Competitive Pressure: How Private School Choice Influenced North Carolina's Public-School Environment

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Abstract

This report offers a rich descriptive analysis of private school competition in North Carolina. We capture five dimensions of school competition—proximity, density, diversity, slots, and the presence of places of worship—and categorize traditional public schools according to the degree of pressure they faced both before and after the enactment of the state-funded private school voucher program known as the Opportunity Scholarship program. A dynamic component of this analysis allows us to identify the fastest- and slowest- growing school choice counties in North Carolina. In addition to geographic region, we also incorporate information on school composition—including student race/ethnicity, gender, grade level, socioeconomic status, and prior achievement— to describe the characteristics of traditional public schools facing relatively high versus relatively low competition. Finally, to fully capture a further dimension of competition from school choice, we describe the private school competitive environments in regions of the state with low, medium, and high levels of charter school competition. This allows us to fully reflect the competition environments faced by traditional public schools responding to both public and private forms of school choice options.

Acknowledgments

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Executive Summary

This report offers a rich descriptive analysis of private school competition in North Carolina, which spread statewide with the enactment of the school voucher program known as the Opportunity Scholarship (OS) program in 2013. We document variation in the initial competitive landscape, as it was experienced by North Carolina's traditional public schools on the eve of the OS program becoming law, then trace the expansion of the program from 2013-14 to 2017-18. Over this time, student enrollment grew sixteen-fold and the number of participating private schools crossed the 500-school threshold. What have these changes meant for the traditional public school context? In this report, we quantify the evolving competitive landscape.

Usage Statistics

- In the 2022-23 school year, there are 25,547 students using Opportunity Scholarships in North Carolina. They are enrolled in 544 private schools.

Understanding the Landscape at Baseline (2013-14):

- We first consider competition in terms of private school proximity. On average, for traditional public schools in 2013-14, the nearest private school was 9.66 minutes or 5.48 miles away.

- We can also think about competition in terms of private school "density." In 2013-14, there were 3 private schools within a 10-minute drive-time radius from a traditional public school, on average.

- We also consider private school diversity— which we define in terms of a private school's religious affiliation or their status as an independent school if the school is not affiliated with a religion or church— to capture another component of school competition. On average, there is just one type of private school within a 10-minute drive-time radius around a traditional public school.

- We might expect that areas with a high charter school presence will also have a higher concentration of private schools as this might signal a greater interest in school choice in a given community, but this does not appear to be the case. There is not a large amount of variation across our competition measures when comparing locales by the degree of charter school concentration they face.

- There is some evidence that small public schools experience greater competitive pressure than large public schools. For example, there is a greater density of private schools within 10 minutes' driving distance from small public schools—four competitors on average— relative to large public schools— three competitors on average.

- Public schools with a higher percentage of Black students experience greater competitive pressure than public schools with fewer Black students. For example, within 10 minutes' driving distance, public schools that have more Black students have 244 private school seats available, compared to 144 seats available.

- In general, public schools with a high percentage of Hispanic students experience slightly more competitive pressure than public schools with fewer Hispanic students.

- The opposite pattern holds for public schools with a high percentage of White students. Schools with a high percentage of white students experience lower levels of competition across all five measures: proximity, density, diversity, and places of worship.

How the Establishment of the OS Program Affected North Carolina's Educational Landscape:

- Even though student enrollment had grown to 7,371 students in 405 private schools by 2017-18, the competitive landscape had barely changed since 2013-14. For example, the average public school was still approximately nine minutes (or five miles) from its nearest private school competitor. Similarly, the density and diversity of private school competitors remained unchanged within 10-, 20-, and 30-minutes' driving distance from a given public school. Within 60-minutes' driving distance, the density of private schools increased slightly, from 73 to 76 private schools, on average.

- We also check for changes by locale, which allows us to separately examine changes in the competitive landscape experienced by public schools in cities, suburbs, towns, and rural areas between 2013-14 and 2017-18. Regardless of locale, the competitive landscape appears to have remained unchanged even as the Opportunity Scholarship program grew.

- We also examine if there were changes in the competitive landscape experienced by public schools in areas of the state that vary based on their level of charter school concentration. In areas with low and medium levels of charter school concentration, we observe no change in the level of competition from private schools between 2013-14 and 2017-18. We observe similar results for areas with a high level of charter school concentration; with the exception of an average increase in the number of private schools within 60 minutes' driving distance from 98 private schools in 2013-14 to 103 private schools in 2017-18.

A County-Level Analysis of OS Applicants, Awardees, and Users

- For each year, 2015 through 2018, we report the top five ranked counties in terms of the number of applicants, awardees, and users of the OS program. Four counties consistently make the top five ranked counties in all years examined: Wake, Mecklenburg, Cumberland, and Guilford Counties.

- In 2015, the first year of data examined, the highest number of applicants came from Mecklenburg County. There were 937 applicants from that county in 2015. Of these, 454 students were ultimately awarded an OS and 165 students used it.

- In 2018, the most recent year of data examined, the highest number of applicants came from Cumberland County. There were 1,858 applicants from that county in 2018. Of these, 1,391 students were ultimately awarded an OS and 852 students used it. This was followed by Mecklenburg County, which saw 1,638 applicants, 1,072 awardees, and 592 users.

- The three counties experiencing the largest increases in the number of Opportunity Scholarship users between 2014-15 and 2017-18 were Sampson, Orange, and Beaufort Counties. The counties with the lowest growth rates were Watauga, Ashe, and Hyde Counties.

Introduction

Background on the OS Program

Publicly funded private school choice programs operate in 31 states, the District of Columbia, and Puerto Rico (American Federation for Children, 2021). The three categories of programs are Education Savings Accounts (ESAs), voucher, and tax-credit scholarship programs; and the average scholarship amount for the three programs is $9,329, $7,299, and $3,995, respectively. In general, over 600,000 students across the nation participate in state-funded private school choice programs (EdChoice, 2022).

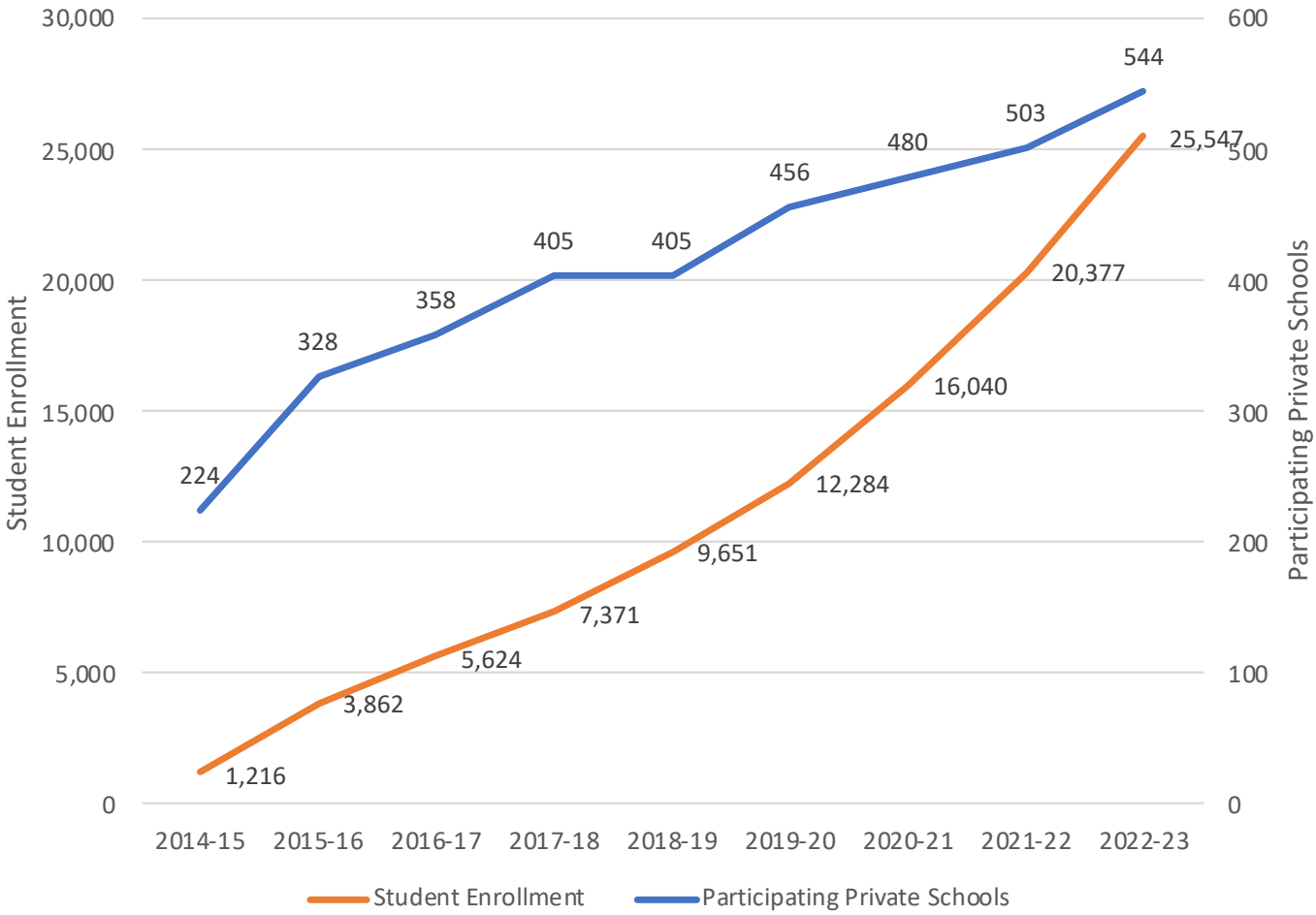
North Carolina's Opportunity Scholarship (OS) program is a means-tested private school voucher program that provides public funds for eligible students to attend participating private elementary and secondary schools. In North Carolina, such schools are often referred to as "non-public" schools. The enacting legislation was ratified by the General Assembly and signed into law by Governor Pat McCrory in July 2013 as part of the Current Operations and Capital Improvements Appropriations Act of 2013, which was North Carolina's biennial budget bill for 2013-14 and 2014-15. It was later amended and codified in Part 2A to Article 39 of Chapter 115C of the North Carolina General Statutes.

