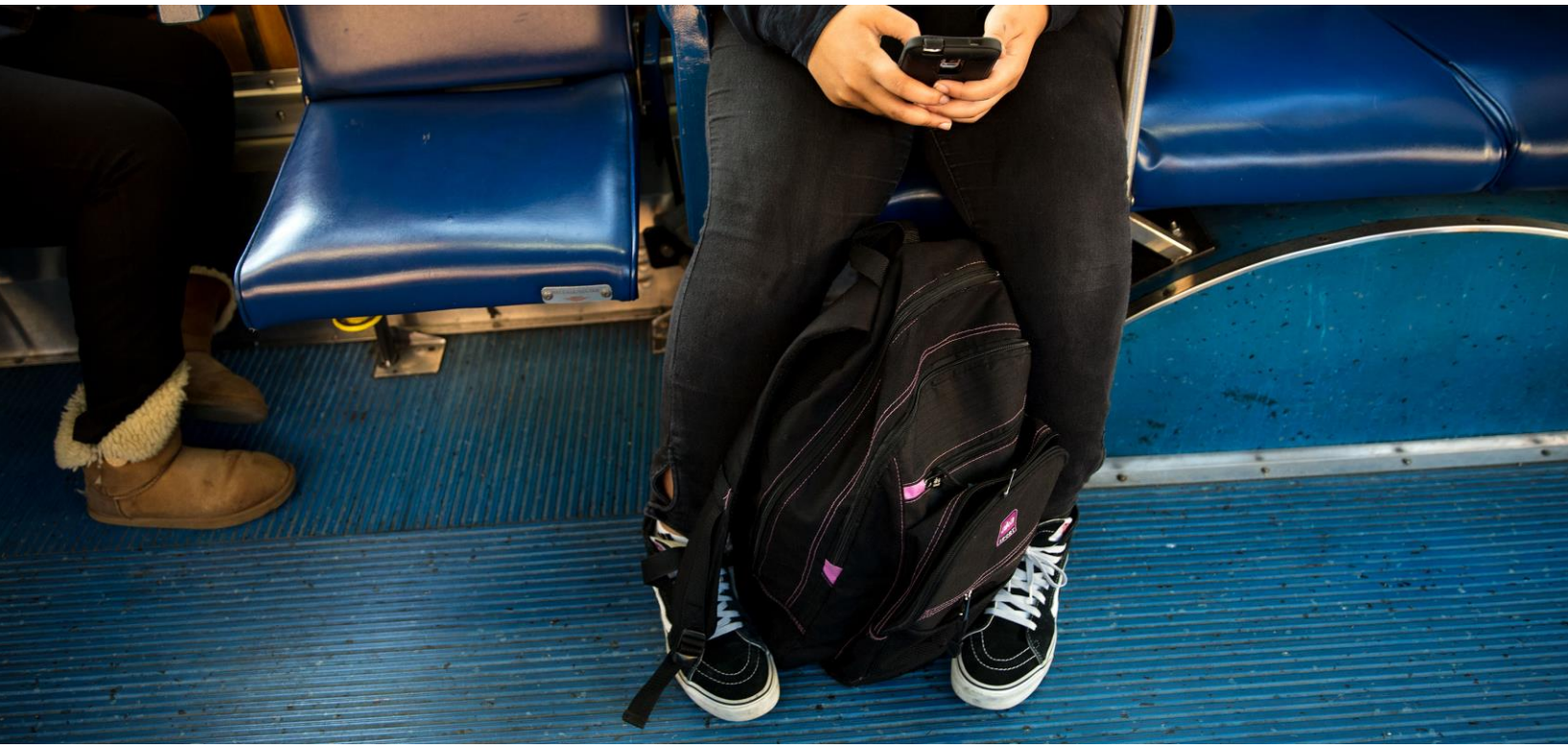

RESEARCH REPORT

The Extra Mile

Time to School and Student Outcomes in Washington, DC

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Executive Summary

In many cities, school choice policies enable students to attend schools outside the neighborhoods where they live. These policies can provide families access to schools they prefer, but students often travel farther and could potentially travel a considerable distance to school. A longer commute to school could lead to increased absenteeism or to an increased likelihood of switching schools, both of which could harm student achievement. But little research assesses whether the advantages of attending a more preferred school outweigh the disadvantage of additional travel time.

