the ratings have been quite similar over the past decade. Over the period of our analysis, from 2000 through 2008, only three new states passed charter legislation (Iowa, Maryland, and Tennessee), and each was given a low rating.

The patterns of charter growth and competition across states with strong and weak charter laws, as defined by CER, are examined. In principal, greater flexibility and support will improve competition in local school markets. It is less clear, however, whether better ratings will translate into more competition for private schools as well as for TPSs. In addition, Witte, Shober, and Manna showed that states with more flexible rules for charters have stricter charter accountability rules than in those states with less flexibility.[52] Strict accountability could limit competition from charters, especially if accountability is pushed by political opponents of charters.

CREDO examined whether state charter policies were related to charter performance.[53] They examined state caps on the numbers of charters, the availability of multiple charter authorizers, and the appeals process to review authorizers' decisions. They found some evidence that unlimited caps and review had a small positive effect on charter performance. States with multiple authorizers had lower overall charter performance, which the authors interpreted

as a possible effect of weak charter applications being shopped between alternative authorizers.

Some cities and states have special programs that offset some costs for attending private schools.[54] The cities of Cleveland, Milwaukee, and the District of Columbia, as well as the state of Ohio, have voucher programs. The Cleveland program gives priority to students living below 200 percent of the federal poverty line. The Milwaukee program is also means-tested and gives priority to students below 175 percent of the poverty line. The District of Columbia program is restricted to students who quality for the free or reduced-price school lunch program, and priority is given to students in low-performing schools (as defined by the No Child Left Behind Act). Ohio has a voucher program for students assigned to a low-performing public school.

Voucher programs have scholarship caps, so the programs may not offset all private school costs. The average national tuition costs in 2008 were $3,236, $4,063, and $10,992 for Catholic, other religious, and nonsectarian private schools, respectively. The caps are about $3,000 for Cleveland, $4,500 for Ohio, $6,400 for Milwaukee, and $7,500 for the District of Columbia.

Table 4 shows the size of each voucher program. The Cleveland and Milwaukee programs more than doubled in size between 2000 and 2008. The District of Columbia program is newer, and voucher enrollments were a much small share of total enrollments. The Ohio failing-schools voucher was started in 2006–07, and scholarships were awarded to fewer than half a percent of students in the state.

Arizona, Florida, Iowa, and Pennsylvania have tax credit programs for private tuition. Arizona has both an individual and corporate tax credit for private-school tuition. The individual program is not means-tested, but the credit is capped at $1,000 for a married couple and $500 for a single parent. Eligibility for the corporate credit is means-tested and scholarship amounts are

Table 4
Private School Voucher Programs

Year	Total Enrollment	Scholarships	Share Total
Cleveland			
2000	85,841	3,406	0.04
2002	88,507	4,523	0.05
2004	84,169	5,887	0.07
2006	76,175	5,813	0.08
2008	66,691	6,273	0.09
Milwaukee			
2000	108,609	7,596	0.07
2002	116,751	10,391	0.09
2004	113,728	12,788	0.11
2006	108,746	15,274	0.14
2008	104,921	18,550	0.18
District of Columbia			
2000	65,828	NA	NA
2002	59,866	NA	NA
2004	67,482	NA	NA
2006	64,900	1,712	0.03
2008	63,849	1,933	0.03
Ohio			
2000	1,729,852	NA	NA
2002	1,828,807	NA	NA
2004	1,813,035	NA	NA
2006	1,806,526	NA	NA
2008	1,786,445	7,114	0.00

Source: Andrew Campanella, Malcom Glenn, and Lauren Perry, *Hope for America's Children: School Choice Yearbook 2010–11* (Washington: Alliance for School Choice, 2011).

capped. Florida is a means-tested corporate scholarship tax credit. Iowa started an individual and corporate scholarship tax credit in 2006–07. Eligibility is restricted to families with income less than 300 percent of the federal poverty guideline. Pennsylvania has a corporate scholarship tax credit for families with incomes of up to $60,000 (plus an additional $13,000 per dependent).

Table 5 shows that the tax credit programs covered about 1–3 percent of total enrollments in each state. The size of the pro-

grams did not vary much from year to year in any of the four states examined.

Finally, the analysis uses information on county population and economic conditions over the years of our data. This county-level information is drawn from the American Community Survey, as well as the Census and Bureau of Labor Statistics databases. The information is useful for identifying underlying local conditions that might be influencing enrollments. Annual information on these types of factors, by school

Table 5
Private School Tax-Credit Programs

Year	Total Enrollment	Participants	Share Total
Arizona			
2000	775,313	15,081	0.02
2002	907,009	19,559	0.02
2004	996,731	20,134	0.02
2006	1,083,951	22,529	0.02
2008	1,070,956	30,268	0.03
Florida			
2000	2,181,242	NA	NA
2002	2,430,497	NA	NA
2004	2,524,978	11,550	0.00
2006	2,615,633	15,123	0.01
2008	2,605,542	21,493	0.01
Iowa			
2000	449,837	NA	NA
2002	474,835	NA	NA
2004	470,689	NA	NA
2006	473,862	NA	NA
2008	470,662	7,527	0.02
Pennsylvania			
2000	1,638,604	NA	NA
2002	1,792,635	17,350	0.01
2004	1,795,182	25,875	0.01
2006	1,801,074	29,638	0.02
2008	1,775,105	43,764	0.02

Source: Andrew Campanella, Malcom Glenn, and Lauren Perry, *Hope for America's Children: School Choice Yearbook 2010–11* (Washington: Alliance for School Choice, 2011).

district and year, would help isolate the contributions of these factors to enrollment patterns, but this type of information is not available at the district level.

Separate analysis is conducted for elementary, middle, and high school students. Some differences in how charter competition affects elementary, middle schools, and high schools are likely. For example, charter high schools might attract students from more distant locations than charter elementary schools because older students are able to drive or use public transportation. Charter high schools may have more specialized curricula that attract students with special interests in science or math. Similarly, charters might draw more private-school students in urban locations than in other areas.

Methods

The formal district-level model is

$$Private_{sdt} = \alpha + \beta Charter_{sdt} + \gamma X_{sct} + \eta_s + \mu_{sd} + \varepsilon_{sdt}, \text{ Eq. 1}$$

where Private is the percent of private enrollment in state s and district d at time t; Charter is the percent of charter enrollment in the district; X is a set of county-level (c) control variables for the socioeconomic, demographic, and economic conditions in the district that vary over time[55]; η is a state-specific effect that is constant over time; μ is a time-invariant effect for each district; and ε is random noise. The state and district effects in the model control for unobserved factors that are likely to affect enrollment patterns within each state over time and to affect enrollment patterns in individual districts within each state.

This statistical model differs in several respects from that of Toma, Zimmer, and Jones and Chakrabarti and Roy. Toma, Zimmer, and Jones used county-level enrollments instead of district-level enrollments. An advantage of the district-level analysis is that districts are generally much smaller geographic areas and better define the educational options available to parents in most

areas. While states and the federal government have some oversight responsibilities, the districts have primary responsibilities for day-to-day decisions. Chakrabarti and Roy used district-level enrollments.[56, 57]

The previous studies controlled for county (or district) fixed effects instead of the random state and district effects, as shown in Equation 1. Some researchers (often economists) prefer the fixed-effects approach because it implicitly controls for unobserved factors that are time invariant. Others researchers argue that fixed effects may "wash out" some of the treatment effect. In addition, the random-effects model is more efficient than the fixed-effects approach.[58] Fixed-effects estimates were also computed and the results were similar to those reported here.[59]

Various versions of the statistical model are estimated for different populations. The earlier studies relied on Michigan data to estimate a single charter effect. This analysis includes charter effects for different grade levels, different location types, and different types of charter laws. This broader national approach provides a more comprehensive indication of how charter schools are affecting the patterns of K–12 enrollments.

The analysis is based on biannual school-level data for 1999–2000 school year through the 2007–2008 school year (for convenience, each year is referenced by the spring calendar year). The CCD first reported charter enrollment in 1999, but the PSS is only conducted biannually. The analysis was limited to data from the 2000, 2002, 2004, 2006, and 2008 CCD and PSS, since these were the only years with information on both charter and private-school enrollments.

Variable Descriptions

The prominence of charter and private schools varies considerably from state to state.[60] Among 40 states with a charter law in 2008, 10 states had charter enrollments of less than 1 percent and 5 states had more than 6 percent of students in charters. States with high urban populations have high pri-

Separate analysis is conducted for elementary, middle, and high school students.

Table 6
School Types by Urban Status at Elementary, Middle, and High School Grade Levels (2000–2008)

	Elementary		Middle		High	
	Not Urban	**Urban**	**Not Urban**	**Urban**	**Not Urban**	**Urban**
Charter enrollment share	0.0132	0.0319	0.0117	0.0328	0.0105	0.0356
No charter in district	0.756	0.269	0.764	0.292	0.79	0.285
Private enrollment share	0.094	0.129	0.0801	0.124	0.0657	0.114
Catholic enrollment share	0.0435	0.0586	0.038	0.0626	0.0324	0.0635
Other religious enrollment share	0.0377	0.0488	0.0315	0.0427	0.0219	0.0328
Nonsectarian enrollment share	0.0128	0.0221	0.0106	0.0187	0.0114	0.0177

Source: Author calculations from Common Core of Data and Private School Universe Survey for 1999–2000 through 2007–2008.
Note: Variable means and standard deviations are shown in more detail in Appendix Tables B-1, C-1, and D-1.

About 3 percent of students are enrolled in charter schools in urban areas, as compared with only about 1 percent of students outside of urban areas.

vate and charter enrollment shares. The correlation between urban and private shares is 0.18, but the correlation between urban and charter shares is 0.71.

Table 6 shows the patterns of school enrollment types at different grade levels and how those patterns vary the share of students in urban (large city) schools. The calculations are based on states with some charters. About 3 percent of students are enrolled in charter schools in urban areas, as compared with only about 1 percent of students outside of urban areas. About a third of students attend a school district that has at least some schools in an urban area. Over 70 percent of students in non-urban districts have no charter option, as compared with about 28 percent of urban students that have no charters in their school district. The average charter numbers in Table 6 are similar across grade levels.

Private-school enrollments are about 4 percentage points higher in urban areas than in non-urban areas. Private enrollments are highest in the elementary grades and fall off in middle and high school grades. The enrollment patterns across Catholic, other religious, and nonsectarian schools are similar to those for all private schools; that is, each type of school is more common in urban than non-urban areas and each type is more common at lower grade levels.

Table 7 shows the patterns of several key demographic and economic variables that are used in the statistical model. The variable means differ little across grade levels, since the variables reflect the characteristics of the district's demographics. About one-fifth of students in urban school districts live in families with incomes below the poverty line. The poverty rate is about 3 percentage points lower in non-urban districts, and median incomes are lower in urban areas than in non-urban areas. Urban districts face extra challenges to educate at-risk students from low-income families. These districts may also have a reduced tax base to fund programs for at-risk students, especially if federal and

state categorical funding for these programs is insufficient. Population growth is higher in urban than in non-urban districts, and these higher growth rates may create a strain on facilities and budgets if district revenues do not keep pace with enrollment growth.

The demographic composition of urban districts is dramatically different than that of non-urban districts. The black population share is about 7 percentage points higher in urban districts than in non-urban districts. The Asian/Pacific Islander and Hispanic population shares are about twice as large in urban districts as in non-urban districts. These three race/ethnic groups constitute about 60 percent of the population in urban areas, as compared with only 30 percent in non-urban areas.

The broad patterns in Tables 6 and 7 are consistent with the evidence that both charters and private schools are more common in areas that are ethnically diverse and with more at-risk students.[61] The urban districts have a disproportionate share of at-risk mi-

nority and low-income students, and they have much larger private and charter sectors that provide choice alternatives for district-managed TPSs.

Several other variables are also included in the regression specifications. The unemployment rate is another indication of economic conditions in the districts. Districts with high population density may include more private schools, since these schools may have sufficient nearby population to support schools with a particular religious or academic orientation. The statistical models include controls for the shares of the district population that are in large cities, mid-sized cities, the fringe of large cities, the fringe of mid-sized cities, and other areas. Private schools may be more common in some of these areas than in others, reflecting the interests of parents in these types of communities as well as the opportunities for schools to provide learning opportunities to specific subgroups of students. In addition to other factors, the models include indica-

Both charters and private schools are more common in areas that are ethnically diverse and with more at-risk students.

Table 7
Demographic and Wealth by Urban Status at Elementary, Middle, and High School Grade Levels (2000–2008)

	Elementary		Middle		High	
	Not Urban	Urban	Not Urban	Urban	Not Urban	Urban
Poverty rate for children 0 to 17	0.17	0.20	0.17	0.20	0.16	0.20
Median income ($1000)	48.53	47.79	48.68	48.07	49.06	47.96
Population growth rate (2-year)	0.02	0.03	0.02	0.03	0.02	0.03
Black population share	0.14	0.21	0.14	0.21	0.13	0.20
Asian/Pacific Islander share	0.03	0.07	0.03	0.07	0.03	0.07
Hispanic share	0.17	0.32	0.17	0.31	0.17	0.33

Source: Author calculations from Common Core of Data and Private School Universe Survey for 1999–2000 through 2007–2008.
Note: Variable means and standard deviations are shown in more detail in Appendix Tables B-1, C-1, and D-1.

tor variables for each year of the data. These variables adjust for broad trends in private-school enrollment rates over the last decade that are not captured by other variables in the models.

The model also included state and district random effects. These variables are controls for persistent factors that may affect the education marketplace in different areas. For example, some states may provide extra support for English-language learners in public schools, and this support might keep those students in public-sector schools. Similarly, some communities may participate more actively in public schools than others (perhaps towns with universities), and this effort may shift the mix of public and private enrollments in the area. The random effect adjusts for many of these nuances that may affect enrollment patterns.

CER rates the charter laws in 12 states as "strong" (e.g., state with ratings of A or B). About 64 percent of charter students are enrolled in these states. Most of these states have had charter legislation for many years, so the growth in charters is lower in strong states than in the states with weaker laws.

Some authors have questioned the merits of the CER rating. Witte, Shober, and Manna argued that CER places too much emphasis on the flexibility of charter regulations (e.g., low barriers to entry, non-binding limits to number of charters, and fiscal autonomy) as compared with the accountability provisions of those regulations.[62] Chi and Welner argued that CER ignores important charter goals like curriculum innovation and serving at-risk students.[63] Various alternatives to the CER rating are proposed, but the merits of these ratings are difficult to test empirically because many factors affect statewide patterns and trends in enrollment patterns. With relatively few states—and little variation in state policies from year to year—it is inherently difficult to identify exactly how charter laws translate into charter "success" and the growth in charter enrollments.