The North Carolina Association of Educators and the North Carolina School Boards Association filed a pair of lawsuits challenging its constitutionality shortly after the OS program passed into law; and sought a permanent injunction against the program. While Superior Court Judge Robert Hobgood halted disbursement of scholarship funds in August, 2013; an appellate court ruling a month later allowed 1,878 students who had already accepted the vouchers before the judge's ruling to receive the funds. Implementation of the OS program continued despite these dual lawsuits and the next application cycle opened February 1, 2014. The program was enjoined twice that year—from February to June and again from August to December 2014. In October 2014, the North Carolina State Supreme Court agreed to hear the two cases, Hart v. State and Richardson v. State and ultimately ruled 4-3 in favor of the program in July 2015, writing that "our constitution specifically envisions that children in our state may be educated by means outside of the public school system."

Five years after the supreme court's declaration that the OS program was constitutional, a second legal challenge, Walker Kelly v. State, was brought against the program on July 27, 2020. Lead plaintiff Tamika Walker Kelly is the president of the North Carolina Association of Educators, the state affiliate of the National Education Association, which is the largest labor union in the United States. The program continued to operate while the case developed and the plaintiffs ultimately dropped the lawsuit in April 2023.

The OS program, which is administered by North Carolina's State Education Assistance Authority, has seen steady growth in both enrollment and the private school participation over time. In the 2022-23 school year, the program served 25,547 students in 544 private schools. The total value of these scholarships was $133,872,245. For context, North Carolina public schools spent $16.1 billion in 2019-20, or about 40 percent of the state budget (North Carolina School Finances Website, nd.). Although the OS program has grown every year since its inception, it still represents a small fraction of total enrollment in North Carolina's elementary and secondary schools (Figure 1). The most recent participation statistic of 25,547 students represents less than two percent of total student enrollment across the state.

FIGURE 1: *Changes in student enrollment and private school participation in North Carolina's Opportunity Scholarship Program, 2014-15 to 2022-23*



Source: The North Carolina State Education Assistance Authority

As of May 2023, eligible students are residents of North Carolina who have not yet received a high school diploma. An eligible student can either be a child in foster care or be a member of a family which meets a household income requirement. The income cap for a family of four to qualify is $102,676, which is 200 percent of the federal free- and reduced-price lunch program. Finally, the eligible student must have used OS funds in the previous year; been previously enrolled in a public school full-time; is entering Kindergarten, first, or second grade; or has a parent on full-time active military duty. In April 2023, Senate Bill 406, "Choose Your School, Choose Your Future," proposed eliminating income eligibility caps in favor of a sliding scale that would offer a 45 percent minimum scholarship for all students, regardless of prior public school attendance. A companion bill in the North Carolina House and veto-proof majority for North Carolina Republicans suggests that further OS program expansion is on the horizon.

In recent years, the North Carolina General Assembly increased funding for the program (Table 1). The value of the voucher was initially set at a static value of $4,200 but is now calculated as 90 percent of the state's per-pupil funding. This translates to $6,168 for the 2022-23 school year. The most recent budget, passed in July 2022,

added $56 million from the state's General Fund into the Opportunity Scholarship Grant Fund Reserve.

TABLE 1: *Participation and Funding Changes to North Carolina's Opportunity Scholarship Program 2014-15 to 2022-23*

School Year	Total Value of Scholarships Disbursed	Participating Private Schools	Student Enrollment	Maximum Scholarship Value	Household Income Cap
2014-15	$ 4,635,320	224	1,216	$ 4,200	<133% FRPL
2015-16	$ 13,159,309	328	3,862	$ 4,200	<133% FRPL
2016-17	$ 21,760,837	358	5,624	$ 4,200	<133% FRPL
2017-18	$ 28,058,656	405	7,371	$ 4,200	<133% FRPL
2018-19	$ 37,988,912	405	9,651	$ 4,200	<133% FRPL
2019-20	$ 48,117,458	456	12,284	$ 4,200	<133% FRPL
2020-21	$ 61,469,705	480	16,040	$ 4,200	<133% FRPL
2021-22	$ 79,467,926	503	20,377	$ 5,850	<150% FRPL
2022-23	$ 133,872,245	544	25,547	$ 6,168	<175% FRPL

Notes: FRPL stands for the federal Free and Reduced-Price Lunch program; Student enrollment refers to total recipients for that year, which includes both new and renewal students.
Source: The North Carolina State Education Assistance Authority Summary of Data, retrieved from https://www.ncseaa.edu/opportunity-scholarship-summary-of-data/

The preamble to House Bill 944, which created the Opportunity Scholarship Act, provides the legislators' intent in creating North Carolina's Opportunity Scholarship Program: to fund the delivery of a sound basic education, to expand educational opportunities for children from families with limited financial resources, to reduce the socioeconomic achievement gap, and to create "additional educational environments that enable each child to learn" so the State "can improve the quality of the education it funds" (HB 944). This latter reason refers to the potential competitive effect of expanding school choice by formalizing a state-funded scholarship program to compete with traditional public schools. Competition from school choice is the topic of this report.

Theoretical Arguments For and Against Competition Between Schools

Milton Friedman (1955) is well known for making the economic case for vouchers in education as a promising alternative to direct government provision of schooling, which he characterized as monopolistic and ineffective. Chubb and Moe (1990) built on this foundation to make a theoretical case for encouraging competition between autonomous educational providers to improve overall educational quality by maximizing its responsiveness. Using a public administration framework, they argued that in the absence of competitive pressure to innovate and diversify, education bureaucracies stagnate, resulting in an ineffective educational experience that is not personalized or adaptive to students' individual needs and preferences.

There are several avenues by which the creation of an educational marketplace might spur improvement in traditional public schools. For example, the presence of private school choice programs might spur traditional public schools to improve and diversify their educational offerings, to authentically address localized student needs, and to implement challenging, innovative, and ambitious reforms to teacher personnel policies, curriculum, and general operations management to better serve students.

Lubienski (2006) offers an alternative perspective, arguing that entrepreneurial reforms have not emerged as predicted in countries that have made some steps towards facilitating an educational marketplace. He notes there have been administrative innovations in the countries he observes but notes that the experimentation has not been observed at the level of classroom practices. He does not offer recommendations for modifications to the market model, rejecting it outright and fails to offer a third approach that would circumvent the standardizing pressures of the status quo and encourage entrepreneurialism and personalization to maximize student learning. Lubienski also leans heavily on the experiences of Chile, New Zealand, and the United Kingdom to make inferences about the United States, ignoring the meaningful differences between the education systems of these various countries.

Private school choice has dramatically expanded in the United States; and this expansion has led to a rich empirical literature on the experiences of students and school systems. We summarize the existing empirical evidence on the competitive effects of private school choice in the United States in the next section.

Prior Research on the Competitive Effects of Private School Choice

There have been over twenty studies of the competitive effects of private school choice programs like North Carolina's OS program, the vast majority of which conclude that competition from private school choice has had a neutral or positive impact on non-choosing students in traditional public schools (Table 2).

TABLE 2: *Studies of the Competitive Effects of Private School Choice Programs on Academic Achievement in the United States*

Citation	State	Program Name	Results
Greene (2001)	Florida	A-Plus School Choice	Positive
Greene & Winters (2004)	Florida	A-Plus School Choice	Positive
Chakrabarti (2008)	Florida	A-Plus School Choice	Positive
Figlio & Rouse (2006)	Florida	A-Plus School Choice	Positive
Rouse, Hannaway, Goldhaber, & Figlio (2013)	Florida	A-Plus School Choice	Positive
West & Peterson (2006)	Florida	A-Plus School Choice	Positive
Forster (2008a)	Florida	A-Plus School Choice	Positive
Bowen & Trivitt (2014)	Florida	A-Plus School Choice	Neutral
Winters & Greene (2011)	Florida	McKay Special Needs Voucher	Positive
Figlio & Hart (2014)	Florida	Tax Credit Scholarship Program	Positive
Figlio, Hart & Karbownik (2023)	Florida	Tax Credit Scholarship Program	Positive
Hoxby (2003)	Wisconsin	MPCP	Positive
Greene & Forster (2002)	Wisconsin	MPCP	Neutral to Positive
Chakrabarti (2013)	Wisconsin	MPCP	Neutral to Positive
Carnoy et al. (2007)	Wisconsin	MPCP	Positive
Greene & Marsh (2009)	Wisconsin	MPCP	Positive
Mader (2010)	Wisconsin	MPCP	Positive
Forster (2008b)	Ohio	EdChoice Vouchers	Positive
Carr (2011)	Ohio	EdChoice Vouchers	Positive
Figlio & Karbownik (2016)	Ohio	EdChoice Vouchers	Positive
Greene & Winters (2007)	Washington DC	DC OSP	Neutral
Greene & Forster (2002)	Texas	EISD Scholarship Program	Positive
Merrifield & Adzima (2014)	Texas	EISD Scholarship Program	Neutral to Positive
Hammons (2002)	Vermont, Maine	Town Tuitioning	Positive
Egalite & Mills (2021)	Louisiana	Louisiana Scholarship Program	Neutral to Positive
Egalite & Catt (2020)	Indiana	Indiana Choice Scholarship Program	Neutral to Positive
Canbolat (2021)	Indiana	Indiana Choice Scholarship Program	Negative

Although 26 of the 27 studies in Table 2 document neutral to positive impacts, a single study by Canbolat (2021) found small negative impacts associated with competition from the Indiana Choice Scholarship program. This study faces significant limitations, including a lack of access to student-level data. The study instead relies on school-level proficiency rates to judge achievement impacts; however, this approach can obscure potentially large learning gains and losses. For example, students whose learning increased from a level that was already slightly above proficient to a level that is very far above proficient are not captured in this approach, as they are all grouped together in the single category of "above proficient." Similarly, students who are already "below proficient" but drop to much lower performance levels are not identified in these data. Canbolat uses year- and district- fixed effects to try to estimate the effect of district-level competition on school proficiency rates, concluding that a one percentage point increase in district-level voucher participation is associated with a reduction of less than one percent (i.e., 0.84 percent reduction in English Language Arts and 0.92 percent reduction in Math) in the number of students per school scoring at or above the proficiency cut-off.