We use student-level data to measure the relationship between travel time to school and students' likelihood of transfer (and where they transfer to), attendance, and test scores in Washington, DC. Travel time to school is especially salient in DC, where roughly three-quarters of students attend a school other than the one tied to their neighborhood. In addition, DC students do not typically have access to yellow bus service and must instead be driven by their parents, take public transit, walk, or bike to school.

We find that a longer commute is associated with an increased likelihood of changing schools, both during the school year and between school years for younger students. For example, 7.2 percent of kindergarteners with a 15-minute drive to school change schools before the end of the school year, compared with 3.9 percent of their peers (at the same school and with similar demographic characteristics) with a 3-minute drive.

Longer commutes are also associated with a slight increase in absenteeism for students across grade levels. But despite the negative associations for school transfer rates and attendance, we find essentially no difference in test score outcomes between sixth-grade schoolmates who travel different distances to the same school. We suspect that the same unobservable factors that may prompt a family to enroll in a more distant school might make students less vulnerable to the potentially negative impacts of a longer travel time.

When students transfer schools in DC, they often move closer to home and are likely to enroll in their in-boundary school if they are transferring within the school year. Although some students do transfer into high-demand schools, particularly between school years, most transfer students do not move into these schools.

DC has made several changes to student transportation options during and after the period covered by our study (2013–14 through 2015–16). Most schools now participate in a common

enrollment lottery, which helps ensure a more efficient allocation of classroom seats according to parent preferences. Another notable change was the Kids Ride Free on Rail program, which has provided students free access to both Metrobus and Metrorail since fall 2015.

These changes mean that it will be important to continue to assess the relationship between travel time to school and student outcomes, which can inform at least three kinds of policy decisions:

- **School selection and assignment.** The common lottery affords opportunities to further level the playing field for disadvantaged students. For example, a preference for admission to nearby schools could be provided for "at-risk" students (e.g., students who are low income, in foster care, or homeless), so that students who are least likely to have the means to travel farther have a better chance of going to a nearby school that they prefer.
- **Expanding transportation options.** Charter schools could continue to experiment with providing bus service, and schools could partner together to run dedicated "shuttles" from one neighborhood to another. A broader solution would be to provide yellow bus transportation for a larger set of students, such as younger students who do not live within walking distance of school. Other cities, such as New Orleans and New York City, do this, but policymakers need to weigh the benefits provided by a yellow bus system with the significant costs of operating it.
- **School capacity and location.** The flip side of helping students get to schools they want to attend is to create more in-demand schools closer to where students live. Long term, city policymakers could consider how to increase the number of high-quality seats, which depends on the ability of schools to expand and the availability of real estate to house new or growing schools.

An important limitation of this report is that it does not capture students who attended a nearby school because their families felt that desirable but farther options were not feasible. Our descriptive information on the outcomes of students who vary widely in their travel times to school must be combined with more qualitative information on the experiences of all DC families to ensure that public school choice policies put families on as level a playing field as possible.

The Extra Mile

Many cities have embraced school choice policies that allow students to attend schools outside their neighborhoods. In 2012, 49 percent of parents living in cities reported that they had a choice of public school options.[1] Washington, DC, offers more choices than most cities, with roughly three-quarters of students attending a school other than the one tied to their neighborhood, including students in charter schools and about half of students in district schools (Coffin 2018).

Students in DC often go to a school that is farther from home than their neighborhood school, with many traveling a considerable distance (Urban Institute Student Transportation Working Group 2018), but little research has assessed the relationship between travel times to school and student outcomes. In particular, there is little empirical basis for knowing whether the advantages of attending a more preferred school outweigh the disadvantage of additional travel time.

This concern is particularly relevant in DC, where students do not typically have access to yellow bus service and must instead be driven by their parents, take public transit, walk, or bike to school. A longer commute to school could potentially limit a student's ability to participate in pre– and post–school day activities, could lead to increased absenteeism, or could cause her to transfer away from her choice school to a closer school. If these associations exist, an increased travel time could subsequently affect a student's academic achievement.

In this report, we use student-level data to examine the association between travel time to school and students' likelihood of transfer (and where they transfer to), attendance, and test scores.