Some regression specifications included the shares of enrollments covered by private

school vouchers and tax credits as shown in Tables 4 and 5. The results showed little evidence that vouchers were affecting private enrollments, but the results were unreliable since vouchers are only offered in three cities and a small new program in Ohio. Tax credits also had little effect on private enrollment trends. These results were also suspect because the credits were only available in a few states and the number of scholarships varied little from year to year in any of the states. Vouchers and tax credits are important components of school choice, but student-level data on enrollments are needed to disentangle how these programs affect family schooling choices.[64]

Results

This section reports the results of various specifications of the district-level models; the primary goal is to identify what proportion of charter students are drawn from private-school alternatives, given other factors affecting the composition of public and private schools. Multivariate models are used to disentangle the effects of enrollment growth, student demographics, economic conditions, urban environment, charter laws, and other factors on the composition of traditional and private schools. The analysis focuses on how changes in charter enrollment percentage in a district affect the percentage of students enrolled in traditional public and private schools. The estimates provide an indication of whether charters are exerting competitive pressure on private schools or whether charter students are predominantly drawn from public schools. All models control for local demographic and economic factors that are likely to affect enrollments.

Four main model specifications are estimated. Each version includes controls for demographic and economic factors in each district in each year. An overall model specification includes controls for the shares of students in cities, suburban, and rural areas. Alternative versions examine whether char-

Vouchers and tax credits are important components of school choice, but student-level data on enrollments are needed to disentangle how these programs affect family schooling choices.

ter competition differs with the urbanization of the district.

The four models are:

1. **Overall.** This version looks at enrollment patterns for all states with a charter law.
2. **Non-Urban Areas.** The sample is restricted to districts with no students in urban areas.
3. **Some Urban Areas.** The sample is restricted to districts with at least some students in urban areas, but with fewer than 50 percent of the students living in a large city.
4. **Highly Urban.** This version focuses on the subset of urban districts with at least 50 percent of students living in a large city.

In addition to the main models, additional models examined whether charter effects were greater in states with CER ratings of A or B. Finally, the models were run separately, where the percentage of private enrollment was replaced with the percentage of Catholic, other religious, and nonsectarian schools in each district. These final estimates indicate whether charters are disproportionately drawing private students from the various types of private schools.

While the detailed specifications are interesting, the sample size is reduced substantially for finer, more-detailed specifications. For example, most districts do not include major metropolitan areas, and these urban areas are concentrated in a subset of states. With the smaller sample sizes, our results may be sensitive to anomalies in the data or special circumstances in a relatively few states or districts.

The models are estimated separately for elementary (grades K through 5), middle (grades 6 through 8), and high schools (grades 9 through 12). The availability of private or charter school seats at one grade level does not create direct competition for TPSs serving other grade levels. Some schools have grade levels outside these standard group-

ings. For example, many parish-level Catholic schools have students in grades K through 8, and some senior high schools have students in grades 10 through 12. The PSS and CCD have student enrollment counts by grade for each school, so these counts were aggregated to the elementary, middle, and high school classifications. In the overwhelming majority of cases, specific schools taught students only at the elementary, middle, or high school grade levels.

The discussion in the remainder of this section primarily focuses on competition between traditional, charter, and private schools. The detailed regression specifications are given in Appendices B, C, and D. Appendix E shows enrollments and the numbers of schools by school type at each grade level.

Elementary School Students

Elementary school charters are drawing students from private schools, and the magnitude of private-school competition is particularly strong in urban areas. Table 8 provides a summary of charter school effects on private enrollments, conditional on other factors in the statistical model (e.g., district demographic and economic conditions), as well as various unmeasured state- and district-level factors (e.g., the state and district random effects). The first line of the table shows that a 1 percent increase in charter enrollment is associated with a 0.08 percent decline in private enrollments. The charter effect is much stronger than this in highly urban schools, however. About 32 percent of charter students are drawn from private schools in districts with large concentrations of urban students. About 7 percent of charter students are drawn from private schools in non-urban districts. The charter effect is about 9 percent for districts with some urban students—higher than for non-urban districts and much lower than for highly urban districts. Private elementary-school enrollments are largest in the most urban areas. Private enrollments are 9.4 percent in non-urban districts, 11.8 percent in

Elementary school charters are drawing students from private schools, and the magnitude of private-school competition is particularly strong in urban areas.

Table 8
Effects of Elementary School Charter Enrollments on Enrollments at Other Types of Schools (2000–2008)

Outcome	All	Not Urban	Some Urban	Highly Urban
Private	-0.0836*	-0.0725*	-0.0856*	-0.3153*
Private & weak law	-0.0574*	-0.0661*	-0.0090	-0.0717
Private & strong law	-0.0927*	-0.0748*	-0.1054*	-0.3443*
Statistically different	No	No	No	No
Catholic	-0.0307*	-0.0255*	-0.0726*	-0.0971*
Other Religious	-0.0367*	-0.0380*	-0.0016	-0.0601
Nonsectarian	-0.0157*	-0.0091*	-0.0157*	-0.1798*

Source: Author calculations from Common Core of Data and Private School Universe Survey for 1999–2000 through 2007–2008.
Note: An asterisk indicates that the coefficient is significantly different from zero at the 0.05 level.

districts with some urban students, and 13.7 in mostly urban districts. Other things being equal, charter competition with private schools is greatest in the districts with the highest concentration of private schools.

The next set of results in Table 8 shows how the charter effect on private schools varies with the strength of state charter laws. In states with strong CER ratings (A or B ratings), the percentages of students drawn from private schools are consistently larger than in other states (especially for urban districts). For example, in highly urban districts, about 34 percent of charter students in states with strong charter laws are drawn from private schools, as compared with about 7 percent of students in other states.

While strong laws are associated with higher charter effects on private enrollments, these differences are not statistically different from those for weak states. The differences are measured imprecisely because most charter students reside in states with CER strong ratings.

The bottom third of Table 8 shows how charter competition in a district affects

the enrollment of different types of private schools. The overall result indicates that charters reduce Catholic, other religious, and nonsectarian enrollments by 3, 4, and 2 percent, respectively. In highly urban schools, charters draw about 10 percent of students from Catholic schools and another 18 percent from nonsectarian schools.

Middle School Students

The middle school results in Table 9 follow the same general pattern as those for elementary school. About 11 percent of all charter students are drawn from private schools. This charter effect is much larger in urban schools. The middle school charter effect is 27 percent for districts with some urban students and 23 percent for districts with large concentrations of urban students. Private middle school enrollments are largest in the most urban areas. Private middle school enrollments are 8.0 in non-urban districts, 10.9 in districts with some urban students, and 13.6 in mostly urban districts. Other things being equal, charter competition with private schools is greater in the

The middle school charter effect is 27 percent for districts with some urban students and 23 percent for districts with large concentrations of urban students.

urban districts with a larger share of private enrollment.

Charters have a larger effect on middle school private enrollments in states with strong charter laws than in other states. The effect is about 7 percentage points higher overall (13 percent in strong-law states versus 6 percent in weak-law states). Among districts with some urban students, 29 percent of charter students are drawn in strong charter states as compared with only 15 percent in other states. Some of these results are not statistically different from zero.

The middle school results indicate that the largest share of private school students are drawn from religious private schools. Overall, charters draw about 4 percent of their students from Catholic schools and another 6 percent from other religious schools. Among districts with some urban students, the charter effect is about 27 percent for Catholic schools, 12 percent for other religious schools, and 13 percent for nonsectarian schools.

High School Students

Charter high schools draw comparable proportions of students from private schools as elementary and middle school charters, but the high school effect varies less with urbanicity (see Table 10). About 12 percent of all charter high school students are drawn from private schools. The charter effect is 14 percent for high schools with some urban students, as compared with 11 percent for non-urban high schools. In highly urban districts, about 15 percent of charter students are drawn from private schools. Private high school enrollments are largest in the most urban areas. Private high school enrollments are 6.5 percent in non-urban districts, 8.2 percent in districts with some urban students, and 13.5 percent in mostly urban districts. Other things being equal, charter competition with private schools is greatest in the districts with the highest concentration of private schools, but this difference is smaller for high schools than for elementary or middle schools.

Why does the charter effect vary less with urbanicity for high schools than for elementary or middle schools? The reasons are unclear from our analysis. Charter high schools often have more specialized curricula than charter schools aimed at lower grades. For

> **The middle school results indicate that the largest share of private school students are drawn from religious private schools.**

Table 9
Effects of Middle School Charter Enrollments on Enrollments at Other Types of Schools (2000–2008)

Outcome	All	Not Urban	Some Urban	Highly Urban
Private	-0.1113*	-0.0868*	-0.2695*	-0.2334*
Private & weak law	-0.0613*	-0.0691*	-0.1504	-0.1120
Private & strong law	-0.1269*	-0.0933*	-0.2861*	-0.2484*
Statistically different	Yes	No	No	No
Catholic	-0.0352*	-0.0282*	-0.2697*	-0.0204
Other Religious	-0.0627*	-0.0388*	-0.1200*	-0.1750*
Nonsectarian	-0.0062	-0.0141*	0.1315*	-0.0326

Source: Author calculations from Common Core of Data and Private School Universe Survey for 1999–2000 through 2007–2008.
Note: An asterisk indicates that the coefficient is significantly different from zero at the 0.05 level.

Table 10
Effects of High School Charter Enrollments on Enrollments at Other Types of Schools (2000–2008)

Outcome	All	Not Urban	Some Urban	Highly Urban
Private	-0.1175*	-0.1112*	-0.1425*	-0.1545*
Private & weak law	-0.1209*	-0.1148*	-0.1784*	-0.1537*
Private & strong law	-0.1152*	0.1091*	-0.0938	-0.1553*
Statistically different	No	No	No	No
Catholic	-0.0568*	-0.0556*	-0.0766	-0.0368
Other Religious	-0.0242*	-0.0229*	-0.0427	-0.0096
Nonsectarian	-0.0276*	-0.0253*	-0.0219	-0.0214

Source: Author calculations from Common Core of Data and Private School Universe Survey for 1999–2000 through 2007–2008.
Note: An asterisk indicates that the coefficient is significantly different from zero at the 0.05 level.

example, many charter high schools focus on a college-ready curriculum, math/science emphasis, or training in the arts. These unique offerings may attract students that are unavailable in both urban and non-urban districts.

Charter effects differ little between states with different CER ratings. In some cases, charters are drawing more students from private schools in states with weak laws, rather than strong ones, but the effects are not statistically different for any of the four model specifications.

The high school evidence provides limited insight into how charters are affecting various types of private schools. Overall, charters draw about 6, 2, and 3 percent of their students from Catholic, other religious, and nonsectarian schools, respectively. The estimated effects for each private school type are insignificantly different from zero for both groups of urban schools. The insignificance of the charter effects for specific charter type reflects both the small magnitude of urban effects for high school students as well as a small number of charter high schools.

Charter effects differ little between states with different Center for Education Reform ratings.

Other Factors in Models

The effects of the control variables in the models are largely as expected. Private enrollments are higher in districts with higher rates of children in poverty, with more race/ethnic diversity, and with more population in large and mid-sized cities.

The random effects indicate that private enrollments vary much more across districts than across states. After controlling for important demographic and economic conditions in districts, private enrollment rates vary substantially across districts.

Projected Charter Enrollments

How are charters affecting the mix of public and private enrollments? In 2011 about 54 million students were enrolled in K–12. About 9 percent of these students were enrolled in private schools (4.4 million students). Another 3 percent were enrolled in charters (about 1.8 million students), but charter enrollments were spread across 40 states and the District of Columbia. About 10 percent of charter students were drawn from private schools.[65] These estimates sug-

gest that about 183,000 charter students were drawn from private schools in 2011. If these students had attended private schools instead of charters, the private enrollment would increase by about 4 percent and the private enrollment share would rise by about 0.3 percentage points.

The enrollment shifts in highly urban districts are much larger. About 24 percent of charter students across all grades are drawn from private schools (about 131,000 students). About 80 percent of students in these districts are in TPSs, with 14 and 6 percent of enrollments in private and charter schools, respectively. If these 131,000 charter students had remained in private schools, the private school enrollments in highly urban districts would rise by 12 percent and the share of private sector enrollments in these districts would be 17 percent, as compared with the current level of 14 percent.

In the past decade, K–12 enrollments grew by about 1 percent per year, while charter enrollments grew by 12 percent per year. If these trends continue, the charter share of total public enrollments will rise from 3.7 percent in 2011 to 6.2 percent in 2016.[66] This level of charter growth would create considerable competitive pressure on both traditional and private schools. The evidence from this study indicates that private schools in highly urban districts are particularly susceptible to charter competition. This pressure may spur both TPS and private-school reforms to attract new students or to maintain their current enrollment levels. If other schools implement similar programs and practices as successful charters (or at least charters that are successful in attracting students), then the trajectory of charter growth is likely to decline from the current trends.

Conclusion

The recent growth in charter school enrollments has drawn students away from both traditional public and private schools.

Private school enrollments are much more sensitive to charters in urban districts and in districts with large urban populations than in non-urban districts. Overall, about 8 percent of charter elementary students are drawn from private schools, while about 11 percent of middle and high school students in charters are drawn from private schools. The magnitude of the charter effect is higher in urban areas. In highly urban districts, private schools contribute 32, 23, and 15 percent of charter elementary, middle, and high school enrollments, respectively.

Our results are consistent with a current strand of literature that shows different student achievement results for charters in urban and non-urban areas.[67] Our evidence on how charters affect private-school enrollments is further support for the hypothesis that charters may address different types of educational demands in urban areas than in other locations. Urban areas have greater population diversity, higher poverty rates, and smaller population growth than non-urban areas. These factors have contributed to the current struggles of urban districts, and perhaps also to private schools problems in urban areas. Perhaps the competitive environment is different in these struggling urban areas than in other locations, and parents are switching to charters for different reasons than they do in smaller towns and cities.

Charters are drawing more students from private schools in areas with stronger charter laws (as defined by CER). Unfortunately, it is difficult to isolate whether this difference reflects specific characteristics of the charter laws or is coincident with other factors in this subset of states. Presumably states are more likely to enact flexible charter regulations where there are more constituents who are interested in school choice and charter enrollment.

The evidence suggests that most charter students are drawn from traditional public schools, yet Catholic schools are losing significant numbers of students to charter schools, especially for elementary students in large metropolitan areas. Their enroll-

In highly urban districts, private schools contribute 32, 23, and 15 percent of charter elementary, middle, and high school enrollments, respectively.

ments have declined dramatically over the past few decades as their constituents moved to suburban neighborhoods and switched to public schools.

The results show that charters are also drawing significant numbers of students from other religious and nonsectarian schools. While these sectors grew over the past decade, the evidence suggests that this growth has been mitigated in many areas by competition from charter schools.

The flow of private school students into charters has important fiscal implications for districts and states. When charters draw students from private schools, public revenue growth may not keep pace with public enrollments, and districts may face pressures to reduce education services available to students. Alternatively, as parents move their children from private to public schools, these parents might become a stronger voice for public education financing.