A 2013 systematic review of the competitive effects literature which summarized findings from seven locations across the nation (Egalite, 2013) concluded that competition had neutral to positive impacts on student achievement. In a follow-up study, Jabbar and colleagues (2019) used meta-analysis to statistically synthesize the findings of every independent study that has been conducted on this topic, concluding that "competition from private school choice (through voucher policies) can have significant positive impacts on overall student achievement."

Collectively, the findings from these studies provide support for the introduction of a private school choice program. Nevertheless, it is important to note that existing research generally focuses on the initial years after the enactment of a private school voucher program and are often unable to provide a perspective on the long-run changes to public schools. What do we know about the effects of large-scale programs that have significantly expanded over the course of a decade or so?

The nation's largest private school choice program is Florida's Tax Credit (FTC) scholarship program, which was enacted in 2001 and has since grown to enroll over 100,000 students (American Federation for Children, 2021). A recent analysis by Figlio, Hart, & Karbownik (2023) offers useful insight to guide our understanding of the systemic effect of a major statewide private school choice program that has experienced significant expansion. The study covers a fifteen-year period, during which time the number of participating students grew sevenfold to 108,098 students, representing approximately four percent of Florida's school-aged population. Figlio and colleagues show that non-choosing students experienced a variety of academic and behavioral benefits as the FTC expanded. Students in traditional public schools that faced the highest level of exposure to private school competition experienced improvements in both math and reading standardized test scores, along with reductions in suspensions and absences, relative to students in public schools that faced relatively lower levels of competition. In addition to documenting these overall positive impacts, the researchers followed-up with subgroup analyses to identify impacts for student groups of particular interest. They report that the students who experience the greatest benefits are those from disadvantaged backgrounds, with lower family incomes and lower levels of mother's educational attainment.

Collectively, these studies of the short- and long-run impacts of expanding private school choice by way of vouchers and tax-credit scholarships document one dimension of the evolving public school experience in the contemporary educational environment. However, little is known about what specific changes have been

experienced by the affected public schools. What is still lacking from the literature is a description of the evolution of the private school competitive landscape as a large scale private school choice program matures.

Our study describes variation in the initial competitive landscape, as it was experienced by North Carolina's traditional public schools on the eve of the OS program becoming law. We use five measures of school competition, which were pioneered by Figlio & Hart (2014) and have been used in numerous studies since. We identify which types of traditional public schools— defined by demographic type and geography—experienced the greatest and least exposure to private school choice. We also trace the statewide expansion of the OS program, to identify the schools that faced the greatest changes in the competitive environment between 2013-14 and 2017-18.

NORTH CAROLINA'S PRIVATE SCHOOLS

History

Article 39 of Chapter 115C of the General Statutes of North Carolina outlines the state's expectations for private schools, which it refers to as "non-public schools." These schools are required to maintain student attendance and immunization records and to conduct annual testing in grades three, six, and nine in the subjects of English grammar, reading, spelling and mathematics. Similarly, a high school competency test that assesses verbal and quantitative skills must be administered in the eleventh grade. Buildings must meet the relevant codes and a nine-month school year is required. The government agency that oversees private schools in North Carolina is the Division of Non-Public Education (NC DNPE). Created in 1961, this state agency initially operated under the oversight of the Department of Public Instruction but was transferred to the Department of Administration in 1979, a department that falls under the jurisdiction of the Office of the Governor. Private schools receive on-site inspections from this agency every two to three years. In non-inspection years, they are asked to voluntarily submit a brief data collection form.

The Private School Landscape in North Carolina, 1965-66 to 2021-22

There are currently 115,311 students enrolled in 828 private schools in North Carolina, the highest enrollment statistic ever recorded for the private school sector in North Carolina. Building from a base of 9,417 students in 83 schools in 1965-66, this growth represents an 1,124 percent increase in student enrollment and an 898 percent increase in the private school count over the past half-century.

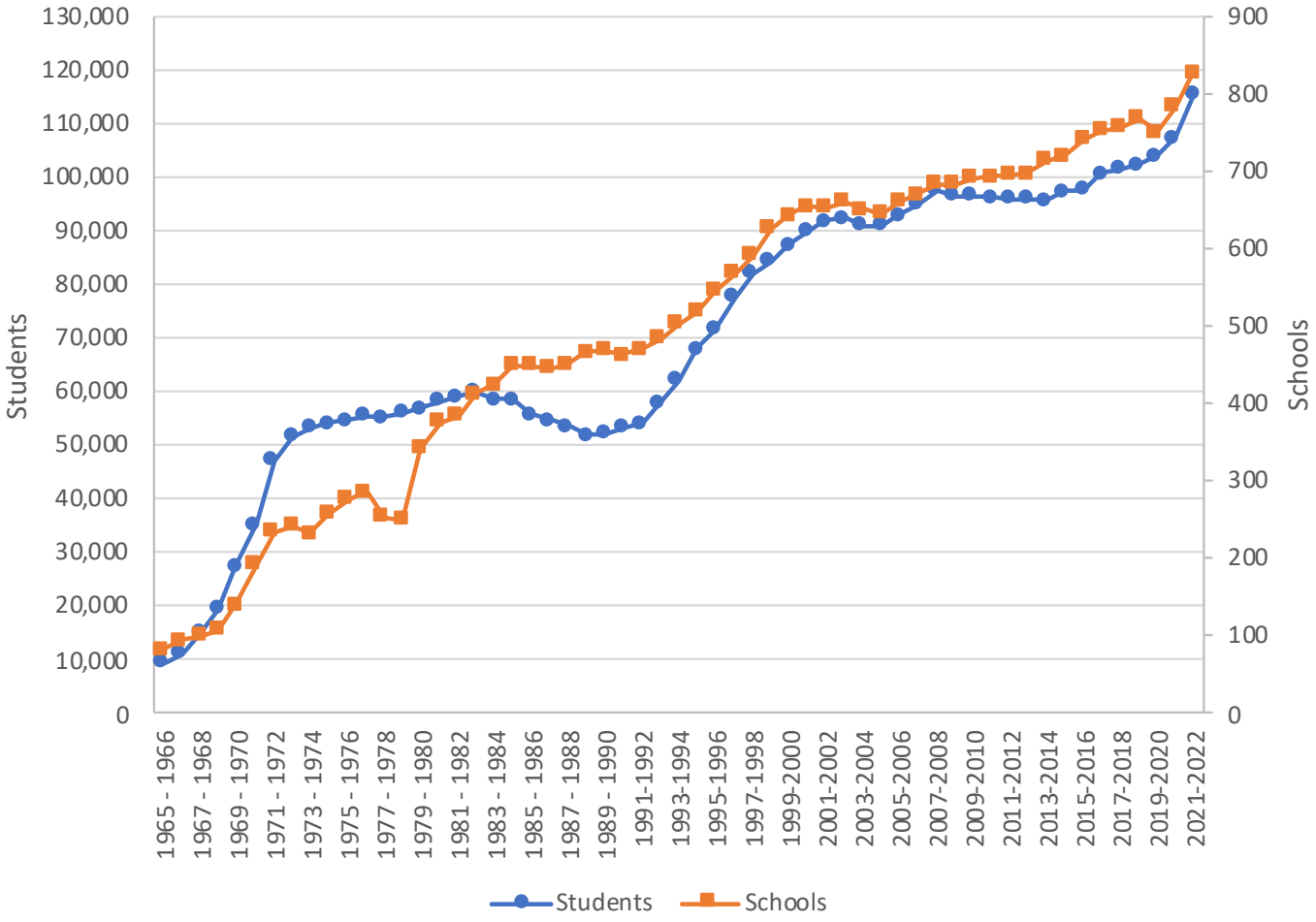
Figure 2 graphs annual growth in both student enrollment and the count of private schools in the 56 years since 1965-66. The fastest growth rates were observed in the late 1960s and early 1970s, with student enrollment jumping 42 percent from 19,401 to 27,471 students between 1968-69 and 1969-70, for example. Similarly high growth rates of 29 percent and 33 percent were observed in the next two years. Helder (n.d.) points to three factors driving private school popularity during this period: removal of prayer and Bible reading from the public schools, changes in educational philosophies and standards that applied to the public schools, and federally mandated racial integration and busing.

By 1972-73, student enrollment in North Carolina's private schools had reached 51,667. Enrollment numbers levelled off and began to decline in the 1980s, before picking up again in the 1990s. In recent years, the expansion of school choice programs like the OS program have contributed to enrollment growth in this sector. Between 2020-21 and 2021-22, enrollment jumped from 107,341 to 115,311, a seven percent growth rate, which is the highest annual jump in private school enrollment since the mid-1990s.

Today, Mecklenburg County has the highest number of private schools in the state with 96 schools. This is closely followed by Wake County with 93 schools (Division of Non-Public Education, 2022). Nine counties have no private schools: Ashe, Camden, Caswell, Graham, Jones, Martin, Perquimans, Tyrrell, and Washington.

Most private school students in North Carolina are enrolled in religious schools (69 percent), with the remaining 31 percent in independent schools. Enrollment is concentrated in the early grades: the grade levels with the highest enrollment are Kindergarten and first grade whereas the grade level with the lowest enrollment is twelfth grade.