Background

Navigating travel to and from school could influence a student's ability to get to school on time and her availability to participate in activities before or after school (Blackmon and Cain 2015; Canfield et al. 2016; Grossman, Walker, and Raley 2001; Teasley 2004). When parents choose their children's schools, they often consider proximity along with indicators of school quality and availability of extracurricular activities (Harris and Larsen 2015; Hastings and Weinstein 2008). There is little research on the impact of travel times on student outcomes, but work on travel mode to school indicates that taking a school-provided yellow bus to kindergarten is associated with fewer absences compared with other travel modes (Gottfried 2017). It is possible that students who travel farther could more frequently be late to, or absent from, school because of transportation concerns.

Long travel times could also increase the likelihood that students decide to transfer to a more convenient school. Students change schools for many reasons: a change of residence (e.g., because of a divorce or family move), a lack of academic or social "fit" within a given school, an opening of a seat at a more desired school, logistic difficulties in getting to school, or disciplinary actions (e.g., expulsion or assignment to an alternative school).

Nationally, highly mobile students (those who moved schools four or more times between kindergarten and eighth grade) are more likely to be African American and are more likely to be from households that are low income, that do not have a father in the home, and that do not own their home (US Government Accountability Office 2010). Student mobility is also more common in urban areas (Welsh 2016), in poorer neighborhoods (Cordes et al. 2015), among students from immigrant families (Fong, Bae, and Huang 2010), and among foster youth (Burley and Halpern 2001; Conger and Finkelstein 2003).

Transferring multiple times between schools could potentially affect a student's outcomes, though the magnitude and direction of this effect may depend on the motivation for the move (e.g., to a higher-quality school or because of a parent job change). Because school transfers can happen for different reasons, evidence on the effects of student mobility on academic and nonacademic outcomes are often context dependent. In a study of New York City schools, "structural" school shifts, such as from the last grade in an elementary school to the first grade in a new middle school, tend to lower achievement scores, while nonstructural shifts yield higher English language arts scores (Schwartz, Stiefel, and Cordes 2017). Using Texas data, researchers found that students who move out of a district experience a slightly higher level of school quality, but there is no overall advantage for school switchers, and students in high-turnover schools could experience a spillover effect that reduces academic achievement (Hanushek, Kain, and Rivkin 2001). Different types of student mobility (e.g., whether changing schools and residences concurrently or changing schools only) can also differentially affect student outcomes (Swanson and Schneider 1999).

The relationship between student mobility and student outcomes also varies by grade. Among elementary students in urban areas, transferring schools is associated with lower standardized test scores, but these relationships are reduced or weakened when student characteristics and prior achievement are controlled for (Alexander, Entwisle, and Dauber 1996; Heinlein and Shinn 2000; Temple and Reynolds 1999). High levels of school mobility during the middle and high school years are associated with an increased risk of high school dropout, even after controlling for student characteristics (Gasper, DeLuca, and Estacion 2012; Rumberger and Larson 1998; South, Haynie, and Bose 2007). In a longitudinal study of Chicago students, moving among schools multiple times between

ages 10 and 14 was associated with lower rates of on-time high school completion, higher likelihoods of experiencing depression symptoms in early adulthood, and lower levels of occupational prestige, even after controlling for student characteristics (Herbers, Reynolds, and Chen 2013; Ou and Reynolds 2008).