Appendix A:
Descriptive Characteristics of States and Large Cities

Table A.1
Elementary School Enrollment, School Type, and Urban Share by State (2008)

	Enrollment	Charter (%)	Private (%)	Urban (%)
Alaska	58,792	4.4	3.8	36.9
Arkansas	239,882	0.7	8.2	0.0
Arizona	534,151	8.4	4.7	40.3
California	2,967,035	3.1	9.7	24.4
Colorado	384,141	7.9	6.1	24.6
Connecticut	273,319	0.6	9.2	0.0
Dist. Of Columbia	36,068	18.6	18.0	99.7

	Enrollment	Charter (%)	Private (%)	Urban (%)
Delaware	65,687	6.4	16.6	0.0
Florida	1,364,941	3.8	11.5	8.8
Georgia	833,000	1.9	7.8	3.6
Hawaii	97,187	3.6	13.8	26.6
Iowa	232,847	0.2	9.4	0.0
Idaho	137,373	3.9	8.0	0.0
Illinois	1,042,864	1.0	12.3	20.1
Indiana	532,960	1.2	10.6	12.1
Kansas	230,544	0.5	9.3	11.4
Louisiana	377,165	2.8	16.0	2.4
Massachusetts	466,778	2.4	10.2	6.1
Maryland	418,125	1.1	14.7	10.3
Michigan	790,088	7.3	8.8	7.8
Minnesota	407,983	3.4	11.9	11.5
Missouri	456,741	1.8	11.3	12.1
Mississippi	254,825	0.1	9.1	0.0
North Carolina	750,199	2.5	7.2	10.2
New Hampshire	91,495	0.2	7.8	0.0
New Jersey	672,369	1.4	13.1	3.4
New Mexico	161,459	1.8	6.4	24.9
Nevada	214,005	1.2	6.0	21.6
New York	1,354,947	1.5	15.0	39.7
Ohio	902,020	4.1	11.8	13.6
Oklahoma	306,370	0.3	5.8	22.0
Oregon	277,294	2.0	9.3	13.0
Pennsylvania	899,701	3.2	14.2	14.3
Rhode Island	71,468	2.2	13.0	0.0
South Carolina	348,257	0.6	7.7	0.0
Tennessee	488,710	0.2	9.4	20.0
Texas	2,265,458	1.9	5.2	28.5
Utah	282,302	4.0	2.5	0.0
Wisconsin	426,879	3.5	15.6	12.5
Wyoming	40,482	0.3	3.0	0.0
Total	**21,755,911**	**2.7**	**10.0**	**31.5**

Source: Author calculations from Common Core of Data and Private School Universe Survey for 2007–2008.
Note: Table includes only states with some charters students in 2008. Charter enrollments are relative to total public and private enrollments.

Table A.2
Middle School Enrollment, School Type, and Urban Share by State (2008)

	Enrollment	Charter (%)	Private (%)	Urban (%)
Alabama	29,502	3.4	3.1	35.7
Arkansas	114,293	1.4	6.9	0.0
Arizona	256,691	7.3	4.3	38.0
California	1,551,440	3.7	9.1	23.4
Colorado	183,731	7.4	5.8	23.0
Connecticut	142,362	1.0	9.7	0.0
Dist. Of Columbia	18,333	30.2	20.2	99.6
Delaware	33,812	5.9	15.8	0.0
Florida	670,459	4.0	11.4	8.5
Georgia	401,021	2.0	7.7	3.2
Hawaii	48,752	3.9	17.8	29.5
Iowa	114,868	0.0	8.2	0.0
Idaho	65,959	4.5	6.4	0.0
Illinois	535,911	1.0	11.1	19.9
Indiana	265,440	0.9	8.9	10.7
Kansas	111,809	0.6	8.3	10.0
Louisiana	184,750	2.7	15.9	3.0
Massachusetts	242,030	3.5	10.4	6.3
Maryland	223,885	0.8	15.1	9.8
Michigan	404,928	6.0	8.2	7.7
Minnesota	205,376	2.5	10.3	10.0
Missouri	228,629	1.6	11.2	11.8
Mississippi	124,217	0.0	8.3	0.0
North Carolina	355,843	2.6	7.1	9.0
New Hampshire	51,094	0.1	7.1	0.0
New Jersey	341,718	1.5	12.0	3.0
New Mexico	78,913	2.9	7.4	22.0
Nevada	106,213	1.2	3.8	20.2
New York	704,646	1.0	14.4	38.1
Ohio	457,787	3.4	10.8	12.7
Oklahoma	143,567	1.2	5.3	20.4
Oregon	139,250	1.9	8.0	10.4
Pennsylvania	478,115	3.4	13.2	13.7
Rhode Island	39,999	1.3	14.0	0.0
South Carolina	172,845	0.4	7.5	0.0
Tennessee	235,777	0.5	10.4	19.6

	Enrollment	Charter (%)	Private (%)	Urban (%)
Texas	1,060,348	2.3	4.8	27.8
Utah	127,703	3.4	2.6	0.0
Virginia	301,559	0.0	8.2	5.9
Wisconsin	217,929	3.6	14.2	11.6
Wyoming	19,882	0.1	2.1	0.0
Total	**11,191,386**	**2.7**	**9.5**	**15.9**

Source: Author calculations from Common Core of Data and Private School Universe Survey for 2007–2008.
Note: Table includes only states with some charters students in 2008. Charter enrollments are relative to total public and private enrollments.

Table A.3
High School Enrollment, School Type, and Urban Share by State (2008)

	Enrollment	Charter (%)	Private (%)	Urban (%)
Alabama	42,051	2.8	2.2	37.4
Arkansas	145,602	1.4	4.6	0.0
Arizona	329,187	10.9	3.9	37.7
California	2,097,499	4.5	7.2	23.4
Colorado	243,570	5.0	4.6	23.1
Connecticut	208,928	0.3	15.9	0.0
Dist. Of Columbia	26,248	19.1	25.2	100.0
Delaware	44,747	5.1	17.4	0.0
Florida	886,502	2.7	9.3	8.3
Georgia	504,868	1.8	6.8	3.1
Hawaii	64,709	2.0	16.2	29.6
Iowa	164,137	0.1	6.0	0.0
Idaho	85,818	2.8	5.8	0.0
Illinois	697,105	1.3	9.1	18.8
Indiana	338,877	0.6	6.5	11.8
Kansas	150,478	0.7	6.5	9.3
Louisiana	213,010	2.4	15.2	4.3
Massachusetts	336,755	1.5	12.4	6.9
Maryland	307,926	0.2	13.2	9.5
Michigan	579,560	3.1	5.9	7.2
Minnesota	295,771	3.1	6.9	11.1
Missouri	315,157	0.9	9.9	11.0
North Carolina	438,861	1.0	6.2	10.1
New Hampshire	75,400	0.4	11.7	0.0

Table A.3 *Continued*

	Enrollment	Charter (%)	Private (%)	Urban (%)
New Jersey	462,179	0.6	11.6	2.8
New Mexico	105,121	4.9	6.3	26.9
Nevada	125,129	1.9	3.0	20.1
New York	978,878	0.4	13.2	38.4
Ohio	637,133	4.4	8.6	14.3
Oklahoma	186,816	1.5	4.5	17.7
Oregon	190,831	1.9	7.2	10.4
Pennsylvania	659,771	3.4	10.8	12.9
Rhode Island	54,743	1.7	12.7	0.0
South Carolina	221,762	1.3	6.5	0.0
Tennessee	314,687	0.2	10.3	17.2
Texas	1,353,263	2.4	4.0	24.7
Utah	170,017	2.2	3.4	0.0
Virginia	409,154	0.0	7.1	5.9
Wisconsin	313,170	3.3	7.6	11.0
Wyoming	27,456	0.4	1.2	0.0
Total	**14,802,876**	**2.5**	**8.2**	**15.8**

Source: Author calculations from Common Core of Data and Private School Universe Survey for 2007–2008.
Note: Table includes only states with some charters students in 2008. Charter enrollments are relative to total public and private enrollments.

Table A.4
List of Districts with Large Elementary School Enrollment and a Large Share of Urban Students

School District	State	Elementary School Enrollment	Urban (%)
Tucson	Arizona	34,745	80
Mesa	Arizona	39,946	87
Los Angeles	California	360,078	79
Long Beach	California	42,095	86
Fresno	California	37,437	95
San Francisco	California	34,708	100
San Diego	California	67,871	100
County of Denver #1	Colorado	41,051	95
District of Columbia	District of Columbia	36,068	99
Duval	Florida	72,461	88
Chicago	Illinois	208,568	99
Boston	Massachusetts	30,010	95
Baltimore City	Maryland	44,016	97
Detroit City	Michigan	61,357	98
Charlotte-Mecklenburg	North Carolina	77,277	69
Albuquerque	New Mexico	50,566	78
New York City #31	New York	30,395	100
Columbus City	Ohio	34,597	95
Cleveland Municipal City	Ohio	33,437	97
Philadelphia City	Pennsylvania	112,818	97
Davidson County	Tennessee	49,091	75
Memphis City	Tennessee	59,438	98
Northside	Texas	43,524	77
North East	Texas	33,713	83
Arlington	Texas	31,038	87
Fort Worth	Texas	43,483	94
Austin	Texas	47,493	94
Dallas	Texas	94,311	95
Houston	Texas	112,288	96
El Paso	Texas	30,583	96
Milwaukee	Wisconsin	53,292	99

Source: Author calculations from Common Core of Data and Private School Universe Survey for 2007–2008.
Note: Districts in table have elementary enrollments of at least 30,000 and at least 50 percent of these students are in urban schools. Enrollment and urban calculations reflect all public and private students in the geographical area of each district.

Table A.5
List of Districts with Large High School Enrollment and a Large Share of Urban Students

District	State	Middle School Enrollment	Urban (%)
Long Beach	California	21,829	91
Los Angeles	California	178,421	77
San Diego	California	33,837	100
Duval	Florida	33,291	90
Chicago	Illinois	106,557	99
Baltimore City	Maryland	22,583	94
Detroit City	Michigan	31,879	97
Albuquerque	New Mexico	23,638	71
Charlotte-Mecklenburg	North Carolina	35,175	59
Philadelphia City	Pennsylvania	58,625	97
Davidson County	Tennessee	22,343	77
Memphis City	Tennessee	28,176	100
Dallas	Texas	38,259	97
Houston	Texas	47,985	96
Northside	Texas	20,101	84
Milwaukee	Wisconsin	25,814	98

Source: Author calculations from Common Core of Data and Private School Universe Survey for 2007–2008.
Note: Districts in table have middle school enrollments of at least 20,000 and at least 50 percent of these students are in urban schools. Enrollment and urban calculations reflect all public and private students in the geographical area of each district.

Table A.6
List of Districts with Large High School Enrollment and a Large Share of Urban Students

District	State	High School Enrollment	Urban (%)
Mesa	Arizona	26,104	86
Tucson	Arizona	22,422	91
Fresno	California	25,406	97
San Diego	California	43,615	100
Long Beach	California	28,075	82
Los Angeles	California	228,306	85
East Side Union	California	27,986	100
San Francisco	California	24,618	100
County of Denver #1	Colorado	20,110	93
District of Columbia	District of Columbia	26,248	100
Duval	Florida	41,954	91
City of Chicago	Illinois	129,587	99
Baltimore City	Maryland	29,307	100
Boston	Massachusetts	23,919	97
Detroit City	Michigan	41,880	100
Albuquerque	New Mexico	30,034	90
New York City #2	New York	45,898	100
New York City #10	New York	21,864	100
Charlotte-Mecklenburg	North Carolina	41,472	69
Columbus City	Ohio	22,613	94
Cleveland Municipal City	Ohio	22,185	99
Philadelphia City	Pennsylvania	74,748	98
Davidson County	Tennessee	29,938	55
Memphis City	Tennessee	38,075	94
Austin	Texas	23,198	89
Dallas	Texas	47,836	97
El Paso	Texas	21,009	100
Houston	Texas	55,174	91
Fort Worth	Texas	23,570	92
Virginia Beach City	Virginia	24,604	99
Milwaukee	Wisconsin	34,372	100

Source: Author calculations from Common Core of Data and Private School Universe Survey for 2007–2008.
Note: Districts in the table have high school enrollments of at least 20,000, and at least 50 percent of these students are in urban schools. Enrollment and urban calculations reflect all public and private students in the geographical area of each district.

Appendix B:
Variable Means and Regression Results for Elementary School Students

Table B.1
Means and Standard Deviations of Elementary School Variables

	Not Urban	Urban	Total
Private enrollment share	0.0940 (0.0922)	0.129 (0.0837)	0.105 (0.0912)
Catholic enrollment share	0.0435 (0.0635)	0.0586 (0.0580)	0.0480 (0.0623)
Other religious enrollment share	0.0377 (0.0551)	0.0488 (0.0406)	0.0410 (0.0514)
Nonsectarian enrollment share	0.0128 (0.0306)	0.0221 (0.0284)	0.0156 (0.0302)
No charter in district	0.756 (0.429)	0.269 (0.444)	0.611 (0.488)
Charter enrollment share	0.0132 (0.0441)	0.0319 (0.0465)	0.0187 (0.0456)
Pro-charter laws (CER)	0.438 (0.496)	0.520 (0.500)	0.463 (0.499)
Poverty rate for children 0 to 17	0.166 (0.0750)	0.200 (0.0652)	0.176 (0.0738)
Median income ($1000)	48.53 (13.50)	47.79 (10.15)	48.31 (12.60)
Population growth rate (2-year)	0.0242 (0.0333)	0.0290 (0.0383)	0.0256 (0.0349)
Black population share	0.135 (0.142)	0.206 (0.158)	0.156 (0.150)
Asian/Pacific Islander share	0.0333 (0.0392)	0.0696 (0.0752)	0.0442 (0.0551)
Hispanic share	0.171 (0.187)	0.315 (0.203)	0.214 (0.203)
Unemployment rate	0.0537 (0.0173)	0.0547 (0.0146)	0.0540 (0.0165)
Population per square mile (1000s)	0.816 (1.252)	4.015 (8.407)	1.770 (4.931)
Large central city (pop at least 250K)	NA	0.593 (0.409)	0.177 (0.351)
Mid-sized central city (pop<250K)	0.180 (0.329)	0.0649 (0.202)	0.146 (0.301)

	Not Urban	Urban	Total
Fringe of large city	0.316	0.295	0.310
	(0.426)	(0.351)	(0.405)
Fringe of med-sized city	0.156	0.00590	0.111
	(0.301)	(0.0481)	(0.263)
Year 2002	0.195	0.192	0.194
	(0.396)	(0.394)	(0.395)
Year 2004	0.222	0.223	0.222
	(0.415)	(0.416)	(0.416)
Year 2006	0.219	0.217	0.219
	(0.414)	(0.412)	(0.413)
Year 2008	0.222	0.217	0.221
	(0.416)	(0.412)	(0.415)

Source: Author calculations from Common Core of Data and Private School Universe Survey of 1999–2000 through 2007–2008.

Note: Entries are means with standard deviations in parentheses. Means are weighted by elementary school enrollments. Omitted reference categories are TPS share, charter in district, weak charter law, white/non-Hispanic share, town/rural share, and year 2000.