FIGURE 2: *North Carolina Private School Enrollment and School Count, 1965-66 to 2021-22*



Source: North Carolina Division of Non-Public Education

COMPETITION FROM PRIVATE SCHOOLS AT BASELINE

State-Level Competition Measures

Following Figlio and Hart (2014), we operationalize competition in five ways: proximity, density, diversity, slots, and places of worship. In building these measures, we improve upon prior work on this topic by using drive-time in place of the straight-line distance between two points. Drive-time is aggregated from millions of anonymized vehicle sensors to account for the realized distance (in minutes and miles) between two points. It takes into consideration traffic patterns, stop signs, and vehicle turn times to convey distance more accurately than a naïve measure built using Euclidean distance alone. Table 3 presents the descriptive statistics at the state level in both minutes and miles.

On average, for traditional public schools in 2013-14, the nearest private school was 9.66 minutes or 5.48 miles away. As expected, private school density increases in correspondence with an increase in the driving radius around a given public school. On average, there were 3 private schools within a 10-minute drive-time radius, 11 schools within 20 minutes, 22 schools within 30 minutes, and 73 schools within an hour's driving distance. We also consider private school diversity— which we define in terms of a school's religious affiliation or their status as an independent school if the school is not affiliated with a religion or church—to capture another component of school competition. On average, there is just one type of private school within a 10-minute drive-time radius around a traditional public school, there are four different types of private schools within 20 minutes, five different types of private schools within 30 minutes and eight different types of private schools within an hour's driving distance.

Under the proximity, density, and diversity measures of competition considered thus far, a private school competitor is identified without regard to the grade levels it serves but a public high school is unlikely to perceive a private elementary school as much of an enrollment threat, given the different populations it serves. Therefore, the next aspect of private school competition we consider is what we term, "slots." This refers to the total enrollment of relevant grade-level private school competitors within a given radius. Slots can be thought of as the number of private seats available for that grade-level. On average, the number of "slots" within a 10-minute driving distance of a public school is 180 students. Within 20 minutes, there are 870 students; within 30 minutes, there are 1,947 students; and within an hour's driving distance, there are 5,799 students.

The fifth category of competition measures consists of places of worship. This includes churches, synagogues, and mosques, for example. We detail the source of these data and other relevant details in the Technical Appendix. This measure is particularly interesting to include because it captures the potential location of where new private schools might be expected to develop after the voucher program passed and this new source of public funding became available to support student tuition for the first time. On average, there were 14 places of worship within a 10-minute drive-time radius, 54 places of worship within 20 minutes, 120 places of worship within 30 minutes, and 375 places of worship within an hour's driving distance.

TABLE 3: *Competition from private schools across North Carolina, 2013-14, in minutes and miles*

Competition Measure	Minutes					Miles				
	N	Mean	SD	Min	Max	N	Mean	SD	Min	Max
[1] Proximity	2616	9.66	7.47	0.04	141.74	2616	5.48	5.35	0.02	55.37
[2] Density										
# Schools within 10 mins (5 miles)	1638	3.45	2.86	1.00	17.00	1598	4.03	3.44	1.00	20.00
# Schools within 20 mins (10 miles)	2402	10.62	10.43	1.00	59.00	2193	8.63	8.72	1.00	48.00
# Schools within 30 mins (15 miles)	2583	22.22	21.29	1.00	100.00	2454	13.39	13.66	1.00	64.00
# Schools within 60 mins	2613	72.87	41.96	1.00	177.00					
[3] Diversity										
Types of schools within 10 mins (5 miles)	2635	1.41	1.57	0.00	8.00	2635	1.51	1.74	0.00	8.00
Types of schools within 20 mins (10 miles)	2635	3.69	2.57	0.00	11.00	2635	3.03	2.50	0.00	10.00
Types of schools within 30 mins (15 miles)	2635	5.41	2.81	0.00	12.00	2635	4.14	2.74	0.00	11.00
Types of schools within 60 mins	2635	8.44	2.64	0.00	12.00					
[3] Slots										
Priv. sch. enrollment within 10 mins (5 miles)	2635	180	350.93	0.00	3,734	2635	214	419.79	0.00	3,749
Priv. sch. enrollment within 20 mins (10 miles)	2635	870	1,379.65	0.00	13,631	2635	678	1,169.98	0.00	10,845
Priv. sch. enrollment within 30 mins (15 miles)	2635	1,947	2,759.29	0.00	22,499	2635	1,179	1,870.65	0.00	15,829
Priv. sch. enrollment within 60 mins	2635	5,799	5,094.39	0.00	32,420					
[5] Places of Worship										
# POW within 10 mins (5 miles)	2312	14	17.00	1.00	98	2215	16	19.51	1.00	93
# POW within 20 mins (10 miles)	2597	54	62.15	1.00	316	2553	40	49.32	1.00	247
# POW within 30 mins (15 miles)	2623	120	117.33	1.00	454	2606	68	77.98	1.00	338
# POW within 60 mins	2635	375	223.92	1.00	945					

Notes: Minutes and miles are measures of drive-time. Competition measures are assessed at the state level. "Slots" refers to total private school enrollment within relevant grade-level competitors; POW stands for Places of Worship, which includes churches, synagogues, and mosques.

Competition, by Locale

In addition to examining the overall competitive environment, we next consider such variables in the context of locale: city, suburb, town, and rural areas (Table 4). As might be expected, cities have the greatest density of private school competitors (five schools, on average, within ten minutes' driving distance), followed by suburbs (three schools), towns (two schools), and rural areas (fewer than two schools). Cities also have the greatest diversity of schooling options (three types of private schools within a 10-minute driving distance), followed by suburbs (almost two types of private schools), towns (one type of private school), and rural areas (fewer than one type of private school). Both slots and places of worship follow the same pattern, with the greatest number of choices available in cities and the smallest number of choices in rural areas.

TABLE 4: *Competition from private schools, by locale, 2013-14, in minutes*

	City		Suburb		Town		Rural	
Competition Measure	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**
[1] Proximity	5.19	2.53	6.98	3.70	9.80	6.41	13.77	8.89
[2] Density								
# Schools within 10 mins	5.16	3.10	2.98	2.59	2.09	1.23	1.62	1.01
# Schools within 20 mins	20.55	11.13	11.92	8.82	3.56	1.89	4.62	4.54
# Schools within 30 mins	40.26	23.63	29.17	19.13	8.57	6.26	11.30	11.91
# Schools within 60 mins	92.83	35.61	92.03	39.41	54.87	36.27	56.66	39.05
[3] Diversity								
Types of schools within 10 mins	3.03	1.62	1.51	1.21	0.97	1.02	0.45	0.74
Types of schools within 20 mins	6.20	2.05	4.60	2.08	2.02	1.25	2.15	1.75
Types of schools within 30 mins	7.62	2.46	6.75	2.07	3.61	1.74	3.90	2.24
Types of schools within 60 mins	9.36	2.45	9.45	2.15	7.49	2.49	7.66	2.66
[3] Slots								
Priv. sch. enrollment within 10 mins	475	501.01	180	295.10	51	94.33	29	94.31
Priv. sch. enrollment within 20 mins	2,111	1,801.38	1,018	1,258.11	123	147.01	230	428.91
Priv. sch. enrollment within 30 mins	4,119	3,656.34	2,528	2,401.80	450	734.83	738	1,263.90
Priv. sch. enrollment within 60 mins	7,969	5,399.59	7,553	5,327.62	3,982	4,297.04	4,141	4,105.82
[5] Places of Worship								
# POW within 10 mins	31	20.26	10	7.71	5	3.66	4	4.97
# POW within 20 mins	121	67.17	60	45.00	13	8.55	20	28.10
# POW within 30 mins	228	116.32	158	103.80	39	37.78	57	69.49
# POW within 60 mins	477	174.68	474	213.84	277	189.23	292	219.70

Notes: Competition measures are assessed at the state level. "Slots" refers to total private school enrollment within relevant grade-level competitors; POW stands for Places of Worship, which includes churches, synagogues, and mosques.

Competition, by Charter School Concentration

We also stratify the state into thirds based on the level of charter school concentration to check for differences in the competitive pressure from private schools experienced by traditional public schools in these three groups (Table 5). While we might expect that areas with a high charter school presence will also have a higher concentration of private schools, this does not appear to be the case as there is not a large amount of variation across most of these measures when comparing locales by the degree of charter school concentration they face.

For example, the average public school is 8.26 minutes from a private school in those parts of the state that have a relatively high concentration of charter schools. While average drive time increases in areas of lower charter concentration, the average drive time is less than a minute longer between a public school and its nearest private competitor in areas with a low concentration of charter schools. Similarly, the density measure indicates a count of approximately four private schools within 10 minutes' driving distance for the average public school, regardless of charter school concentration. Specifically, there are 3.61 private schools within 10 minutes' driving distance for high charter concentration regions, 3.65 private schools in this radius for medium charter concentration regions, and 3.56 private schools in this radius for low charter concentration regions. Likewise, the diversity measure indicates a count of about two types of private schools, on average, within 10 minutes' driving distance for a given public school, regardless of the level of charter school concentration in that area. There is a small amount of variation in the slots measure. High charter concentration areas have 231 private school slots, on average, within 10 minutes' driving distance. Medium charter concentration areas have 224 private school slots in this radius and low charter concentration areas have 160 private school slots in this radius. Finally, there is little variation in the number of places of worship by high, medium, and low charter school concentration areas until we get to the largest driving distance. Within 60 minutes' driving distance, there are 527 places of worship in those parts of the state that have relatively high charter school concentration, 418 places of worship in parts of the state with medium charter school concentration, and 285 places of worship in parts of the state with low charter school concentration.