DC Transportation and School Choice Policy

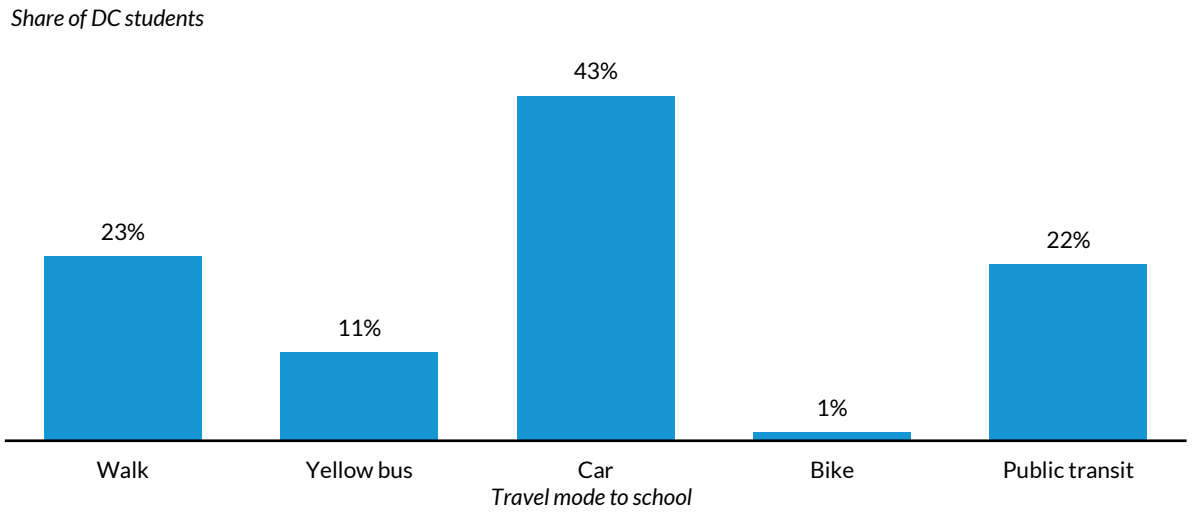
In Washington, DC, most students are eligible for a transit pass through the Kids Ride Free transportation program. This pass allows students attending public and private schools to ride free during the school year on Metrobuses (Metrorail access was added for public school students in the 2015–16 school year).[2] During the 2016–17 school year, more than 32,000 students used the Kids Ride Free transit benefit (WMATA 2018). DC students enrolled in special education are eligible for yellow bus service as determined by their Individualized Education Program, and a few charter schools provide yellow bus service, sometimes for a fee depending on ability to pay (OSSE 2013).[3]

A survey of DC families, conducted in 2017 by the Center on Reinventing Public Education, found that children attending public school were most likely to report traveling to school by car (43 percent), walking (23 percent), or via public transit (22 percent) (figure 1).

FIGURE 1

How DC Public School Students Travel to School

Usual mode of travel to school, as reported by DC families



Source: Center on Reinventing Public Education.
Note: Sample includes only families who send their children to a DC public school (DC Public Schools or DC Public Charter School Board).

Washington, DC, has a robust system of public school choice, where families choose to attend their in-boundary traditional DC Public Schools (DCPS) school, another traditional DCPS school, or a charter school overseen by the DC Public Charter School Board (PCSB). Over our study period (2013–14 to 2015–16), students could apply to attend preferred out-of-boundary schools by lottery, though the lottery's structure changed substantially between 2013–14 and 2014–15.

In the 2013–14 school year, DCPS conducted a lottery for all seats in prekindergarten, specialized K–8 schools, and out-of-boundary schools, while charter schools operated separate lotteries for their schools.[4] Starting in the 2014–15 school year, Washington, DC, moved to a common lottery, administered through the website MySchoolDC.org, where parents can apply to DCPS schools and most charter schools (more than 90 percent of charter school seats) (21st Century School Fund 2013). This system, built on a sophisticated matching algorithm, assigns students to schools based on the family's ranking of schools and a randomly assigned lottery number.[5] Students receive preferred status based on the school's lottery preferences (e.g., sibling attending, sibling accepted, or transfer preference). DCPS elementary schools also have a preference provision for students who live more than a half-mile from their in-boundary school and apply to another DCPS school less than a half-mile from their home. In all years, students were assigned to waiting lists for schools they ranked higher than their matched school, which can remain active throughout the school year. If a student receives a spot off the waiting list at another school, she can withdraw from her current school to enroll at her preferred school.[6]

Previous work on Washington, DC's school choice system shows that parents prefer nearby schools but appear willing to travel for what they perceive as higher-quality schools. Students who opted into out-of-boundary or charter schools in the 2007–08 and 2008–09 school years tended to travel farther and travel to higher-performing schools (Özek 2011). A study of 2014–15 school lottery choices estimated that a typical middle school parent would be willing to travel an additional 1.2 miles for a 10-point increase in the school's proficiency rate on state-administered standardized tests (Glazerman and Dotter 2016).

Data and Methods

We use DCPS and PCSB student-level data from the 2013–14, 2014–15, and 2015–16 school years to look at the relationship between projected student travel times and student outcomes. We follow students who were in kindergarten, sixth grade, or ninth grade in 2013–14 through to the 2015–16 school year. At the end of our sample, students should be in 2nd, 8th, and 11th grade, if they followed a standard grade progression. However, not all students followed a standard grade progression (appendix

table A.1). Some students were held back or moved forward or were moved to some other status (e.g., enrolled in adult education, private school, or out of DC). We present results for any student who was present in our 2013–14 sample grades for whom we have complete demographic data and who was enrolled in a traditional public school (TPS) or public charter school (PCS) in the relevant period. Restricting our sample only to students who followed a standard grade progression does not substantially change our results.