Table B.2
Effects of Charters on Percent Private Elementary School Enrollment

Variable	All	Not Urban	Some Urban	Highly Urban
No charter in district	-0.0037*	-0.0035	-0.0075	-0.0104
	(0.0018)	(0.0019)	(0.0064)	(0.0110)
Charter enrollment share	-0.0836*	-0.0725*	-0.0856*	-0.3153*
	(0.0096)	(0.0101)	(0.0411)	(0.0646)
Poverty rate for children 0 to 17	-0.0690*	-0.0637*	-0.0356	-0.2097
	(0.0148)	(0.0148)	(0.1082)	(0.2116)
Median income ($1000)	0.0002*	0.0002	0.0012	0.0001
	(0.0001)	(0.0001)	(0.0007)	(0.0012)
Population growth rate (2-year)	-0.0245*	-0.0215	-0.0539	0.2401*
	(0.0109)	(0.0119)	(0.0310)	(0.1000)
Black population share	0.1098*	0.0722*	0.0211	0.2553*
	(0.0092)	(0.0098)	(0.0827)	(0.1155)
Asian/Pacific Islander share	0.1221*	0.0343	-0.3592*	0.4213*
	(0.0335)	(0.0388)	(0.1627)	(0.1901)
Hispanic share	0.0152	-0.0052	-0.0182	0.2722*
	(0.0079)	(0.0081)	(0.0621)	(0.0884)
Unemployment rate	-0.1086*	-0.1149*	-0.0888	0.7786
	(0.0304)	(0.0304)	(0.2388)	(0.3990)
Population per square mile (1000s)	0.0028*	0.0112*	0.0203*	0.0016
	(0.0004)	(0.0012)	(0.0074)	(0.0012)

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Table B.2 *Continued*

Variable	All	Not Urban	Some Urban	Highly Urban
Large central city (pop at least 250K)	0.0668* (0.0060)	NA	0.1338* (0.0207)	0.0481 (0.0419)
Mid-sized central city (pop<250K)	0.0397* (0.0027)	0.0391* (0.0028)	0.0023 (0.0173)	0.0523 (0.0501)
Fringe of large city	0.0275* (0.0017)	0.0243* (0.0018)	-0.0076 (0.0139)	0.1181* (0.0549)
Fringe of med-sized city	0.0097* (0.0017)	0.0098* (0.0016)	-0.0205 (0.0396)	NA
Year 2002	-0.0053* (0.0009)	-0.0047* (0.0009)	-0.0112 (0.0061)	-0.0185 (0.0118)
Year 2004	-0.0099* (0.0009)	-0.0088* (0.0009)	-0.0216* (0.0065)	-0.0213 (0.0111)
Year 2006	-0.0191* (0.0011)	-0.0178* (0.0011)	-0.0292* (0.0075)	-0.0176 (0.0130)
Year 2008	-0.0138* (0.0014)	-0.0116* (0.0014)	-0.0351* (0.0106)	-0.0279 (0.0174)
Constant	0.0576* (0.0072)	0.0625* (0.0071)	0.1067* (0.0495)	-0.0237 (0.0938)
Standard Deviation (State)	0.0240* (0.0031)	0.0224* (0.0030)	0.0535* (0.0133)	0.0662* (0.0230)
Standard Deviation (District)	0.0900* (0.0007)	0.0874* (0.0007)	0.1203* (0.0053)	0.1408* (0.0084)
Standard Deviation (Residual)	0.0429* (0.0002)	0.0421* (0.0002)	0.0452* (0.0010)	0.0636* (0.0019)
Log Likelihood Ratio	2254.95	1848.85	202.43	58.21
Number of Observations	44752	42554	1396	798

Source: Author calculations from Common Core of Data and Private School Universe Survey of 1999–2000 through 2007–2008.
Note: An asterisk indicates that the coefficient is significantly different from zero at the 0.05 level. Standard errors are in parentheses. Omitted reference categories are TPS share, charter in district, white/non-Hispanic share, town/rural share, and year 2000. No schools in mostly urban districts are in the fringe of midsized cities.

Table B.3
Effects of Charters and CER Status on Percent Private Elementary School Enrollment

Variable	All	Not Urban	Some Urban	Highly Urban
No charter in district	-0.0034	-0.0034	-0.0060	-0.0113
	(0.0018)	(0.0019)	(0.0066)	(0.0110)
Charter enrollment share	-0.0574*	-0.0661*	-0.0090	-0.0717
	(0.0167)	(0.0172)	(0.0762)	(0.1577)
Private enrollment share & pro-charter law	-0.0353	-0.0087	-0.0964	-0.2725
	(0.0183)	(0.0190)	(0.0807)	(0.1607)
Poverty rate for children 0 to 17	-0.0690*	-0.0637*	-0.0412	-0.2372
	(0.0148)	(0.0148)	(0.1083)	(0.2119)
Median income ($1000)	0.0002*	0.0002	0.0012	0.0001
	(0.0001)	(0.0001)	(0.0007)	(0.0012)
Population growth rate (2-year)	-0.0250*	-0.0215	-0.0539	0.1514
	(0.0109)	(0.0119)	(0.0310)	(0.1127)
Black population share	0.1097*	0.0722*	0.0151	0.2679*
	(0.0092)	(0.0098)	(0.0828)	(0.1157)
Asian/Pacific Islander share	0.1221*	0.0343	-0.3544*	0.4335*
	(0.0335)	(0.0388)	(0.1626)	(0.1904)
Hispanic share	0.0152	-0.0052	-0.0174	0.2911*
	(0.0079)	(0.0081)	(0.0620)	(0.0890)
Unemployment rate	-0.1077*	-0.1147*	-0.0727	0.7193
	(0.0304)	(0.0304)	(0.2391)	(0.3998)
Population per square mile (1000s)	0.0028*	0.0112*	0.0205*	0.0016
	(0.0004)	(0.0012)	(0.0074)	(0.0012)
Large central city (pop at least 250K)	0.0668*	NA	0.1325*	0.0491
	(0.0060)		(0.0208)	(0.0419)
Mid-sized central city (pop<250K)	0.0397*	0.0391*	0.0014	0.0520
	(0.0027)	(0.0028)	(0.0173)	(0.0500)
Fringe of large city	0.0275*	0.0243*	-0.0082	0.1167*
	(0.0017)	(0.0018)	(0.0139)	(0.0548)
Fringe of med-sized city	0.0097*	0.0098*	-0.0196	NA
	(0.0017)	(0.0016)	(0.0396)	
Year 2002	-0.0053*	-0.0047*	-0.0115	-0.0196
	(0.0009)	(0.0009)	(0.0061)	(0.0118)
Year 2004	-0.0099*	-0.0088*	-0.0219*	-0.0237*
	(0.0009)	(0.0009)	(0.0065)	(0.0111)

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Table B.3 *Continued*

Variable	All	Not Urban	Some Urban	Highly Urban
Year 2006	-0.0191*	-0.0178*	-0.0294*	-0.0211
	(0.0011)	(0.0011)	(0.0075)	(0.0131)
Year 2008	-0.0138*	-0.0116*	-0.0356*	-0.0323
	(0.0014)	(0.0014)	(0.0106)	(0.0176)
Constant	0.0572*	0.0624*	0.1067*	-0.0245
	(0.0072)	(0.0071)	(0.0495)	(0.0937)
Standard Deviation (State)	0.0240*	0.0224*	0.0531*	0.0658*
	(0.0031)	(0.0030)	(0.0133)	(0.0228)
Standard Deviation (District)	0.0900*	0.0874*	0.1203*	0.1413*
	(0.0007)	(0.0007)	(0.0053)	(0.0085)
Standard Deviation (Residual)	0.0429*	0.0421*	0.0452*	0.0635*
	(0.0002)	(0.0002)	(0.0010)	(0.0019)
Log Likelihood Ratio	2258.62	1849.01	204.00	61.37
Number of Observations	44752	42554	1396	798

Source: Author calculations from Common Core of Data and Private School Universe Survey of 1999–2000 through 2007–2008.

Note: An asterisk indicates that the coefficient is significantly different from zero at the 0.05 level. Standard errors are in parentheses. Omitted reference categories are TPS share, charter in district, weak charter law, white/non-Hispanic share, town/rural share, and year 2000. No schools in mostly urban districts are in the fringe of midsized cities.

Table B.4
Effects of Charters on Percent Catholic Elementary School Enrollment

Variable	All	Not Urban	Some Urban	Highly Urban
No charter in district	-0.0005	-0.0012	0.0016	-0.0003
	(0.0012)	(0.0013)	(0.0056)	(0.0078)
Charter enrollment share	-0.0307*	-0.0255*	-0.0726*	-0.0971*
	(0.0065)	(0.0067)	(0.0360)	(0.0458)
Poverty rate for children 0 to 17	-0.0336*	-0.0317*	-0.0918	-0.0472
	(0.0100)	(0.0099)	(0.0948)	(0.1507)
Median income ($1000)	0.0001	0.0000	0.0006	0.0009
	(0.0001)	(0.0001)	(0.0006)	(0.0009)
Population growth rate (2-year)	-0.0231*	-0.0219*	-0.0528	0.2019*
	(0.0073)	(0.0078)	(0.0272)	(0.0728)
Black population share	0.0494*	0.0135	0.0474	0.1739*
	(0.0067)	(0.0071)	(0.0711)	(0.0742)

Variable	All	Not Urban	Some Urban	Highly Urban
Asian/Pacific Islander share	0.0010	-0.0704*	-0.3550*	0.0475
	(0.0240)	(0.0276)	(0.1394)	(0.1211)
Hispanic share	0.0242*	0.0042	0.0531	0.1323*
	(0.0057)	(0.0059)	(0.0545)	(0.0579)
Unemployment rate	-0.0590*	-0.0545*	-0.2969	0.3992
	(0.0205)	(0.0201)	(0.2087)	(0.2883)
Population per square mile (1000s)	0.0016*	0.0106*	0.0052	-0.0001
	(0.0003)	(0.0009)	(0.0064)	(0.0008)
Large central city (pop at least 250K)	0.0372*	NA	0.1074*	0.0034
	(0.0042)		(0.0181)	(0.0301)
Mid-sized central city (pop<250K)	0.0259*	0.0257*	-0.0084	0.0029
	(0.0019)	(0.0019)	(0.0150)	(0.0361)
Fringe of large city	0.0171*	0.0148*	-0.0186	0.0085
	(0.0012)	(0.0012)	(0.0121)	(0.0394)
Fringe of med-sized city	0.0067*	0.0067*	0.0038	NA
	(0.0011)	(0.0011)	(0.0346)	
Year 2002	-0.0040*	-0.0037*	0.0011	-0.0102
	(0.0006)	(0.0006)	(0.0054)	(0.0086)
Year 2004	-0.0064*	-0.0056*	-0.0081	-0.0094
	(0.0006)	(0.0006)	(0.0057)	(0.0080)
Year 2006	-0.0106*	-0.0092*	-0.0169*	-0.0162
	(0.0007)	(0.0007)	(0.0066)	(0.0093)
Year 2008	-0.0110*	-0.0090*	-0.0198*	-0.0264*
	(0.0010)	(0.0010)	(0.0093)	(0.0123)
Constant	0.0257*	0.0325*	0.0842	-0.0518
	(0.0053)	(0.0050)	(0.0435)	(0.0649)
Standard Deviation (State)	0.0207*	0.0172*	0.0570*	0.0431*
	(0.0026)	(0.0022)	(0.0129)	(0.0161)
Standard Deviation (District)	0.0668*	0.0652*	0.0968*	0.0842*
	(0.0005)	(0.0005)	(0.0043)	(0.0051)
Standard Deviation (Residual)	0.0285*	0.0275*	0.0397*	0.0467*
	(0.0001)	(0.0001)	(0.0009)	(0.0014)
Log Likelihood Ratio	1503.64	1390.14	184.94	27.99
Number of Observations	44752	42554	1396	798

Source: Author calculations from Common Core of Data and Private School Universe Survey of 1999–2000 through 2007–2008.

Note: An asterisk indicates that the coefficient is significantly different from zero at the 0.05 level. Standard errors are in parentheses. Omitted reference categories are TPS share, charter in district, white/non-Hispanic share, town/rural share, and year 2000. No schools in mostly urban districts are in the fringe of midsized cities.

Table B.5
Effects of Charters on Percent Other Religious Elementary School Enrollment

Variable	All	Not Urban	Some Urban	Highly Urban
No charter in district	-0.0025*	-0.0019	-0.0058	-0.0081
	(0.0012)	(0.0014)	(0.0038)	(0.0055)
Charter enrollment share	-0.0367*	-0.0380*	0.0016	-0.0601
	(0.0067)	(0.0071)	(0.0245)	(0.0322)
Poverty rate for children 0 to 17	-0.0222*	-0.0198	0.0351	0.0117
	(0.0102)	(0.0104)	(0.0643)	(0.1054)
Median income ($1000)	-0.0000	-0.0000	-0.0001	-0.0009
	(0.0001)	(0.0001)	(0.0004)	(0.0006)
Population growth rate (2-year)	-0.0043	-0.0031	-0.0204	0.0213
	(0.0077)	(0.0086)	(0.0185)	(0.0515)
Black population share	0.0273*	0.0209*	-0.0082	-0.0204
	(0.0054)	(0.0058)	(0.0438)	(0.0458)
Asian/Pacific Islander share	0.0312	0.0292	0.0533	0.0610
	(0.0203)	(0.0240)	(0.0849)	(0.0673)
Hispanic share	-0.0048	-0.0051	-0.0524	-0.0656*
	(0.0046)	(0.0048)	(0.0303)	(0.0319)
Unemployment rate	-0.0603*	-0.0624*	-0.0123	0.0085
	(0.0213)	(0.0216)	(0.1412)	(0.2027)
Population per square mile (1000s)	0.0010*	0.0014*	0.0072	0.0010*
	(0.0003)	(0.0007)	(0.0038)	(0.0004)
Large central city (pop at least 250K)	0.0177*	NA	0.0157	0.0162
	(0.0038)		(0.0123)	(0.0214)
Mid-sized central city (pop<250K)	0.0132*	0.0121*	0.0117	0.0174
	(0.0018)	(0.0019)	(0.0102)	(0.0257)
Fringe of large city	0.0087*	0.0076*	0.0073	0.0794*
	(0.0012)	(0.0012)	(0.0082)	(0.0279)
Fringe of med-sized city	0.0024*	0.0022	0.0018	NA
	(0.0011)	(0.0011)	(0.0236)	
Year 2002	-0.0006	-0.0005	-0.0051	-0.0061
	(0.0007)	(0.0007)	(0.0036)	(0.0061)
Year 2004	-0.0024*	-0.0021*	-0.0072	-0.0118*
	(0.0007)	(0.0007)	(0.0038)	(0.0056)
Year 2006	-0.0061*	-0.0062*	-0.0044	-0.0021
	(0.0008)	(0.0008)	(0.0044)	(0.0064)
Year 2008	-0.0009	-0.0007	-0.0029	0.0012
	(0.0010)	(0.0010)	(0.0061)	(0.0084)

Variable	All	Not Urban	Some Urban	Highly Urban
Constant	0.0299*	0.0293*	0.0472	0.0867*
	(0.0044)	(0.0045)	(0.0277)	(0.0437)
Standard Deviation (State)	0.0098*	0.0101*	0.0173*	0.0000*
	(0.0014)	(0.0015)	(0.0066)	(0.0000)
Standard Deviation (District)	0.0508*	0.0500*	0.0648*	0.0576*
	(0.0004)	(0.0004)	(0.0030)	(0.0042)
Standard Deviation (Residual)	0.0311*	0.0311*	0.0272*	0.0335*
	(0.0001)	(0.0001)	(0.0006)	(0.0010)
Log Likelihood Ratio	571.62	450.73	25.38	45.74
Number of Observations	44752	42554	1396	798

Source: Author calculations from Common Core of Data and Private School Universe Survey of 1999–2000 through 2007–2008.
Note: An asterisk indicates that the coefficient is significantly different from zero at the 0.05 level. Standard errors are in parentheses. Omitted reference categories are TPS share, charter in district, white/non-Hispanic share, town/rural share, and year 2000. No schools in mostly urban districts are in the fringe of midsized cities.