TABLE 5: *Competition from private schools, by charter concentration, 2013-14, in minutes*

Competition Measure	High Charter Concentration		Medium Charter Concentration		Low Charter Concentration	
	Mean	SD	Mean	SD	Mean	SD
[1] Proximity	8.26	5.57	9.06	6.30	9.41	6.56
[2] Density						
# Schools within 10 mins	3.61	2.97	3.65	2.94	3.56	2.91
# Schools within 20 mins	13.54	12.50	12.62	11.48	9.04	6.39
# Schools within 30 mins	30.61	25.28	28.06	23.66	16.19	9.63
# Schools within 60 mins	98.07	39.67	84.37	39.80	55.05	26.10
[3] Diversity						
Types of schools within 10 mins	1.59	1.52	1.51	1.59	1.55	1.74
Types of schools within 20 mins	4.22	2.51	4.11	2.82	3.74	2.40
Types of schools within 30 mins	6.18	2.89	6.00	3.04	5.32	2.24
Types of schools within 60 mins	9.44	2.29	9.01	2.67	8.12	2.29
[3] Slots						
Priv. sch. enrollment within 10 mins	231	425.99	224	388.61	160	279.27
Priv. sch. enrollment within 20 mins	1,286	1,819.31	1,138	1,468.58	565	682.87
Priv. sch. enrollment within 30 mins	3,041	3,639.20	2,596	2,816.89	1Ω	1,052.63
Priv. sch. enrollment within 60 mins	8,966	5,555.90	6,946	4,738.26	3,272	2,755.60
[5] Places of Worship						
# POW within 10 mins	15	16.62	15	16.11	15	20.05
# POW within 20 mins	72	74.66	65	62.38	49	48.70
# POW within 30 mins	168	137.31	150	120.85	91	70.21
# POW within 60 mins	527	203.03	418	182.51	285	170.39

Notes: Competition measures are assessed at the state level. "Slots" refers to total private school enrollment within relevant grade-level competitors; POW stands for Places of Worship, which includes churches, synagogues, and mosques.

Competition, by Traditional Public School Type

We can also explore the characteristics of traditional public schools facing relatively high versus relatively low levels of competition to learn more about differences by demographic profile. Table 6 displays baseline differences in the five competition measures across four dimensions: by school enrollment, school percent of students identified as Black, school percent of students identified as Hispanic, and school percent of students identified as White. The difference in the average value of a given competition measure between school environment types is indicated in the columns titled, "Diff". Asterisks indicate that a given difference is statistically significant: if a difference does not have an asterisk, it is statistically indistinguishable from zero.

Looking first at school size, we compare small public schools—defined as being below the median enrollment size for that Core-Based Statistical area—to large public schools—defined as being above the median enrollment size for that Core-Based Statistical area. Small public schools experience slightly greater competitive pressure than large public schools. For example, there is a greater density of private schools within 10 minutes' driving distance for small public schools, which have four competitors, relative to large public schools, which only have three competitors, on average. Similarly, on average, there are 16 places of worship within 10 minutes' driving distance for small public schools, compared to just 12 places of worship for large public schools. There are no differences in the diversity of private schools or number of private school slots available within 10 minutes and although the difference in proximity is statistically significant, it is small in magnitude and not meaningfully different, amounting to just one minute difference in driving time.

Next, we consider differences in the competitive environment by the demographic make-up of the student body. We do this by comparing public schools with above and below median values for three racial/ethnic groups: Black, Hispanic, and White. Across all five competition measures, we find evidence that public schools with a higher percentage of Black students experience greater competitive pressure than public schools with fewer Black students. Specifically, public schools that have more Black students are closer, on average, to a private school competitor (7.91 minutes' driving distance) than public schools that have fewer Black students (10 minutes' driving distance). Similarly, public schools that have more Black students have a greater density of private school competitors. Within 10 minutes' driving distance, public schools that have more Black students have 3.94 private school competitors, compared to 2.94 competitors. Similarly, public schools that have more Black students also have a greater diversity of private school competitors surrounding them. Within 10 minutes' driving distance, public schools that have more Black students have 1.95 types of private schools, compared to 1.06 types of private schools. There are also more private school slots available for public schools with more Black students. Within 10 minutes' driving distance, public schools that have more Black students have 243.76 private school slots, compared to 144.42 slots. Finally, we observe the same pattern for places of worship. Public schools that have more Black students have 20 places of worship within 10 minutes' driving distance, on average, compared to 7.62 places of worship.

Findings for public schools with a high percentage of Hispanic students are largely similar. Across four of the five competition measures, we find evidence that public schools with a higher percentage of Hispanic students experience greater competitive pressure than public schools with fewer Hispanic students. That is, public schools that have more Hispanic students have a shorter proximity to the nearest private school competitor (8.77 minutes compared to 9.38 minutes), a greater density of private school competitors within 10 minutes' driving distance (3.67 compared to 3.34 competitors), a greater diversity of private school competitors within 10 minutes' driving

distance (1.60 compared to 1.40 types of competitors), and a higher number of places of worship within 10 minutes' driving distance (15.17 compared to 13.24). Conversely, the opposite pattern holds for public schools with a high percentage of White students. Schools with a higher percentage of white students experience lower levels of competition across all five measures: proximity, density, diversity, and places of worship.

TABLE 6: *Competition from private schools, by traditional public school type, 2013-14, in minutes*

Competition Measure	Enrollment			%Black			%Hispanic			%White		
	Above Median	Below Median	Diff *(s.e.)*	Above Median	Below Median	Diff *(s.e.)*	Above Median	Below Median	Diff *(s.e.)*	Above Median	Below Median	Diff *(s.e.)*
[1] Proximity	-8.58	-9.59	1.01*** (0.27)	-7.91	-10.24	2.33*** (0.27)	-8.77	-9.38	0.61** (0.27)	-10.31	-7.84	-2.47*** (0.27
[2] Density												
Within 10 mins	3.28	3.77	-0.49*** (0.15)	3.94	2.94	1.00*** (0.14)	3.67	3.34	0.32** (0.15)	2.82	4.05	-1.23*** (0.14)
Within 20 mins	11.19	11.15	0.04 (0.45)	13.49	8.77	4.72*** (0.44)	11.63	10.69	0.94** (0.45	8.57	13.7	-5.13*** (0.44)
Within 30 mins	24.43	23.06	1.37 (0.89)	27.11	20.36	6.74*** (0.88)	24.74	22.77	1.96** (0.89)	19.69	27.83	-8.15*** (0.88)
Within 60 mins	75.56	79.43	-3.87** (1.7)	78.44	76.51	1.93 (1.7)	79.27	75.66	3.61** (1.69)	75.11	79.85	-4.74*** (1.69)
[3] Diversity												
Within 10 mins	1.46	1.55	-0.09 (0.07)	1.95	1.06	0.88*** (0.06	1.6	1.4	0.20*** (0.07)	1.06	1.95	-0.89*** (0.06)
Within 20 mins	4.06	3.81	0.25** (0.11)	4.51	3.36	1.14*** (0.1)	4.1	3.77	0.33*** (0.11)	3.3	4.58	-1.27*** (0.1)
Within 30 mins	5.84	5.6	0.24** (0.11)	6.06	5.38	0.68*** (0.11)	5.87	5.57	0.29*** -0.11)	5.29	6.16	-0.87*** -0.11)
Within 60 mins	8.61	8.95	-0.35*** (0.1)	8.77	8.79	-0.02 (0.1)	8.88	8.67	0.21** (0.1)	8.67	8.89	-0.22** (0.1)
[3] Slots												
Within 10 mins	183.68	204.8	-21.12 (14.93)	243.76	144.42	99.34*** (14.77)	196.14	192.15	4 (14.92)	144.55	244.22	-99.67*** (14.78)
Within 20 mins	931.88	955.41	-23.53 (58.58)	1,192.25	694.21	498.04*** (57.58)	952.66	934.38	18.28 (58.54)	683.84	1,205.74	-521.90*** (57.58)
Within 30 mins	2,114.02	2,118.28	-4.26 (117.13)	2,553.87	1,677.26	876.61*** (115.55)	2,154.83	2,077.20	77.63 (117.05)	1,613.70	2,623.36	-1,009.67*** (115.35)
Within 60 mins	5,814.92	6,729.12	-914.20*** (210.31)	6,388.22	6,148.01	240.21 (210.85)	6,235.76	6,300.98	-65.22 (211.02)	6,014.24	6,524.73	-510.50** (210.69)
[5] POW												
Within 10 mins	12.32	16.23	-3.91*** (0.75)	20.03	7.62	12.41*** (0.67)	15.17	13.24	1.94*** (0.75)	7.92	19.96	-12.04*** (0.68)
Within 20 mins	59.02	56.87	2.16 (2.6)	77.11	38.47	38.64*** (2.46)	61.09	54.79	6.30** (2.59)	39.15	76.7	-37.55*** (2.47)
Within 30 mins	136.89	120.28	16.61*** (4.83)	151.59	105.55	46.04*** (4.75)	132.67	124.64	8.03* (4.84)	105.43	152.03	-46.60*** (4.75)
Within 60 mins	400.63	400.77	-0.14 (8.98)	407.64	393.75	13.89 (8.97)	405.49	395.89	9.6 (8.97)	391.87	409.62	-17.75** (8.97)

*** p < .01, ** p< .05, * p < .10

Notes: Competition measures are assessed at the state level. "Slots" refers to total private school enrollment within relevant grade-level competitors; POW stands for Places of Worship, which includes churches, synagogues, and mosques. The Above and Below Median classifications for the school characteristics in this table are determined by comparing the school-level characteristic with other schools in its Core-Based Statistical Area (CBSA).

CHANGES IN COMPETITION AFTER THE OS PROGRAM WAS ENACTED

Changes by Locale

We next examine if there were changes in the level of competition experienced by traditional public schools after the Opportunity Scholarship program was enacted. Specifically, we document how the patterns observed thus far had changed by 2017-18, relative to pre-program levels. Table 7 presents proximity, density, and diversity measures in both minutes and miles. We show the 2013-14 and 2017-18 statistics, and calculate the difference, by measure. We are unfortunately not able to include the other two measures—slots and places of worship—for 2017-18 due to data limitations.

Looking across all public schools in the state, we observe no change over this four-year period in terms of proximity to the nearest private school or diversity of private schools within any of the radii examined. Even though student enrollment in the Opportunity Scholarship program had grown to 7,371 students in 405 private schools by 2017-18, the competitive landscape does not appear to have changed much since 2013-14. For example, the average public school was still approximately nine minutes (or five miles) from its nearest private school competitor. Similarly, the density and diversity of private school competitors remained unchanged within 10-, 20-, and 30-minutes' driving distance from a given public school. The only significant change we observe is within 60-minutes' driving distance. In this radius, the density of private schools increased from 73 to 76 private schools, on average.

We also check for differences by locale. It is possible, for example, that public schools in North Carolina's cities and suburbs experienced a change in private school competition between 2013-14 and 2017-18 that differed from the change experienced by public schools located in towns and rural areas. However, this does not appear to be the case. Regardless of locale, the results suggest that the competitive landscape has remained unchanged over the same period in which the OS program experienced dramatic growth.

TABLE 7: *Competition from private schools across North Carolina, overall and by locale, 2013-14 to 2017-18, in minutes and miles*

Competition Measure	All Schools			City			Suburb			Town			Rural		
	2017-18	2013-14	Diff (s.e.)	2017-18	2013-14	Diff (s.e.)	2017-18	2013-14	Diff (s.e.)	2017-18	2013-14	Diff (s.e.)	2017-18	2013-14	Diff (s.e.)
Minutes															
[1] Proximity	-9.37	-9.66	0.3 (0.21)	-5.2	-5.19	-0.01 (0.14)	-6.94	-6.98	0.04 (0.23)	-9.71	-9.8	0.09 (0.5)	-13.13	-13.77	0.63 (0.39)
[2] Density															
Within 10 mins	3.48	3.45	0.03 (0.11)	5.42	5.16	0.26 (0.19)	3.06	2.98	0.08 (0.19)	1.91	2.09	-0.18 (0.12)	1.58	1.62	-0.05 (0.07)
Within 20 mins	10.87	10.62	0.25 (0.31)	21.44	20.55	0.89 (0.61)	12.29	11.92	0.37 (0.56)	3.33	3.56	-0.23 (0.15)	4.7	4.62	0.08 (0.22)
Within 30 mins	23.12	22.22	0.9 (0.61)	41.16	40.26	0.9 (1.28)	30.42	29.17	1.25 (1.21)	8.39	8.57	-0.18 (0.49)	11.97	11.3	0.67 (0.54)
Within 60 mins	76.29	72.87	3.42*** (1.2)	96.59	92.83	3.75* (1.97)	96.32	92.03	4.29* (2.53)	56.5	54.87	1.63 (2.92)	59.51	56.66	2.85 (1.75)
[3] Diversity															
Within 10 mins	1.42	1.41	0.01 (0.04)	3.02	3.03	-0.01 (0.09)	1.57	1.51	0.06 (0.08)	0.87	0.97	-0.11 (0.08)	0.5	0.45	0.05 (0.03)
Within 20 mins	3.64	3.69	-0.04 (0.07)	6.07	6.2	-0.13 (0.11)	4.55	4.6	-0.05 (0.13)	1.92	2.02	-0.1 (0.1)	2.19	2.15	0.04 (0.08)
Within 30 mins	5.31	5.41	-0.09 (0.08)	7.47	7.62	-0.16 (0.13)	6.6	6.75	-0.16 (0.13)	3.46	3.61	-0.15 (0.14)	3.89	3.9	0 (0.1)
Within 60 mins	8.32	8.44	-0.11 (0.08)	9.33	9.36	-0.03 (0.14)	9.34	9.45	-0.11 (0.15)	7.28	7.49	-0.21 (0.21)	7.52	7.66	-0.14 (0.12)
Miles															
[1] Proximity	-5.29	-5.48	0.19 (0.15)	-2.03	-1.95	-0.08 (0.07)	-3.32	-3.3	-0.01 (0.14)	-5.3	-5.45	0.15 (0.38)	-8.34	-8.77	0.43 (0.27)
[2] Density															
Within 5 miles	4.06	4.03	0.04 (0.13)	6.55	6.24	0.31 (0.22)	3.16	3.19	-0.03 (0.2)	1.98	2.11	-0.13 (0.13)	1.53	1.55	-0.02 (0.08)
Within 10 miles	8.74	8.63	0.12 (0.27)	17.45	16.74	0.71 (0.53)	8.58	8.49	0.09 (0.42)	2.68	2.81	-0.13 (0.15)	3.11	3.15	-0.04 (0.15)
Within 15 miles	13.73	13.39	0.34 (0.4)	27.05	26.22	0.83 (0.84)	16.51	16.04	0.47 (0.68)	3.63	3.83	-0.2 (0.16)	5.88	5.71	0.18 (0.28)

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Competition Measure	All Schools 2017-18	All Schools 2013-14	All Schools Diff (s.e.)	City 2017-18	City 2013-14	City Diff (s.e.)	Suburb 2017-18	Suburb 2013-14	Suburb Diff (s.e.)	Town 2017-18	Town 2013-14	Town Diff (s.e.)	Rural 2017-18	Rural 2013-14	Rural Diff (s.e.)
[3] Diversity															
Within 5 miles	1.51	1.51	0	3.47	3.49	-0.02	1.58	1.53	0.05	0.86	1	-0.15*	0.42	0.37	0.05*
			(0.05)			(0.1)			(0.08)			(0.08)			(0.03)
Within 10 miles	3	3.03	-0.03	5.66	5.76	-0.1	3.75	3.73	0.02	1.53	1.66	-0.13	1.39	1.37	0.02
			(0.07)			(0.11)			(0.12)			(0.09)			(0.06)
Within 15 miles	4.08	4.14	-0.07	6.54	6.68	-0.14	5.32	5.43	-0.1	2.1	2.21	-0.11	2.52	2.51	0.01
			(0.08)			(0.12)			(0.13)			(0.09)			(0.09)

*** p < .01, ** p< .05, * p < .10

Notes: Minutes and miles are measures of drive-time. Proximity refers to the driving distance from a public school to the nearest private school. Density refers to the number of private schools within a given radius. Diversity refers to how many types of private schools exist within a given radius, with type defined by religious affiliation. School Locale is provided by the National Center on Education Statistics (NCES): "The NCES locale framework is developed from urban areas defined by the Census Bureau. Locales are assigned to schools based on their reported physical address location. Agencies may operate schools in more than one type of locale therefore an agency locale assignment reflects the dominant locale where most students are enrolled in school."
Source: https://nces.ed.gov/programs/edge/Geographic/LocaleBoundaries

Changes by Level of Charter School Concentration

We can also check for changes in the competitive landscape experienced by public schools in areas of the state that vary based on their level of charter school concentration. Charter schools represent an alternative form of school choice to vouchers. Regions of the state with high numbers of these public schools of choice might differ in important ways from regions of the state with low numbers of charter schools. For example, perhaps the traditional public schools are under-performing in those areas or families are dissatisfied for other reasons, which created a fertile environment for the establishment of charter schools. If families in these areas are already open to public school choice, they might also have been open to private-school choice once the Opportunity Scholarship program became law and state funding began to flow to eligible families.

We do this by dividing the state into three groups—low, medium, and high levels of charter school concentration—and compare the competitive landscape in 2013-14 and 2017-18 within each of these three groups (Table 8). In areas with low and medium levels of charter school concentration, we observe no change in the level of competition from private schools over this period. For example, in low and medium charter school concentration areas, the average traditional public school was nine minutes from the nearest private school at baseline and again four years after the program was established. In areas with a high level of charter school concentration, we also observe no change in the level of private school competition experienced by the average public school, with one exception. For traditional public schools in areas with a high concentration of charter schools, the number of private schools within 60 minutes' driving distance increased by five schools, on average, from 98 private schools in 2013-14 to 103 private schools in 2017-18.

TABLE 8: *Competition from private schools across North Carolina, overall and by locale, 2013-14 to 2017-18, in minutes and miles*

Competition Measure	Low			Medium			High		
	2017-18	2013-14	Diff *(s.e.)*	2017-18	2013-14	Diff *(s.e.)*	2017-18	2013-14	Diff *(s.e.)*
Minutes									
[1] Proximity	-9.01	-9.41	0.4 (0.33)	-8.95	-9.06	0.11 (0.35)	-7.98	-8.26	0.28 (0.27)
[2] Density									
Within 10 mins	3.61	3.56	0.06 (0.2)	3.55	3.65	-0.09 (0.21)	3.76	3.61	0.15 (0.19)
Within 20 mins	9.36	9.04	0.32 (0.37)	12.82	12.62	0.2 (0.65)	13.98	13.54	0.44 (0.66)
Within 30 mins	16.84	16.19	0.65 (0.52)	28.62	28.06	0.57 (1.3)	31.98	30.61	1.36 (1.3
Within 60 mins	57.64	55.05	2.59* (1.4)	87.73	84.37	3.35 (2.23)	103.23	98.07	5.16** (2.03)
[3] Diversity									
Within 10 mins	1.56	1.55	0.01 (0.09)	1.53	1.51	0.02 (0.09)	1.61	1.59	0.02 (0.08)
Within 20 mins	3.73	3.74	-0.01 (0.13)	4.05	4.11	-0.06 (0.15)	4.16	4.22	-0.05 (0.12)
Within 30 mins	5.29	5.32	-0.02 (0.12)	5.87	6	-0.12 (0.17)	6.07	6.18	-0.11 (0.15)
Within 60 mins	7.91	8.12	-0.21 (0.13)	9.14	9.01	0.13 (0.15)	9.34	9.44	-0.1 (0.12)
Miles									
[1] Proximity	-4.97	-5.23	0.26 (0.24)	-5.02	-5.05	0.03 -0.26)	-4.1	-4.25	0.16 (0.19)
[2] Density									
Within 5 miles	4.07	3.96	0.1 (0.22)	4.07	4.17	-0.11 (0.24)	4.6	4.46	0.14 (0.25)
Within 10 miles	7.6	7.33	0.27 (0.35)	9.47	9.55	-0.07 (0.51)	11.28	11.02	0.25 (0.58)
Within 15 miles	10.89	10.55	0.34 (0.4)	15.68	15.68	-0.01 (0.81)	19.09	18.35	0.74 (0.88)