Table B.6
Effects of Charters on Percent Nonsectarian Elementary School Enrollment

Variable	All	Not Urban	Some Urban	Highly Urban
No charter in district	-0.0014	-0.0013	-0.0033	-0.0052
	(0.0007)	(0.0008)	(0.0028)	(0.0062)
Charter enrollment share	-0.0157*	-0.0091*	-0.0157	-0.1798*
	(0.0040)	(0.0040)	(0.0185)	(0.0364)
Poverty rate for children 0 to 17	-0.0097	-0.0078	0.0509	-0.2092
	(0.0060)	(0.0058)	(0.0481)	(0.1186)
Median income ($1000)	0.0001*	0.0002*	0.0006*	-0.0004
	(0.0000)	(0.0000)	(0.0003)	(0.0007)
Population growth rate (2-year)	0.0029	0.0038	0.0103	0.0396
	(0.0046)	(0.0048)	(0.0143)	(0.0548)
Black population share	0.0346*	0.0381*	-0.0003	0.1118
	(0.0031)	(0.0031)	(0.0228)	(0.0817)
Asian/Pacific Islander share	0.0891*	0.0715*	0.0685	0.3851*
	(0.0121)	(0.0133)	(0.0421)	(0.1319)
Hispanic share	0.0001	-0.0005	-0.0047	0.3257*
	(0.0027)	(0.0026)	(0.0154)	(0.0601)
Unemployment rate	-0.0063	-0.0167	0.1104	0.3592
	(0.0125)	(0.0122)	(0.1023)	(0.2201)

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Table B.6 *Continued*

Variable	All	Not Urban	Some Urban	Highly Urban
Population per square mile (1000s)	0.0001	-0.0003	0.0013	0.0017
	(0.0001)	(0.0004)	(0.0019)	(0.0009)
Large central city (pop at least 250K)	0.0139*	NA	0.0125	0.0325
	(0.0023)		(0.0088)	(0.0232)
Mid-sized central city (pop<250K)	0.0023*	0.0027*	0.0025	0.0434
	(0.0011)	(0.0011)	(0.0068)	(0.0276)
Fringe of large city	0.0007	0.0010	0.0038	0.0515
	(0.0007)	(0.0007)	(0.0055)	(0.0304)
Fringe of med-sized city	-0.0001	0.0001	-0.0205	NA
	(0.0007)	(0.0006)	(0.0177)	
Year 2002	-0.0004	-0.0002	-0.0056*	-0.0035
	(0.0004)	(0.0004)	(0.0028)	(0.0065)
Year 2004	-0.0010*	-0.0009*	-0.0061*	-0.0018
	(0.0004)	(0.0004)	(0.0029)	(0.0061)
Year 2006	-0.0025*	-0.0025*	-0.0089*	-0.0005
	(0.0004)	(0.0004)	(0.0032)	(0.0074)
Year 2008	-0.0019*	-0.0019*	-0.0123*	-0.0039
	(0.0006)	(0.0006)	(0.0043)	(0.0100)
Constant	0.0012	0.0004	-0.0249	-0.0633
	(0.0025)	(0.0024)	(0.0183)	(0.0575)
Standard Deviation (State)	0.0044*	0.0041*	0.0073*	0.0701*
	(0.0007)	(0.0007)	(0.0029)	(0.0169)
Standard Deviation (District)	0.0306*	0.0279*	0.0276*	0.1024*
	(0.0002)	(0.0002)	(0.0013)	(0.0062)
Standard Deviation (Residual)	0.0183*	0.0176*	0.0221*	0.0344*
	(0.0001)	(0.0001)	(0.0005)	(0.0010)
Log Likelihood Ratio	537.08	413.27	28.47	70.73
Number of Observations	44752	42554	1396	798

Source: Author calculations from Common Core of Data and Private School Universe Survey of 1999–2000 through 2007–2008.

Note: An asterisk indicates that the coefficient is significantly different from zero at the 0.05 level. Standard errors are in parentheses. Omitted reference categories are TPS share, charter in district, white/non-Hispanic share, town/rural share, and year 2000. No schools in mostly urban districts are in the fringe of midsized cities.

Appendix C:
Variable Means and Regression Results for Middle School Students

Table C.1
Means and Standard Deviations of Middle School Variables

Variable	Not Urban	Urban	Total
Private enrollment share	0.0801	0.124	0.0927
	(0.0903)	(0.0878)	(0.0917)
Catholic enrollment share	0.0380	0.0626	0.0450
	(0.0607)	(0.0633)	(0.0624)
Other religious enrollment share	0.0315	0.0427	0.0347
	(0.0516)	(0.0404)	(0.0489)
Nonsectarian enrollment share	0.0106	0.0187	0.0129
	(0.0338)	(0.0289)	(0.0327)
No charter in district	0.764	0.292	0.629
	(0.425)	(0.455)	(0.483)
Charter enrollment share	0.0117	0.0328	0.0177
	(0.0417)	(0.0559)	(0.0471)
Pro-charter laws (CER)	0.437	0.517	0.460
	(0.496)	(0.500)	(0.498)
Poverty rate for children 0 to 17	0.165	0.198	0.174
	(0.0741)	(0.0665)	(0.0736)
Median income ($1000s)	48.68	48.07	48.50
	(13.79)	(10.35)	(12.90)
Population growth rate (2-year)	0.0241	0.0289	0.0255
	(0.0331)	(0.0397)	(0.0352)
Black population share	0.135	0.208	0.156
	(0.141)	(0.159)	(0.150)
Asian/Pacific Islander share	0.0336	0.0698	0.0439
	(0.0400)	(0.0751)	(0.0550)
Hispanic share	0.168	0.309	0.208
	(0.185)	(0.203)	(0.200)
Unemployment rate	0.0534	0.0543	0.0536
	(0.0173)	(0.0147)	(0.0166)
Population per square mile (1000)	0.818	4.055	1.743
	(1.230)	(8.468)	(4.869)
Large central city (pop at least 250K)	NA	0.581	0.166
		(0.412)	(0.343)

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Table C.1 *Continued*

Variable	Not Urban	Urban	Total
Mid-sized central city (pop<250K)	0.181	0.0626	0.147
	(0.336)	(0.201)	(0.308)
Fringe of large city	0.314	0.303	0.311
	(0.432)	(0.359)	(0.413)
Fringe of med-sized city	0.153	0.00659	0.111
	(0.312)	(0.0544)	(0.273)
Year 2002	0.187	0.184	0.186
	(0.390)	(0.387)	(0.389)
Year 2004	0.220	0.224	0.221
	(0.414)	(0.417)	(0.415)
Year 2006	0.221	0.219	0.220
	(0.415)	(0.414)	(0.414)
Year 2008	0.218	0.215	0.217
	(0.413)	(0.411)	(0.412)

Source: Author calculations from Common Core of Data and Private School Universe Survey of 1999–2000 through 2007–2008.
Note: Entries are means with standard deviations in parentheses. Means are weighted by middle school enrollments.

Table C.2
Effects of Charters on Percent Private Middle Enrollment

Variable	All	Not Urban	Some Urban	Highly Urban
No charter in district	-0.0075*	-0.0071*	-0.0072	0.0115
	(0.0016)	(0.0017)	(0.0069)	(0.0101)
Charter enrollment share	-0.1113*	-0.0868*	-0.2695*	-0.2334*
	(0.0094)	(0.0104)	(0.0445)	(0.0349)
Poverty rate for children 0 to 17	-0.0517*	-0.0491*	0.0799	-0.2986
	(0.0155)	(0.0154)	(0.1273)	(0.1908)
Median income ($1000s)	0.0004*	0.0004*	0.0007	-0.0006
	(0.0001)	(0.0001)	(0.0008)	(0.0011)
Population growth rate (2-year)	-0.0203	-0.0176	-0.0652	0.2289*
	(0.0112)	(0.0123)	(0.0359)	(0.0885)
Black population share	0.1019*	0.0647*	-0.0422	0.1524
	(0.0102)	(0.0108)	(0.0803)	(0.1262)
Asian/Pacific Islander share	0.2390*	0.1276*	-0.3598	0.4761*
	(0.0364)	(0.0421)	(0.1860)	(0.1938)

Variable	All	Not Urban	Some Urban	Highly Urban
Hispanic share	0.0139	0.0012	-0.0872	-0.0422
	(0.0089)	(0.0091)	(0.0663)	(0.0977)
Unemployment rate	-0.0448	-0.0484	-0.1222	0.8194*
	(0.0314)	(0.0311)	(0.2706)	(0.3604)
Population per square mile (1000)	0.0030*	0.0104*	0.0154*	0.0025
	(0.0005)	(0.0013)	(0.0059)	(0.0013)
Large central city (pop at least 250K)	0.0655*		0.1630*	0.0183
	(0.0059)		(0.0259)	(0.0459)
Mid-sized central city (pop<250K)	0.0293*	0.0282*	0.0081	0.0255
	(0.0026)	(0.0026)	(0.0184)	(0.0522)
Fringe of large city	0.0131*	0.0109*	-0.0014	0.0065
	(0.0016)	(0.0016)	(0.0149)	(0.0594)
Fringe of med-sized city	0.0027	0.0030	-0.0429	
	(0.0016)	(0.0016)	(0.0346)	
Year 2002	0.0021*	0.0018*	0.0091	0.0065
	(0.0009)	(0.0009)	(0.0070)	(0.0106)
Year 2004	-0.0019*	-0.0017	0.0055	0.0014
	(0.0009)	(0.0009)	(0.0074)	(0.0099)
Year 2006	-0.0090*	-0.0088*	0.0030	0.0180
	(0.0011)	(0.0011)	(0.0086)	(0.0117)
Year 2008	-0.0039*	-0.0029*	0.0023	0.0194
	(0.0015)	(0.0015)	(0.0119)	(0.0159)
Constant	0.0376*	0.0423*	0.1161*	0.1238
	(0.0074)	(0.0072)	(0.0555)	(0.0953)
Standard Deviation (State)	0.0236*	0.0218*	0.0613*	0.0740*
	(0.0034)	(0.0033)	(0.0157)	(0.0276)
Standard Deviation (County)	0.1019*	0.0983*	0.1278*	0.1613*
	(0.0008)	(0.0008)	(0.0056)	(0.0095)
Standard Deviation (Residual)	0.0412*	0.0401*	0.0528*	0.0553*
	(0.0002)	(0.0002)	(0.0011)	(0.0017)
Log Likelihood Ratio	1296.05	892.65	108.94	95.91
Number of Observations	40636	38409	1408	780

Source: Author calculations from Common Core of Data and Private School Universe Survey of 1999–2000 through 2007–2008.

Note: An asterisk indicates that the coefficient is significantly different from zero at the 0.05 level. Standard errors are in parentheses. Omitted reference categories are TPS share, charter in district, white/non-Hispanic share, town/rural share, and year 2000.

Table C.3
Effects of Charters and CER Status on Percent Private Middle Enrollment

Variable	All	Not Urban	Some Urban	Highly Urban
No charter in district	-0.0068*	-0.0068*	-0.0049	0.0108
	(0.0016)	(0.0017)	(0.0071)	(0.0101)
Charter enrollment share	-0.0613*	-0.0691*	-0.1504	-0.1120
	(0.0168)	(0.0177)	(0.0973)	(0.0884)
Private enrollment share & pro-charter law	-0.0657*	-0.0243	-0.1357	-0.1364
	(0.0184)	(0.0196)	(0.0987)	(0.0921)
Poverty rate for children 0 to 17	-0.0520*	-0.0492*	0.0715	-0.3150
	(0.0155)	(0.0154)	(0.1274)	(0.1907)
Median income ($1000s)	0.0004*	0.0004*	0.0007	-0.0005
	(0.0001)	(0.0001)	(0.0008)	(0.0011)
Population growth rate (2-year)	-0.0214	-0.0177	-0.0657	0.1698
	(0.0112)	(0.0123)	(0.0359)	(0.0967)
Black population share	0.1018*	0.0647*	-0.0432	0.1647
	(0.0102)	(0.0108)	(0.0802)	(0.1248)
Asian/Pacific Islander share	0.2389*	0.1272*	-0.3488	0.4736*
	(0.0364)	(0.0421)	(0.1860)	(0.1915)
Hispanic share	0.0139	0.0013	-0.0824	-0.0351
	(0.0089)	(0.0091)	(0.0664)	(0.0955)
Unemployment rate	-0.0424	-0.0476	-0.1005	0.8079*
	(0.0314)	(0.0311)	(0.2710)	(0.3598)
Population per square mile (1000)	0.0030*	0.0104*	0.0152*	0.0024
	(0.0005)	(0.0013)	(0.0059)	(0.0013)
Large central city (pop at least 250K)	0.0653*		0.1573*	0.0166
	(0.0059)		(0.0263)	(0.0458)
Mid-sized central city (pop<250K)	0.0292*	0.0282*	0.0073	0.0226
	(0.0026)	(0.0026)	(0.0184)	(0.0522)
Fringe of large city	0.0131*	0.0109*	-0.0023	0.0048
	(0.0016)	(0.0016)	(0.0149)	(0.0593)
Fringe of med-sized city	0.0027	0.0030	-0.0403	
	(0.0016)	(0.0016)	(0.0347)	
Year 2002	0.0021*	0.0018*	0.0085	0.0053
	(0.0009)	(0.0009)	(0.0070)	(0.0106)
Year 2004	-0.0019*	-0.0017	0.0051	-0.0003
	(0.0009)	(0.0009)	(0.0074)	(0.0100)
Year 2006	-0.0091*	-0.0088*	0.0025	0.0156
	(0.0011)	(0.0011)	(0.0086)	(0.0118)

Variable	All	Not Urban	Some Urban	Highly Urban
Year 2008	-0.0040*	-0.0030*	0.0016	0.0157
	(0.0015)	(0.0015)	(0.0119)	(0.0160)
Constant	0.0367*	0.0419*	0.1157*	0.1206
	(0.0074)	(0.0073)	(0.0555)	(0.0946)
Standard Deviation (State)	0.0235*	0.0218*	0.0612*	0.0636*
	(0.0033)	(0.0033)	(0.0157)	(0.0309)
Standard Deviation (District)	0.1019*	0.0983*	0.1276*	0.1629*
	(0.0008)	(0.0008)	(0.0056)	(0.0098)
Standard Deviation (Residual)	0.0412*	0.0401*	0.0528*	0.0552*
	(0.0002)	(0.0002)	(0.0011)	(0.0016)
Log Likelihood Ratio	1308.65	894.09	110.85	97.92
Number of Observations	40636	38409	1408	780

Source: Author calculations from Common Core of Data and Private School Universe Survey of 1999–2000 through 2007–2008.
Note: An asterisk indicates that the coefficient is significantly different from zero at the 0.05 level. Standard errors are in parentheses. Omitted reference categories are TPS share, charter in district, weak charter law, white/non-Hispanic share, town/rural share, and year 2000.

Table C.4
Effects of Charters on Percent Catholic Middle Enrollment

Variable	All	Not Urban	Some Urban	Highly Urban
No charter in district	-0.0007	-0.0010	-0.0026	0.0058
	(0.0011)	(0.0011)	(0.0058)	(0.0086)
Charter enrollment share	-0.0352*	-0.0282*	-0.2197*	-0.0204
	(0.0065)	(0.0070)	(0.0375)	(0.0303)
Poverty rate for children 0 to 17	-0.0147	-0.0110	-0.0718	-0.1440
	(0.0107)	(0.0104)	(0.1073)	(0.1644)
Median income ($1000s)	0.0002*	0.0002*	-0.0003	0.0002
	(0.0001)	(0.0001)	(0.0006)	(0.0009)
Population growth rate (2-year)	-0.0081	-0.0042	-0.0459	0.1760*
	(0.0078)	(0.0082)	(0.0303)	(0.0791)
Black population share	0.0389*	0.0047	-0.1180	0.1796*
	(0.0075)	(0.0078)	(0.0667)	(0.0845)
Asian/Pacific Islander share	0.1276*	0.0602*	-0.3531*	0.3089*
	(0.0262)	(0.0300)	(0.1532)	(0.1303)
Hispanic share	0.0162*	0.0028	-0.0696	0.0575
	(0.0065)	(0.0066)	(0.0554)	(0.0657)

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Table C.4 *Continued*

Variable	All	Not Urban	Some Urban	Highly Urban
Unemployment rate	-0.0223	-0.0216	-0.0017	0.3557
	(0.0217)	(0.0209)	(0.2277)	(0.3174)
Population per square mile (1000)	0.0020*	0.0091*	0.0158*	0.0006
	(0.0003)	(0.0010)	(0.0048)	(0.0008)
Large central city (pop at least 250K)	0.0373*		0.1294*	0.0210
	(0.0042)		(0.0217)	(0.0406)
Mid-sized central city (pop<250K)	0.0199*	0.0189*	0.0046	0.0320
	(0.0018)	(0.0018)	(0.0153)	(0.0462)
Fringe of large city	0.0122*	0.0101*	-0.0024	0.0315
	(0.0011)	(0.0011)	(0.0124)	(0.0519)
Fringe of med-sized city	0.0036*	0.0035*	0.0127	
	(0.0011)	(0.0011)	(0.0292)	
Year 2002	-0.0003	-0.0002	0.0035	0.0021
	(0.0006)	(0.0006)	(0.0059)	(0.0094)
Year 2004	-0.0021*	-0.0017*	0.0044	-0.0036
	(0.0006)	(0.0006)	(0.0062)	(0.0087)
Year 2006	-0.0054*	-0.0046*	0.0055	-0.0008
	(0.0008)	(0.0007)	(0.0072)	(0.0100)
Year 2008	-0.0055*	-0.0044*	0.0090	-0.0030
	(0.0010)	(0.0010)	(0.0100)	(0.0134)
Constant	0.0108*	0.0158*	0.1359*	-0.0107
	(0.0054)	(0.0051)	(0.0467)	(0.0761)
Standard Deviation (State)	0.0196*	0.0163*	0.0604*	0.0447*
	(0.0026)	(0.0023)	(0.0136)	(0.0170)
Standard Deviation (District)	0.0755*	0.0732*	0.0998*	0.0950*
	(0.0006)	(0.0006)	(0.0045)	(0.0061)
Standard Deviation (Residual)	0.0283*	0.0267*	0.0447*	0.0502*
	(0.0001)	(0.0001)	(0.0010)	(0.0015)
Log Likelihood Ratio	762.55	562.51	108.11	22.73
Number of Observations	40636	38409	1408	780

Source: Author calculations from Common Core of Data and Private School Universe Survey of 1999–2000 through 2007–2008.

Note: An asterisk indicates that the coefficient is significantly different from zero at the 0.05 level. Standard errors are in parentheses. Omitted reference categories are TPS share, charter in district, white/non-Hispanic share, town/rural share, and year 2000.

Table C.5
Effects of Charters on Percent Other Religious Middle Enrollment

Variable	All	Not Urban	Some Urban	Highly Urban
No charter in district	-0.0049*	-0.0044*	-0.0049	0.0083
	(0.0011)	(0.0012)	(0.0043)	(0.0062)
Charter enrollment share	-0.0627*	-0.0388*	-0.1200*	-0.1750*
	(0.0063)	(0.0070)	(0.0267)	(0.0215)
Poverty rate for children 0 to 17	-0.0258*	-0.0249*	0.0602	-0.0083
	(0.0103)	(0.0103)	(0.0750)	(0.1171)
Median income ($1000s)	0.0000	0.0000	0.0002	-0.0002
	(0.0001)	(0.0001)	(0.0004)	(0.0007)
Population growth rate (2-year)	-0.0083	-0.0065	-0.0336	0.0926
	(0.0077)	(0.0085)	(0.0224)	(0.0545)
Black population share	0.0267*	0.0204*	0.0206	-0.0232
	(0.0055)	(0.0059)	(0.0345)	(0.0696)
Asian/Pacific Islander share	0.0525*	0.0268	0.0148	0.1017
	(0.0204)	(0.0240)	(0.0732)	(0.0950)
Hispanic share	0.0035	0.0014	-0.0138	-0.0313
	(0.0048)	(0.0050)	(0.0252)	(0.0478)
Unemployment rate	-0.0366	-0.0360	-0.1757	0.1925
	(0.0212)	(0.0213)	(0.1588)	(0.2220)
Population per square mile (1000)	0.0007*	0.0019*	-0.0009	0.0005
	(0.0003)	(0.0007)	(0.0023)	(0.0006)
Large central city (pop at least 250K)	0.0210*		0.0167	0.0084
	(0.0036)		(0.0091)	(0.0284)
Mid-sized central city (pop<250K)	0.0108*	0.0108*	0.0031	0.0114
	(0.0017)	(0.0017)	(0.0096)	(0.0323)
Fringe of large city	0.0025*	0.0015	0.0021	0.0009
	(0.0011)	(0.0011)	(0.0077)	(0.0367)
Fringe of med-sized city	-0.0002	-0.0000	-0.0324	
	(0.0011)	(0.0010)	(0.0214)	
Year 2002	0.0018*	0.0015*	0.0077	0.0050
	(0.0006)	(0.0006)	(0.0042)	(0.0065)
Year 2004	-0.0000	-0.0002	0.0031	0.0032
	(0.0006)	(0.0006)	(0.0044)	(0.0060)
Year 2006	-0.0022*	-0.0026*	0.0032	0.0080
	(0.0007)	(0.0008)	(0.0049)	(0.0070)
Year 2008	0.0026*	0.0024*	0.0045	0.0167
	(0.0010)	(0.0010)	(0.0066)	(0.0094)

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Table C.5 *Continued*

Variable	All	Not Urban	Some Urban	Highly Urban
Constant	0.0263*	0.0263*	0.0305	0.0422
	(0.0043)	(0.0044)	(0.0284)	(0.0559)
Standard Deviation (State)	0.0097*	0.0099*	0.0116*	0.0000*
	(0.0015)	(0.0016)	(0.0051)	(0.0000)
Standard Deviation (District)	0.0516*	0.0504*	0.0510*	0.0973*
	(0.0004)	(0.0004)	(0.0024)	(0.0058)
Standard Deviation (Residual)	0.0289*	0.0284*	0.0347*	0.0343*
	(0.0001)	(0.0001)	(0.0007)	(0.0011)
Log Likelihood Ratio	461.70	296.51	34.98	103.13
Number of Observations	40636	38409	1408	780

Source: Author calculations from Common Core of Data and Private School Universe Survey of 1999–2000 through 2007–2008.

Note: An asterisk indicates that the coefficient is significantly different from zero at the 0.05 level. Standard errors are in parentheses. Omitted reference categories are TPS share, charter in district, white/non-Hispanic share, town/rural share, and year 2000.

Table C.6
Effects of Charters on Percent Nonsectarian Middle Enrollment

Variable	All	Not Urban	Some Urban	Highly Urban
No charter in district	-0.0018*	-0.0017*	0.0007	-0.0002
	(0.0008)	(0.0008)	(0.0031)	(0.0064)
Charter enrollment share	-0.0062	-0.0141*	0.1315*	-0.0326
	(0.0043)	(0.0046)	(0.0194)	(0.0244)
Poverty rate for children 0 to 17	-0.0067	-0.0090	0.0857	-0.1637
	(0.0070)	(0.0068)	(0.0549)	(0.1275)
Median income ($1000s)	0.0002*	0.0002*	0.0006*	-0.0011
	(0.0000)	(0.0000)	(0.0003)	(0.0007)
Population growth rate (2-year)	-0.0073	-0.0082	0.0025	-0.0357
	(0.0053)	(0.0056)	(0.0165)	(0.0689)
Black population share	0.0369*	0.0405*	0.0064	0.0202
	(0.0036)	(0.0038)	(0.0249)	(0.0471)
Asian/Pacific Islander share	0.0593*	0.0431*	0.1428*	0.2063*
	(0.0134)	(0.0158)	(0.0526)	(0.0713)

Variable	All	Not Urban	Some Urban	Highly Urban
Hispanic share	-0.0044	-0.0007	-0.0041	-0.0243
	(0.0031)	(0.0033)	(0.0200)	(0.0363)
Unemployment rate	-0.0093	-0.0116	-0.0637	0.0284
	(0.0146)	(0.0141)	(0.1143)	(0.2614)
Population per square mile (1000)	0.0002	-0.0004	-0.0047*	0.0014*
	(0.0002)	(0.0005)	(0.0016)	(0.0004)
Large central city (pop at least 250K)	0.0085*		0.0102	0.0034
	(0.0024)		(0.0065)	(0.0338)
Mid-sized central city (pop<250K)	0.0017	0.0010	0.0111	0.0012
	(0.0011)	(0.0011)	(0.0067)	(0.0388)
Fringe of large city	-0.0015*	-0.0010	-0.0005	-0.0133
	(0.0007)	(0.0007)	(0.0053)	(0.0419)
Fringe of med-sized city	-0.0009	-0.0008	-0.0136	
	(0.0007)	(0.0007)	(0.0155)	
Year 2002	0.0009*	0.0008	0.0028	0.0037
	(0.0004)	(0.0004)	(0.0031)	(0.0081)
Year 2004	0.0005	0.0004	0.0000	0.0063
	(0.0004)	(0.0004)	(0.0032)	(0.0075)
Year 2006	-0.0015*	-0.0017*	-0.0048	0.0139
	(0.0005)	(0.0005)	(0.0036)	(0.0080)
Year 2008	-0.0009	-0.0009	-0.0069	0.0123
	(0.0007)	(0.0007)	(0.0048)	(0.0102)
Constant	-0.0011	-0.0010	-0.0247	0.0810
	(0.0029)	(0.0028)	(0.0208)	(0.0550)
Standard Deviation (State)	0.0056*	0.0055*	0.0244*	0.0170*
	(0.0008)	(0.0008)	(0.0051)	(0.0077)
Standard Deviation (District)	0.0331*	0.0331*	0.0278*	0.0431*
	(0.0003)	(0.0003)	(0.0014)	(0.0031)
Standard Deviation (Residual)	0.0201*	0.0189*	0.0261*	0.0461*
	(0.0001)	(0.0001)	(0.0005)	(0.0013)
Log Likelihood Ratio	352.50	270.66	102.35	33.56
Number of Observations	40636	38409	1408	780

Source: Author calculations from Common Core of Data and Private School Universe Survey of 1999–2000 through 2007–2008.

Note: An asterisk indicates that the coefficient is significantly different from zero at the 0.05 level. Standard errors are in parentheses. Omitted reference categories are TPS share, charter in district, white/non-Hispanic share, town/rural share, and year 2000.

Appendix D:
Variable Means and Regression Results
for High School Students

Table D.1
Means and Standard Deviations of High School Variables

Variable	Not Urban	Urban	Total
Private enrollment share	0.0657	0.114	0.0786
	(0.111)	(0.102)	(0.111)
Catholic enrollment share	0.0324	0.0635	0.0407
	(0.0860)	(0.0866)	(0.0872)
Other religious enrollment share	0.0219	0.0328	0.0248
	(0.0490)	(0.0394)	(0.0468)
Nonsectarian enrollment share	0.0114	0.0177	0.0131
	(0.0451)	(0.0289)	(0.0415)
No charter in district	0.790	0.285	0.655
	(0.407)	(0.452)	(0.475)
Charter enrollment share	0.0105	0.0356	0.0172
	(0.0413)	(0.0583)	(0.0477)
Pro-charter laws (CER)	0.454	0.535	0.476
	(0.498)	(0.499)	(0.499)
Poverty rate for children 0 to 17	0.162	0.202	0.173
	(0.0720)	(0.0648)	(0.0723)
Median income ($1000s)	49.06	47.96	48.76
	(13.65)	(10.11)	(12.81)
Population growth rate (2-year)	0.0234	0.0291	0.0249
	(0.0329)	(0.0401)	(0.0350)
Black population share	0.125	0.203	0.146
	(0.129)	(0.157)	(0.142)
Asian/Pacific Islander share	0.0342	0.0710	0.0440
	(0.0404)	(0.0744)	(0.0542)
Hispanic share	0.169	0.326	0.211
	(0.184)	(0.199)	(0.201)
Unemployment rate	0.0532	0.0546	0.0536
	(0.0173)	(0.0143)	(0.0166)
Population per square mile (1000s)	0.847	4.485	1.818
	(1.253)	(9.713)	(5.376)
Large central city (pop at least 250K)	NA	0.606	0.162
		(0.408)	(0.341)

Variable	Not Urban	Urban	Total
Mid-sized central city (pop<250K)	0.187	0.0642	0.154
	(0.344)	(0.194)	(0.316)
Fringe of large city	0.316	0.275	0.305
	(0.437)	(0.344)	(0.415)
Fringe of med-sized city	0.147	0.00651	0.109
	(0.314)	(0.0446)	(0.277)
Year 2002	0.182	0.177	0.181
	(0.386)	(0.382)	(0.385)
Year 2004	0.206	0.212	0.208
	(0.404)	(0.409)	(0.406)
Year 2006	0.225	0.226	0.225
	(0.418)	(0.418)	(0.418)
Year 2008	0.234	0.233	0.234
	(0.423)	(0.423)	(0.423)

Source: Author calculations from Common Core of Data and Private School Universe Survey of 1999–2000 through 2007–2008.
Note: Entries are means with standard deviations in parentheses. Means are weighted by high school enrollments.