Competition Measure	Low			Medium			High		
	2017-18	2013-14	Diff *(s.e.)*	2017-18	2013-14	Diff *(s.e.)*	2017-18	2013-14	Diff *(s.e.)*
[3] Diversity									
Within 5 miles	1.66	1.62	0.03 (0.1)	1.6	1.6	0 (0.1)	1.78	1.78	-0.01 (0.09)
Within 10 miles	3.1	3.09	0.01 (0.13)	3.31	3.32	-0.01 (0.14)	3.57	3.66	-0.09 (0.12)
Within 15 miles	4.14	4.13	0.01 (0.13)	4.43	4.53	-0.1 (0.16)	4.81	4.92	-0.11 (0.14)

*** p < .01, ** p< .05, * p < .10

Notes: Minutes and miles are measures of drive-time. Proximity refers to the driving distance from a public school to the nearest private school. Density refers to the number of private schools within a given radius. Diversity refers to how many types of private schools exist within a given radius, with type defined by religious affiliation. Charter concentration represents the percentage of public school student enrollment in a CBSA represented by charter school enrollment. This measure is broken into thirds. The bottom third are classified as "low" concentration, the middle third are classified as "middle" concentration, the top third are classified as "high" concentration.

A COUNTY-LEVEL ANALYSIS OF THE OS PROGRAM

Next, we highlight specific counties in North Carolina by reporting the top five ranked counties in terms of the number of applicants, awardees, and users of the OS program between 2014-15 and 2018-19 (Table 9). Four counties consistently make the top five ranked counties in all years examined: Wake, Mecklenburg, Cumberland, and Guilford Counties. Durham County makes the top five in just one year (2015), whereas Forsyth County makes the top five list in 2016, 2017, and 2018.

To put applicant counts in perspective, we also provide the enrollment counts for traditional public schools in those counties and scale the OS users per 1,000 traditional public school students.

In 2014-15, the first year of data examined, the highest number of applicants came from Mecklenburg County. There were 937 applicants from that county in 2014-15. Of these, 454 students were ultimately awarded an OS and 165 students used it.

In 2017-18, the most recent year of data examined, the highest number of applicants came from Cumberland County. There were 1,858 applicants from that county in 2017-18. Of these, 1,391 students were ultimately awarded an OS and 852 students used it. This was followed by Mecklenburg County, which saw 1,638 applicants, 1,072 awardees, and 592 users.

TABLE 9: *County-Level Analysis of Opportunity Scholarship Applicants, Awardees, and Users, 2014-15 to 2017-18*

County	TPS Enrollment	OS Applicants			OS Awarded			OS Users		
		Count	Rank	OS per 1,000 Students	Count	Rank	OS per 1,000 Students	Count	Rank	OS per 1,000 Students
2015										
Mecklenburg	155,563	937	1	6.02	454	1	2.92	165	2	1.06
Wake	171,868	785	2	4.57	398	2	2.32	182	1	1.06
Cumberland	52,475	575	3	10.96	299	3	5.7	133	4	2.53
Guilford	77,471	530	4	6.84	264	4	3.41	143	3	1.85
Durham	39,466	224	5	5.68	112	5	2.84	40	6	1.01
2016										
Wake	176,574	1,221	1	6.91	926	1	5.24	490	1	2.78
Cumberland	52,277	1,162	2	22.23	888	2	16.99	454	2	8.68
Mecklenburg	157,909	1,055	3	6.68	804	3	5.09	338	3	2.14
Guilford	77,768	706	4	9.08	574	4	7.38	325	4	4.18
Forsyth	56,370	414	5	7.34	313	5	5.55	192	5	3.41
2017										
Cumberland	52,383	1,599	1	30.53	1,141	1	21.78	686	1	13.1
Wake	180,986	1,432	2	7.91	1,034	2	5.71	633	2	3.5
Mecklenburg	159,605	1,354	3	8.48	847	3	5.31	480	3	3.01
Guilford	78,651	788	4	10.02	601	4	7.64	415	4	5.28
Forsyth	56,597	543	5	9.59	408	5	7.21	287	5	5.07
2018										
Cumberland	52,027	1,858	1	35.71	1,391	1	26.74	852	1	16.38
Mecklenburg	161,671	1,638	2	10.13	1,072	3	6.63	592	3	3.66
Wake	184,425	1,554	3	8.43	1,088	2	5.9	665	2	3.61
Guilford	79,117	991	4	12.53	706	4	8.92	486	4	6.14
Forsyth	56,754	649	5	11.44	489	5	8.62	355	5	6.26

Notes: TPS stands for traditional public school. OS stands for Opportunity Scholarship.

We can also use these data to infer the fastest- and slowest-growing school choice counties in North Carolina. Table 10 compares the counts of Opportunity Scholarship users in 2014-15 and 2017-18, by county. Unsurprisingly, the largest growth was experienced by counties that initially had low numbers of OS program users. In terms of percent change, the county that experienced the greatest growth over this period was Sampson County, which had just two OS users in 2015 but grew to 72 users by 2018, representing a 3,500 percent increase. This was followed by Orange County, which had only one OS user in 2015 but grew to 29 users by 2018, which is a 2,800 percent increase. Similarly, Beaufort County had only two users in 2015 but grew to 48 users by 2018, which is a 2,300 percent increase. The three slowest growing counties were Watauga, Ashe, and Hyde Counties. In these three locations, there were zero OS users in 2014-15 and just a single student using an Opportunity Scholarship in 2017-18.

Table 10: *Fastest and Slowest Growing School Choice Counties, 2014-2015 to 2017-18*

County	TPS Enrollment	Count Of OS Users in 2014-15	Count Of OS Users in 2017-18	Percent Change
Sampson County	11,939	2	72	3500%
Orange County	20,002	1	29	2800%
Beaufort County	7,514	2	48	2300%
Transylvania County	3,797	1	22	2100%
McDowell County	6,338	3	61	1933%
Rutherford County	10,279	4	68	1600%
Buncombe County	30,982	12	190	1483%
Catawba County	24,585	4	61	1425%
Chatham County	9,622	1	15	1400%
Onslow County	25,824	22	322	1364%
Madison County	2,489	2	28	1300%
Person County	5,775	2	25	1150%
Davidson County	25,468	7	85	1114%
Pasquotank County	5,936	4	48	1100%
Northampton County	3,156	3	36	1100%
Hertford County	3,106	1	12	1100%
Craven County	14,517	9	105	1067%
Washington County	1,853	2	23	1050%
Harnett County	20,690	11	126	1045%
Henderson County	13,924	5	56	1020%
Brunswick County	13,548	5	55	1000%
Scotland County	6,147	1	11	1000%
Wayne County	19,813	16	154	863%
Iredell County	29,458	10	96	860%
Randolph County	22,928	17	159	835%
Alamance County	24,552	13	113	769%
Columbus County	9,484	6	51	750%
Cleveland County	15,614	5	42	740%
Yadkin County	5,642	1	8	700%
Pender County	9,085	3	21	600%
Rockingham County	13,396	11	75	582%
Rowan County	21,445	19	127	568%
Vance County	7,867	3	20	567%
Durham County	39,466	40	265	563%
New Hanover County	26,675	14	92	557%
Robeson County	24,764	15	97	547%
Cumberland County	52,475	133	852	541%
Granville County	8,214	6	38	533%
Forsyth County	56,074	57	355	523%
Carteret County	8,723	4	24	500%
Gaston County	34,356	38	219	476%
Lee County	10,253	8	46	475%
Franklin County	8,896	8	44	450%
Pitt County	24,305	10	54	440%
Union County	43,062	31	167	439%
Davie County	6,338	3	16	433%
Wilson County	13,021	10	52	420%
Cherokee County	3,592	2	10	400%
Cabarrus County	36,704	26	121	365%
Stokes County	6,563	3	13	333%
Johnston County	35,315	16	67	319%
Hoke County	8,096	24	97	304%
Wilkes County	10,430	6	24	300%

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County	TPS Enrollment	Count Of OS Users in 2014-15	Count Of OS Users in 2017-18	Percent Change
Warren County	2,655	2	8	300%
Richmond County	7,741	5	19	280%
Wake County	171,868	182	665	265%
Halifax County	7,222	5	18	260%
Mecklenburg County	155,563	165	592	259%
Caldwell County	12,129	4	14	250%
Guilford County	77,471	143	486	240%
Lenoir County	9,477	11	37	236%
Mitchell County	1,852	11	35	218%
Nash County	16,599	12	36	200%
Dare County	5,086	1	3	200%
Clay County	1,362	1	3	200%
Moore County	13,603	6	17	183%
Currituck County	3,937	7	18	157%
Anson County	3,526	7	15	114%
Caswell County	2,817	2	4	100%
Stanly County	9,104	0	32	n/a
Surry County	11,990	0	28	n/a
Duplin County	10,133	0	20	n/a
Montgomery County	4,194	0	20	n/a
Pamlico County	1,776	0	19	n/a
Bertie County	2,743	0	18	n/a
Burke County	13,309	0	16	n/a
Perquimans County	1,762	0	16	n/a
Greene County	3,181	0	16	n/a
Macon County	4,440	0	15	n/a
Haywood County	7,445	0	14	n/a
Edgecombe County	8,765	0	11	n/a
Lincoln County	13,545	0	9	n/a
Alexander County	5,257	0	9	n/a
Jackson County	3,909	0	8	n/a
Martin County	3,772	0	7	n/a
Chowan County	2,263	0	7	n/a
Jones County	1,211	0	7	n/a
Swain County	2,290	0	7	n/a
Yancey County	2,235	0	7	n/a
Bladen County	4,925	0	6	n/a
Avery County	2,401	0	6	n/a
Gates County	1,691	0	6	n/a
Graham County	1,236	0	5	n/a
Alleghany County	1477	0	4	n/a
Polk County	2,380	0	3	n/a
Camden County	1,944	0	2	n/a
Tyrrell County	594	0	2	n/a
Watauga County	4,615	0	1	n/a
Ashe County	3,240	0	1	n/a
Hyde County	609	0	1	n/a

Notes: TPS stands for traditional public school.

CONCLUSION

In this report, we offer descriptive evidence on the ways in which private school choice has influenced North Carolina's public-school environment between 2014-15 and 2017-18. We do this through four channels. First, we categorize traditional public schools according to the degree of pressure they faced both before and after the enactment of OS program. Second, we describe the characteristics of traditional public schools facing relatively high versus relatively low competition. Third, we describe the private school competitive environments in regions of the state with low, medium, and high levels of charter school competition. Finally, we identify the fastest- and slowest- growing school choice counties in North Carolina.

Given the likely continued expansion of the program, the trends spotlighted here can be useful predictors of what can be expected for various regions of the state. It will be important to continue documenting applications, awards, and usage statistics to better understand the competitive environment created by the OS program.

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TECHNICAL APPENDIX

Methodology

Calculating Distance from Public to Private Schools

We used a proprietary software called 'Maptitude' to calculate the distance in minutes and the travel time in miles from public schools (origins) to private schools (destinations) of interest. To do so, we generated a latitude and longitude for each public and private school. Using the Distance and Time Travel Tables tool in Maptitude, we then generated a table containing the fastest route (in miles and minutes) from each public school to every private school, statewide. To reduce errors, we utilized a decision rule of skipping any potential routes longer than 600 minutes. Because the lists of schools change each year, with some schools closing and new schools open, we repeated this process for each school year beginning in 2013-14 and ending 2017-18. Table A1shows the count of origins and destinations used in each year.

TABLE A1: *Counts of Public and Private Schools Used for Maptitude Calculations, by Year*

Year	Origins	Destinations
2013-14	2,635	715
2014-15	2,631	718
2015-16	2,654	745
2016-17	2,694	753
2017-18	2,690	750

Notes: The terms "origins" and "destinations" are designations within the 'Maptitude' software. In this case, origins are public schools and destinations are private schools.

Determining Private School Grade-Span

Our analyses also required data on the specific grade levels served, by school. We downloaded the public school grade-span data from the Elementary and Secondary Information System (ELSi) maintained by the National Center for Education Statistics, an agency within the U.S. Department of Education. Unfortunately, the grade-span information for each year was not always complete. In these instances, we cross-referenced earlier or later years of ELSi listings to generate longitudinal entries on school-specific grade ranges.

To access data on private school grade-span, the most complete listings of private school data are maintained by the North Carolina Division of Non-Public Education (NC DNPE). For the years in question, the NC DNPE had reliable data for 2013-14, 2014-15, 2015-16, and 2016-17. Unfortunately, no private school data were available from NC DNPE for the 2017-18 school year. To address this missing data issue, we first copied the 2016-17 data into the 2017-18 listings. To verify records and fill in any gaps, we then cross-referenced entries with ELSi, which maintains private school records for every other school year (for the years in question, 2013-14, 2015-16, and 2017-18). We defaulted to the grade spans listed in the NC DNPE records if there was a conflict, but in cases where no data were available in the NC DNPE records, we used the ELSi data to fill in the gaps. In the end, we were able to provide grade span information for 94% or more of the private schools across all years (Table A2).

TABLE A2: *Private Schools Missing Grade-Span Data, by Year*

Year	Private Schools Still Missing Grade-Span Data After Imputation	All Private Schools
2013-14	31	715
2014-15	9	718
2015-16	19	745
2016-17	36	753
2017-18	49	750

Notes: The data provided in columns 2 and 3 refers to private school counts. Data were initially accessed from NC DNPE; Missing entries were imputed with data from ELSi.

Determining Private School Religious Affiliation

The NC DNPE documents whether a private school is religious or independent, but the ELSi provides a more detailed description of private schools' specific religious affiliation. Therefore, we utilize the ELSi variable that identifies the school as "Catholic," "Other religious," or "Nonsectarian," and a second ELSi variable that further categorizes the school into one of the following categories: African Methodist Episcopal, Amish, Assembly of God, Assembly of God (Pentecostal), Baptist, Christian (no specific denomination), Church of Christ, Church of God, Church of God in Christ, Episcopal, Friends, Islamic, Jewish, Lutheran Church – Missouri Synod, Mennonite, Methodist, Nonsectarian, Orthodox, Other Lutheran, Pentecostal, Presbyterian, Roman Catholic, and Seventh-Day Adventist. Because private school data hosted in ELSi comes from a biennial survey, not an annual survey, religious affiliation data were available for 2013-14, 2015-16, and 2017-18.

To compile a complete dataset that included all private schools and their religious affiliation across all years in question, we created a master dataset that listed private schools and their religious affiliation for 2013-14, 2015-16, and 2017-18. We then cross-checked this list across all years to ensure consistency in the designated religious affiliation over time. A number of private schools that closed early or opened late in our time span had only one year of religious affiliation data. Using Google searches, we vetted 10 percent of these schools. The records appeared correct in all cases.

Regarding private schools for which we had multiple years of data on their religious affiliation, the majority of cases were consistent over time. In a small number of cases, however, a private school had data from two or three time points but lacked agreement in the documented religious affiliation over time. For example, some schools were listed as nonsectarian in one year and then religiously affiliated the next year. Each of these cases was checked manually through Google searches to confirm the correct religious affiliation.

This process provided religious affiliation data for 743 of the 886 total private schools across the five school years of interest. We then manually searched for the religious affiliations of the remaining schools by google-searching the school name and geographic location. If a phone number could be ascertained through the Google search, we called the school directly. Using these steps, we identified the religious affiliation of 75 schools. We could not determine the religious affiliation of the remaining 68 private schools.

PLACES OF WORSHIP

Our data on places of worship in North Carolina come from the Internal Revenue Services' charities and non-profits data set, filtered for North Carolina (Internal Revenue Service, n.d.). We then filtered on religious affiliation by relying on an entry's National Taxonomy of Exempt Entities activity code (Urban Institute, 2019). This resulted in 5,635 entries. We recognized this list was unlikely to be inclusive of all places of worship in North Carolina because not all religious institutions are required to file with the IRS, so we instituted several follow-up steps to augment the database.

First, we noticed that none of the Catholic churches were part of the IRS dataset. This is because North Carolina's Catholic churches are managed by two dioceses, the Charlotte Diocese and the Diocese of Raleigh. Thus, to ensure that Catholic churches were listed individually in the Places of Worship dataset, we added entries for every Catholic church and mission in North Carolina, retrieved from the respective diocesan websites.

Second, we integrated a places of worship dataset that was generated specifically for the city of Charlotte, North Carolina (Charlotte Open Data Portal, n.d.). This dataset contained 596 records, none of which were already included in the IRS dataset. We added these new records to the master dataset and concluded that the IRS dataset provided a good foundation but was incomplete.

To create a more complete dataset, we focused on the 12 largest cities in North Carolina, searching for open-source data similar to the Charlotte dataset. Limiting ourselves to the top twelve cities created a manageable list that included at least one city from each of North Carolina's three regions. The cities we searched were Charlotte, Raleigh, Greensboro, Durham, Winston-Salem, Fayetteville, Cary, Wilmington, High Point, Concord, Greenville, and Asheville. We first searched to see if the city had an Open Data portal, like Charlotte. For those that did, we searched this portal for "religious institutions" and "places of worship." If they did not, we used these keywords in a general search with the city name. Most cities did not have a list like that of the City of Charlotte.

We also wanted to ensure that our list from the IRS was focused on places of worship and not non-profit organizations and other institutions. To screen for this possibility, we went through the list manually, and marked records with the word "church," "synagogue," and "mosque," as places of worship. We then manually checked another 1,400 records from the 12 largest cities listed above using Google to confirm they were places of worship. Our main confirmation criteria were if the place of worship had a physical meeting space and if it offered services. In cases where records did not have an online footprint, we did not count the place of worship in the list. Of the 3,460 records we vetted using these two methods, 2,301 (67%) were confirmed as places of worship, meaning that we are able to use 41% of the original dataset (5,635 records) with confidence.

As a final step, we took the confirmed list from the IRS dataset, and merged in the datasets we found in our search. Our final list consists of 2,585 places of worship from the following sources:

1. IRS vetted records (2,301)
2. Listings from the Catholic Diocese (94)
3. Data from Greensboro's places of worship database (92)
4. Listings from mosquesmasjids.com (54)
5. Data from two Asheville websites listing places of worship (44)

Calculating Distances from Public Schools to Places of Worship

As before, we used Maptitude software to calculate the distance in minutes and the travel time in miles from public schools (origins) to places of worship (destinations). To do so, we generated a latitude and longitude for each public and private school. Using the Distance and Time Travel Tables tool in Maptitude, we then generated a table containing the fastest route (in miles and minutes) from each public school to every place of worship statewide, skipping routes longer than 600 minutes. In cases where the address attached to the place of worship was a post office box or a general location, we mapped to the closest address and zip code or the nearest city and zip code combination.

Because the lists of schools change each year as schools close and new schools open, we repeated this process for each school year beginning in 2013-14 and ending 2017-18. The list of places of worship does not vary over time because we did not have information about when places of worship opened and closed. Table A3 shows the count of origins and destinations examined each year.

TABLE A3: *Counts of Public Schools and Places of Worship Used for Maptitude Calculations, by Year*

Year	Origins	Destinations
2013-14	2,635	2,585
2014-15	2,631	2,585
2015-16	2,654	2,585
2016-17	2,694	2,585
2017-18	2,690	2,585

Notes: The terms "origins" and "destinations" are designations within the 'Maptitude' software. In this case, origins are public schools and destinations are places of worship.