Table D.2
Effects of Charters on Percent Private High School Enrollment

Variable	All	Not Urban	Some Urban	Highly Urban
No charter in district	-0.0087*	-0.0094*	-0.0048	-0.0036
	(0.0018)	(0.0018)	(0.0097)	(0.0124)
Charter enrollment share	-0.1175*	-0.1112*	-0.1425*	-0.1545*
	(0.0105)	(0.0112)	(0.0630)	(0.0543)
Poverty rate for children 0 to 17	-0.0117	-0.0236	0.2499	0.4098
	(0.0164)	(0.0160)	(0.1958)	(0.2685)
Median income ($1000s)	0.0005*	0.0005*	0.0012	-0.0016
	(0.0001)	(0.0001)	(0.0013)	(0.0017)
Population growth rate (2-year)	-0.0391*	-0.0361*	-0.1067*	0.1391
	(0.0119)	(0.0125)	(0.0539)	(0.1206)
Black population share	0.1173*	0.0722*	0.0229	0.3457*
	(0.0100)	(0.0104)	(0.1022)	(0.1355)
Asian/Pacific Islander share	0.1498*	0.0591	-0.2591	0.8211*
	(0.0402)	(0.0449)	(0.2227)	(0.2457)

Table D.2 *Continued*

Variable	All	Not Urban	Some Urban	Highly Urban
Hispanic share	0.0179*	0.0092	-0.1225	-0.0197
	(0.0086)	(0.0086)	(0.0781)	(0.1064)
Unemployment rate	-0.1203*	-0.0806*	-1.6244*	-0.9491
	(0.0337)	(0.0327)	(0.4181)	(0.5400)
Population per square mile (1000s)	0.0010*	0.0084*	0.0154	-0.0006
	(0.0004)	(0.0013)	(0.0079)	(0.0014)
Large central city (pop at least 250K)	0.0909*	NA	0.0753*	-0.0056
	(0.0060)		(0.0198)	(0.0482)
Mid-sized central city (pop<250K)	0.0279*	0.0266*	-0.0012	-0.0220
	(0.0026)	(0.0026)	(0.0217)	(0.0599)
Fringe of large city	0.0082*	0.0064*	-0.0267	-0.0828
	(0.0017)	(0.0017)	(0.0171)	(0.0561)
Fringe of med-sized city	-0.0019	-0.0020	0.0922	NA
	(0.0017)	(0.0016)	(0.0855)	
Year 2002	0.0038*	0.0032*	0.0327*	0.0276
	(0.0010)	(0.0010)	(0.0109)	(0.0150)
Year 2004	0.0010	0.0007	0.0282*	0.0112
	(0.0010)	(0.0010)	(0.0116)	(0.0148)
Year 2006	-0.0062*	-0.0052*	-0.0149	0.0054
	(0.0012)	(0.0012)	(0.0136)	(0.0175)
Year 2008	-0.0024	-0.0017	0.0094	0.0262
	(0.0016)	(0.0015)	(0.0186)	(0.0229)
Constant	0.0158*	0.0212*	0.1209	0.0848
	(0.0070)	(0.0068)	(0.0840)	(0.1223)
Standard Deviation (State)	0.0144*	0.0128*	0.0530*	0.0643*
	(0.0023)	(0.0021)	(0.0203)	(0.0255)
Standard Deviation (District)	0.0927*	0.0888*	0.1296*	0.1648*
	(0.0007)	(0.0007)	(0.0073)	(0.0106)
Standard Deviation (Residual)	0.0439*	0.0421*	0.0711*	0.0746*
	(0.0002)	(0.0002)	(0.0018)	(0.0024)
Log Likelihood Ratio	1082.10	654.26	85.65	53.06
Number of Observations	38787	37107	1010	670

Source: Author calculations from Common Core of Data and Private School Universe Survey of 1999–2000 through 2007–2008.
Note: An asterisk indicates that the coefficient is significantly different from zero at the 0.05 level. Standard errors are in parentheses. Omitted reference categories are TPS share, charter in district, white/non-Hispanic share, town/rural share, and year 2000. No schools in mostly urban districts are in the fringe of midsized cities.

Table D.3
Effects of Charters and CER Status on Percent Private High School Enrollment

Variable	All	Not Urban	Some Urban	Highly Urban
No charter in district	-0.0088*	-0.0094*	-0.0047	-0.0036
	(0.0018)	(0.0019)	(0.0097)	(0.0124)
Charter enrollment share	-0.1209*	-0.1148*	-0.1784*	-0.1537*
	(0.0152)	(0.0168)	(0.0778)	(0.0718)
Private enrollment share & pro-charter law	0.0057	0.0058	0.0846	-0.0017
	(0.0183)	(0.0196)	(0.1078)	(0.0982)
Poverty rate for children 0 to 17	-0.0116	-0.0236	0.2495	0.4098
	(0.0164)	(0.0160)	(0.1959)	(0.2688)
Median income ($1000s)	0.0005*	0.0005*	0.0012	-0.0016
	(0.0001)	(0.0001)	(0.0013)	(0.0017)
Population growth rate (2-year)	-0.0389*	-0.0360*	-0.1036	0.1387
	(0.0119)	(0.0125)	(0.0541)	(0.1225)
Black population share	0.1173*	0.0722*	0.0282	0.3457*
	(0.0100)	(0.0104)	(0.1023)	(0.1356)
Asian/Pacific Islander share	0.1499*	0.0591	-0.2583	0.8215*
	(0.0402)	(0.0449)	(0.2224)	(0.2459)
Hispanic share	0.0179*	0.0092	-0.1218	-0.0196
	(0.0086)	(0.0086)	(0.0780)	(0.1065)
Unemployment rate	-0.1204*	-0.0807*	-1.6581*	-0.9491
	(0.0337)	(0.0327)	(0.4205)	(0.5406)
Population per square mile (1000s)	0.0010*	0.0084*	0.0153	-0.0006
	(0.0004)	(0.0013)	(0.0079)	(0.0014)
Large central city (pop at least 250K)	0.0910*	NA	0.0754*	-0.0055
	(0.0060)		(0.0199)	(0.0482)
Mid-sized central city (pop<250K)	0.0279*	0.0266*	-0.0013	-0.0220
	(0.0026)	(0.0026)	(0.0217)	(0.0599)
Fringe of large city	0.0082*	0.0064*	-0.0271	-0.0827
	(0.0017)	(0.0017)	(0.0171)	(0.0565)
Fringe of med-sized city	-0.0019	-0.0020	0.0890	NA
	(0.0017)	(0.0016)	(0.0856)	
Year 2002	0.0038*	0.0032*	0.0335*	0.0276
	(0.0010)	(0.0010)	(0.0110)	(0.0151)
Year 2004	0.0010	0.0007	0.0292*	0.0112
	(0.0010)	(0.0010)	(0.0117)	(0.0148)
Year 2006	-0.0061*	-0.0052*	-0.0141	0.0054
	(0.0012)	(0.0012)	(0.0136)	(0.0175)

Table D.3 *Continued*

Variable	All	Not Urban	Some Urban	Highly Urban
Year 2008	-0.0024	-0.0017	0.0101	0.0262
	(0.0016)	(0.0015)	(0.0187)	(0.0229)
Constant	0.0158*	0.0213*	0.1214	0.0848
	(0.0070)	(0.0068)	(0.0840)	(0.1224)
Standard Deviation (State)	0.0144*	0.0128*	0.0529*	0.0644*
	(0.0023)	(0.0021)	(0.0203)	(0.0256)
Standard Deviation (District)	0.0927*	0.0888*	0.1294*	0.1649*
	(0.0007)	(0.0007)	(0.0073)	(0.0106)
Standard Deviation (Residual)	0.0439*	0.0421*	0.0712*	0.0747*
	(0.0002)	(0.0002)	(0.0018)	(0.0024)
Log Likelihood Ratio	1082.03	654.19	85.13	53.15
Number of Observations	38787	37107	1010	670

Source: Author calculations from Common Core of Data and Private School Universe Survey of 1999–2000 through 2007–2008.

Note: An asterisk indicates that the coefficient is significantly different from zero at the .05 level. Standard errors are in parentheses. Omitted reference categories are TPS share, charter in district, weak charter law, white/non-Hispanic share, town/rural share, and year 2000. No schools in mostly urban districts are in the fringe of midsized cities.

Table D.4
Effects of Charters on Percent Catholic High School Enrollment

Variable	All	Not Urban	Some Urban	Highly Urban
No charter in district	-0.0020	-0.0022	-0.0033	-0.0020
	(0.0012)	(0.0012)	(0.0086)	(0.0092)
Charter enrollment share	-0.0568*	-0.0556*	-0.0766	-0.0368
	(0.0072)	(0.0075)	(0.0562)	(0.0395)
Poverty rate for children 0 to 17	-0.0042	-0.0101	-0.0031	0.0429
	(0.0114)	(0.0107)	(0.1741)	(0.2000)
Median income ($1000s)	0.0001	0.0001	0.0007	-0.0003
	(0.0001)	(0.0001)	(0.0011)	(0.0012)
Population growth rate (2-year)	-0.0148	-0.0092	-0.0924	0.1613
	(0.0082)	(0.0083)	(0.0480)	(0.0860)
Black population share	0.0630*	0.0145*	0.0365	0.2545*
	(0.0074)	(0.0073)	(0.0868)	(0.1049)
Asian/Pacific Islander share	0.1039*	0.0061	-0.2087	0.5276*
	(0.0293)	(0.0316)	(0.1844)	(0.1873)

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Variable	All	Not Urban	Some Urban	Highly Urban
Hispanic share	0.0073	-0.0037	-0.0866	0.0217
	(0.0064)	(0.0060)	(0.0609)	(0.0798)
Unemployment rate	-0.0430	-0.0146	-0.9871*	-0.3159
	(0.0232)	(0.0217)	(0.3699)	(0.3938)
Population per square mile (1000s)	0.0008*	0.0109*	0.0139*	-0.0010
	(0.0003)	(0.0010)	(0.0067)	(0.0010)
Large central city (pop at least 250K)	0.0586*	NA	0.0390*	0.0070
	(0.0042)		(0.0177)	(0.0375)
Mid-sized central city (pop<250K)	0.0192*	0.0180*	-0.0067	0.0064
	(0.0018)	(0.0018)	(0.0194)	(0.0473)
Fringe of large city	0.0067*	0.0054*	-0.0276	0.0046
	(0.0012)	(0.0011)	(0.0152)	(0.0437)
Fringe of med-sized city	-0.0000	-0.0001	0.1064	NA
	(0.0012)	(0.0011)	(0.0762)	
Year 2002	0.0008	0.0007	0.0169	0.0090
	(0.0007)	(0.0006)	(0.0097)	(0.0110)
Year 2004	-0.0001	0.0001	0.0128	0.0068
	(0.0007)	(0.0007)	(0.0102)	(0.0108)
Year 2006	-0.0026*	-0.0012	-0.0146	0.0007
	(0.0008)	(0.0008)	(0.0119)	(0.0129)
Year 2008	-0.0022*	-0.0009	-0.0001	0.0076
	(0.0011)	(0.0010)	(0.0163)	(0.0168)
Constant	0.0034	0.0087	0.0995	0.0112
	(0.0050)	(0.0046)	(0.0732)	(0.0931)
Standard Deviation (State)	0.0119*	0.0075*	0.0248*	0.0381*
	(0.0018)	(0.0014)	(0.0158)	(0.0269)
Standard Deviation (District)	0.0696*	0.0657*	0.1172*	0.1322*
	(0.0005)	(0.0005)	(0.0063)	(0.0083)
Standard Deviation (Residual)	0.0299*	0.0277*	0.0635*	0.0524*
	(0.0001)	(0.0001)	(0.0016)	(0.0017)
Log Likelihood Ratio	682.93	491.20	65.13	52.73
Number of Observations	38787	37107	1010	670

Source: Author calculations from Common Core of Data and Private School Universe Survey of 1999–2000 through 2007–2008.

Note: An asterisk indicates that the coefficient is significantly different from zero at the 0.05 level. Standard errors are in parentheses. Omitted reference categories are TPS share, charter in district, white/non-Hispanic share, town/rural share, and year 2000. No schools in mostly urban districts are in the fringe of midsized cities.

Table D.5
Effects of Charters on Percent Other Religious High School Enrollment

Variable	All	Not Urban	Some Urban	Highly Urban
No charter in district	-0.0032*	-0.0035*	0.0010	0.0003
	(0.0011)	(0.0011)	(0.0047)	(0.0066)
Charter enrollment share	-0.0242*	-0.0229*	-0.0427	-0.0096
	(0.0062)	(0.0068)	(0.0306)	(0.0291)
Poverty rate for children 0 to 17	-0.0069	-0.0058	0.0161	0.0710
	(0.0096)	(0.0096)	(0.0941)	(0.1429)
Median income ($1000s)	0.0002*	0.0002*	-0.0002	-0.0006
	(0.0001)	(0.0001)	(0.0006)	(0.0009)
Population growth rate (2-year)	-0.0072	-0.0105	0.0008	-0.0067
	(0.0072)	(0.0077)	(0.0263)	(0.0635)
Black population share	0.0251*	0.0226*	-0.0201	-0.0409
	(0.0051)	(0.0054)	(0.0418)	(0.0741)
Asian/Pacific Islander share	0.0237	0.0297	-0.0074	0.0245
	(0.0211)	(0.0242)	(0.0895)	(0.1331)
Hispanic share	0.0022	0.0042	-0.0431	-0.1285*
	(0.0043)	(0.0044)	(0.0314)	(0.0553)
Unemployment rate	-0.0448*	-0.0410*	-0.3383	-0.1212
	(0.0200)	(0.0198)	(0.2015)	(0.2850)
Population per square mile (1000s)	0.0003	-0.0006	0.0023	0.0004
	(0.0002)	(0.0007)	(0.0032)	(0.0007)
Large central city (pop at least 250K)	0.0218*	NA	0.0317*	0.0138
	(0.0034)		(0.0097)	(0.0255)
Mid-sized central city (pop<250K)	0.0078*	0.0076*	0.0069	0.0078
	(0.0015)	(0.0016)	(0.0104)	(0.0316)
Fringe of large city	0.0033*	0.0028*	0.0061	0.0323
	(0.0010)	(0.0010)	(0.0081)	(0.0297)
Fringe of med-sized city	-0.0008	-0.0009	0.0253	NA
	(0.0010)	(0.0010)	(0.0410)	
Year 2002	0.0021*	0.0020*	0.0086	-0.0020
	(0.0006)	(0.0006)	(0.0053)	(0.0079)
Year 2004	0.0006	0.0004	0.0134*	-0.0029
	(0.0006)	(0.0006)	(0.0056)	(0.0078)
Year 2006	-0.0017*	-0.0020*	0.0078	0.0031
	(0.0007)	(0.0007)	(0.0065)	(0.0092)
Year 2008	0.0006	0.0002	0.0178*	0.0099
	(0.0009)	(0.0009)	(0.0088)	(0.0121)

Variable	All	Not Urban	Some Urban	Highly Urban
Constant	0.0082*	0.0078*	0.0570	0.0850
	(0.0039)	(0.0039)	(0.0384)	(0.0649)
Standard Deviation (State)	0.0044*	0.0049*	0.0191*	0.0214*
	(0.0009)	(0.0010)	(0.0076)	(0.0130)
Standard Deviation (District)	0.0471*	0.0457*	0.0493*	0.0985*
	(0.0004)	(0.0004)	(0.0029)	(0.0063)
Standard Deviation (Residual)	0.0269*	0.0263*	0.0356*	0.0392*
	(0.0001)	(0.0001)	(0.0009)	(0.0013)
Log Likelihood Ratio	290.53	196.86	23.20	11.53
Number of Observations	38787	37107	1010	670

Source: Author calculations from Common Core of Data and Private School Universe Survey of 1999–2000 through 2007–2008.
Note: An asterisk indicates that the coefficient is significantly different from zero at the 0.05 level. Standard errors are in parentheses. Omitted reference categories are TPS share, charter in district, white/non-Hispanic share, town/rural share, and year 2000. No schools in mostly urban districts are in the fringe of midsized cities.

Table D.6
Effects of Charters on Percent Nonsectarian High School Enrollment

Variable	All	Not Urban	Some Urban	Highly Urban
No charter in district	-0.0032*	-0.0032*	-0.0027	-0.0032
	(0.0009)	(0.0010)	(0.0034)	(0.0073)
Charter enrollment share	-0.0276*	-0.0253*	-0.0219	-0.0214
	(0.0053)	(0.0057)	(0.0223)	(0.0296)
Poverty rate for children 0 to 17	-0.0014	-0.0086	0.2311*	0.0326
	(0.0083)	(0.0081)	(0.0701)	(0.1540)
Median income ($1000s)	0.0002*	0.0002*	0.0004	-0.0005
	(0.0001)	(0.0001)	(0.0005)	(0.0009)
Population growth rate (2-year)	-0.0152*	-0.0148*	-0.0206	-0.0275
	(0.0063)	(0.0066)	(0.0192)	(0.0859)
Black population share	0.0334*	0.0355*	-0.0076	-0.0205
	(0.0042)	(0.0045)	(0.0442)	(0.0498)
Asian/Pacific Islander share	0.0167	0.0179	-0.0340	0.1421
	(0.0171)	(0.0195)	(0.0981)	(0.0814)
Hispanic share	0.0057	0.0062	-0.0339	-0.0002
	(0.0036)	(0.0037)	(0.0347)	(0.0391)
Unemployment rate	-0.0349*	-0.0260	-0.2902	-0.3717
	(0.0176)	(0.0171)	(0.1493)	(0.3441)

Continued next page

Table D.6 *Continued*

Variable	All	Not Urban	Some Urban	Highly Urban
Population per square mile (1000s)	0.0000	-0.0009	-0.0004	0.0007
	(0.0002)	(0.0006)	(0.0035)	(0.0005)
Large central city (pop at least 250K)	0.0103*	NA	0.0061	-0.0410
	(0.0028)		(0.0070)	(0.0328)
Mid-sized central city (pop<250K)	0.0006	0.0005	0.0001	-0.0428
	(0.0013)	(0.0013)	(0.0078)	(0.0408)
Fringe of large city	-0.0024*	-0.0023*	-0.0045	-0.0680
	(0.0009)	(0.0009)	(0.0062)	(0.0379)
Fringe of med-sized city	-0.0010	-0.0010	-0.0253	NA
	(0.0008)	(0.0008)	(0.0306)	
Year 2002	0.0010	0.0005	0.0072	0.0212*
	(0.0005)	(0.0005)	(0.0039)	(0.0106)
Year 2004	0.0007	0.0003	0.0028	0.0126
	(0.0005)	(0.0005)	(0.0042)	(0.0102)
Year 2006	-0.0016*	-0.0018*	-0.0051	0.0117
	(0.0006)	(0.0006)	(0.0049)	(0.0109)
Year 2008	-0.0006	-0.0007	-0.0033	0.0138
	(0.0008)	(0.0008)	(0.0069)	(0.0134)
Constant	0.0043	0.0050	-0.0093	0.0910
	(0.0035)	(0.0035)	(0.0320)	(0.0652)
Standard Deviation (State)	0.0080*	0.0081*	0.0273*	0.0184*
	(0.0011)	(0.0011)	(0.0095)	(0.0088)
Standard Deviation (District)	0.0356*	0.0346*	0.0614*	0.0405*
	(0.0003)	(0.0003)	(0.0035)	(0.0041)
Standard Deviation (Residual)	0.0239*	0.0228*	0.0247*	0.0581*
	(0.0001)	(0.0001)	(0.0006)	(0.0019)
Log Likelihood Ratio	202.00	155.81	20.81	17.07
Number of Observations	38787	37107	1010	670

Source: Author calculations from Common Core of Data and Private School Universe Survey of 1999–2000 through 2007–2008.
Notes: An asterisk indicates that the coefficient is significantly different from zero at the 0.05 level. Standard errors are in parentheses. Omitted reference categories are TPS share, charter in district, white/non-Hispanic share, town/rural share, and year 2000. No schools in mostly urban districts are in the fringe of midsized cities.

Appendix E:
Enrollments and Numbers of Schools by School Type and Urbanicity, 2008

Table E.1
Enrollment by School Type and Urbanicity, 2008

School Type	All Students	Non-Urban Students	Some Urban Students	Highly Urban Students
Elementary Schools				
TPS	19,005,101	14,754,198	1,296,087	2,954,816
Charter	582,567	315,887	56,647	210,033
Catholic	928,170	672,231	46,419	209,520
Other Religious	900,107	643,775	74,812	181,521
Nonsectarian	336,557	208,557	31,364	96,636
Total	**21,752,502**	**16,594,648**	**1,505,330**	**3,652,525**
Middle Schools				
TPS	9,833,809	7,778,745	654,513	1,400,551
Charter	295,092	148,880	26,105	120,107
Catholic	479,949	338,260	22,840	118,850
Other Religious	420,522	296,256	39,009	85,256
Nonsectarian	159,434	102,730	10,576	46,128
Total	**11,188,806**	**8,664,871**	**753,044**	**1,770,892**
High Schools				
TPS	13,221,367	10,609,357	820,985	1,791,025
Charter	365,043	183,626	26,720	154,697
Catholic	583,281	381,179	28,130	173,971
Other Religious	406,677	284,238	38,167	84,271
Nonsectarian	218,355	148,754	11,919	57,683
Total	**14,794,723**	**11,607,155**	**925,921**	**2,261,647**

Source: Author calculations from Common Core of Data and Private School Universe Survey of 2007–2008.

Table E.2
Number of Schools by School Type and Urbanicity, 2008

School Type	All Schools	Non-Urban Schools	Some Urban Schools	Highly Urban Schools
Elementary Schools				
TPS	47,911	39,083	2,262	6,566
Charter	2,552	1,427	228	897
Catholic	5,255	3,906	205	1,144
Other Religious	9,515	7,560	601	1,354
Nonsectarian	3,662	2,573	344	745
Total	**68,895**	**54,549**	**3,640**	**10,706**
Middle Schools				
TPS	33,763	27,870	1,557	4,336
Charter	2,513	1,451	191	871
Catholic	5,284	3,916	202	1,166
Other Religious	8,932	7,189	533	1,210
Nonsectarian	2,275	1,637	149	489
Total	**52,767**	**42,063**	**2,632**	**8,072**
High Schools				
TPS	19,323	16,374	862	2,087
Charter	1,825	1,041	136	648
Catholic	1,118	806	49	263
Other Religious	4,676	3,735	313	628
Nonsectarian	1,332	978	80	284
Total	**28,274**	**22,934**	**1,430**	**3,910**

Source: Author calculations from Common Core of Data and Private School Universe Survey of 2007–2008.

Notes

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3. Charter growth was large in percentage terms

in the 1990s, but the numbers of students and schools were small. The base year for this calculation is 2000, because the National Center for Education Statistics did not tabulate information on charters until 1999.

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13.   Some lottery losers may attend a private school and not take the state-sponsored student achievement test. As a result, private school students are generally not considered in lottery studies of student achievement. This problem may bias the results of some lottery studies.

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44. Gerhard Glomm, Douglas Harris, and Te-Fen Lo, "Charter School Location," Economics of Education Review 24, no. (2005): 451–57.

45. Booker, Zimmer, and Buddin, "The Effect of Charter Schools on School Peer Composition."

46. Christiana Stoddard and Sean Corcoran, "The Political Economy of School Choice: Support for Charter Schools across States and School Districts," *Journal of Urban Economics* 62 (2007): 27–54.

47. Eugenia Toma, Ron Zimmer, and John Jones, "Beyond Achievement: Enrollment Consequences of Charter Schools in Michigan," *Advances in Applied Microeconomics* 14 (2006): 241–55.

48. Rajashri Chakrabarti and Joydeep Roy, "Do Charter Schools Crowd Out Private School Enrollment? Evidence from Michigan," Federal Reserve Bank of New York, Staff Report No. 472, 2010.

49. Ibid. Chakrabarti and Roy also used an instrumental variable approach similar to that of Bettinger (see note 26).

50. A correlation between charter laws and enrollments would not necessarily imply that those laws have a causal effect on enrollments. States may enact "strong" charter laws because parents in those states are eager to have charter alternatives for traditional public schools. If so, the charter environment in those states would be favorable for charters even in the absence of the strong charter laws. The problem is that it is

difficult to isolate the separate effects of the laws on charter enrollment from the underlying attitudes of state residents toward charters.

51. Zimmer et al., in *Charter Schools in Eight States: Effects of Achievement, Attainment, Integration, and Competition*, showed that students are more likely to attend a charter school if there is a charter near their traditional public school. This presumably reflects the fact that the time and money costs of attending a charter are reduced by the proximity of the charter. A similar issue is likely to accrue for private schools.

52. John Witte, Arnold Shober, and Paul Manna, "Analyzing State Charter School Laws and Their Influence on the Formation of Charter Schools in the United States," unpublished manuscript, 2003.

53. Center for Research on Education Outcomes (CREDO), *Multiple Choice: Charter School Performance in 16 States* (Stanford, CA: CREDO, 2009).

54. Andrew Campanella, Malcom Gleen, and Lauren Perry, *Hope for America's Children: School Choice Yearbook 2010–11* (Washington: Alliance for School Choice, 2011). In addition to scholarships for general education students, some states have scholarship programs for disabled students. These programs are generally small, but they do enhance the choice options for disabled students. This research focuses on the overall enrollment patterns, so the analysis was unable to detect the effects of these programs on the enrollment choices for disabled students.

55. Many districts span more than one county. District-level demographic and economic variables are computed by averaging the county-level variables for each school in the district. The averages are weighted by the number of students in each district school.

56. A portion of Chakrabarti and Roy's analysis, "Do Charter Schools Crowd Out Private School Enrollment? Evidence from Michigan," was based on the 1990 and 2000 censuses. District-level measures of population demographics, wealth, and employment patterns are available for census years. The limitation of census data for this type of analysis is that the data are only collected at 10-year intervals. The biannual approach used here captures more of the ongoing changes in charter competition between traditional and private schools.

57. In several states (e.g., Florida, Maryland, and Virginia), districts are countywide. In some of these counties, demographics and economics opportunities may vary considerably within the counties.

58. Jeffrey Wooldridge, *Econometric Analysis of Cross Section and Panel Data* (Cambridge, MA: MIT Press, 2002); and Andrew Gelman and Jennifer Hill, *Data Analysis using Regression and Multilevel/Hierarchical Models* (Cambridge: Cambridge University Press, 2007). Both the Wooldridge and Gelman and Hill studies discuss the relative merits of fixed and random effects models.

59. Initial work explored a school-level model, where traditional and private schools faced competition from charters within a five mile radius. This approach was used in several student-level studies of charter competition (Bifulco and Ladd, "The Impact of Charter Schools on Student Achievement: Evidence from North Carolina,"; Sass, "Charter Schools and Student Achievement in Florida,"; Buddin and Zimmer, "Is Charter School Competition in California Improving the Performance of Traditional Public Schools?"; Zimmer et al., *Charter Schools in Eight States: Effects of Achievement, Attainment, Integration, and Competition*). A school-level model of charter competition was explored in Chakrabarti and Roy, "Do Charter Schools Crowd Out Private School Enrollment? Evidence from Michigan." For our problem, the school-level approach had two problems. First, many districts had several traditional public schools within a five-mile (or even a 2.5 mile) radius of one another, so charters could potentially draw students from multiple TPSs. The potential advantages of a school-level approach were substantially diminished if charter enrollment gains were dispersed across several TPSs. Second, most of the control variables were not available at the school level. Socioeconomic, demographic, and economic conditions are measured only at the county level, except during census years. Given these issues, the analysis focused on competitive effects within school districts.

60. Appendix A shows enrollment type and urban status for each state with a charter law in 2008. Tables A.1, A.2, and A.3 describe patterns for elementary, middle, and high school students, respectively. Appendix A also lists large districts at each grade level that have at least 50 percent of their students in urban schools.

61. Glomm et al., *Charter Schools in Eight States: Effects of Achievement, Attainment, Integration, and Competition*; Booker, Zimmer, and Buddin, "The Effect of Charter Schools on School Peer Composition"; Stoddard and Corcoran, "The Political Economy of School Choice."

62. Witte et al., "Analyzing State Charter School Laws and Their Influence on the Formation of Charter Schools in the United States."

63. Wendy Chi and Kevin Welner, "Charter Ranking Roulette: An Analysis of Choice: Sup-

port for Charter Schools across States and School Districts," *Economics of Education Review* 24, no. 4 (2008): 451–57.

64. Figlio and Hart used student-level data to look at Florida's tax credit scholarship program. They found that the program had a positive effect on student test scores in traditional public schools: that is, test scores in TPSs near private alternatives improved more than at comparable TPSs where students had more limited access to private alternatives. See David Figlio and Cassandra Hart, "Competitive Effects of Means-Tested School Vouchers," Working Paper 16056, National Bureau of Economic Research, 2010.

65. The percentage of all charter students drawn from private schools is the weighted average of the percentage of elementary, middle, and high school students drawn from charters weighted by the proportions of charter students in schools at each grade level (see Tables 8 through 10).

66. The projections are based on the rates in Table 2. With 12 percent annual growth, charter enrollments would grow from 1.8 million in 2011 to about 3.2 million in 2016. A one percent growth in public enrollments would increase enrollments from 49.2 in 2011 to 52.8 in 2016.

67. Angrist et al., "Explaining Charter School Effectiveness"; Gleason et al., *The Evaluation of Charter School Impacts: Final Report*.