Calculating Travel Times

We have a residential address for nearly every student in our dataset. To conduct our analysis, we assign each address to its corresponding census block (for most DC students, this is an actual city block) and calculate the distance from the population-weighted centroid of the census block to the student's school address. Using Google's Distance Matrix API (application programming interface), we calculate a driving and transit travel time for each school the student attends over the course of our three-year panel and for each instance where a student or school changes location, as reported in the administrative data.[7] Times are calculated for a Wednesday morning commute, departing at 8:00 a.m. (most schools in DC start at 8:45 a.m.). Although students were not offered free transit on Metrorail until the 2015–16 school year, we allow Metrorail as an option for student transit travel, as well as Metrobus. Because of the API's structure, we cannot calculate driving and transit times for past dates. Although DC implements quarterly adjustments to its Metrobus routes, these changes are generally incremental and are unlikely to bias our estimates.

Analysis Methodology

We conduct two analyses. First, we look at the relationship between calculated drive time (in normal traffic) to school and four student outcomes:

- **Within-year student mobility.** Whether a student changes schools at least once within the current school year (i.e., enrolls in a new school at least once after the start of the school year). To more accurately identify students who are transferring during the school year at a more meaningful point in time, we count a transfer only if it occurs after the first two weeks of school or before the last two weeks of school, using DCPS (traditional calendar) start and end dates for each year.[8]
- **Between-year student mobility.** Whether a student changes schools between school years.

- **Attendance.** The share of days a student is present at school (for students who change schools, we calculate a weighted average). To harmonize differences in attendance measures between PCSB and DCPS, we use in-seat attendance from DCPS and re-create a similar measure for charter schools. DCPS's data guidebook defines full-day attendance as one where a student was at school for at least 80 percent of the school day. Charter school practices vary.
- **Test scores.** The student's score on DC's end-of-year standardized tests in English language arts and math. These data are calculated only for sixth-grade students and are standardized within grade, subject, and year. During the first year of our study, DC public and public charter schools offered the DC Comprehensive Assessment System test to assess students. By the 2014–15 school year, DC had switched to the Partnership for Assessment of Readiness for College and Careers test.[9]

To more accurately represent the relationships between drive times and these outcomes, we use linear regression analysis, holding certain student characteristics and school characteristics constant.[10] We control for the following student characteristics:

- Gender
- Race or ethnicity (white, black, Hispanic, Asian, other)
- Free and reduced-price lunch eligibility
- English Language Learner (ELL) status
- Special education enrollment[11]
- Ward of student's home address

We use a school-specific identification code to control for unobserved characteristics at the school level (e.g., curriculum offered at a given school). When we examine the likelihood of within-year transfer, we control for the first school that the student transferred out of in that year. When we examine likelihood of between-year transfer, we use the school that students were enrolled in at the end of the prior school year. When we look at the other outcome variables, we use the primary school the student attended during that school year, using membership days. We ran these analyses for both driving and public transit times and found similar results. For simplicity, we provide all results for driving time in normal traffic.

In our second analysis, we dive deeper into where students go when they transfer schools within and between school years. We provide a descriptive analysis of where students go when they transfer

(when they transfer to another public school in DC) and the characteristics of these schools, such as whether they are closer or farther than the first school attended.

Limitations

Our analysis is subject to several limitations. First, although we estimate driving and transit times for nearly every student in our dataset, we do not directly observe the student's actual travel mode or travel times to school. Moreover, we observe only one address for each student-school entry in our data. If a student frequently travels from a different address (e.g., from the home of another custodial parent or guardian), our results might not accurately reflect the student's typical distance from school. Additionally, if a student permanently changes addresses during the year but remains at the same school, their parents might not report the address change until the next school year.

Further limitations include errors related to incomplete or overlapping data. In some cases, we observe an overlap in the exit date of a student's old school and the entry date for her new school, making it hard to establish when a transfer occurred. Although we observe where students transfer to, we often do not know why they moved. We have some school-recorded information on why a student left a given school, but these data are incomplete and often do not provide information on the motivation for a move. Further, we do not have data on other outcomes, such as participation in extracurricular activities or end-of-year grades, which might give us a better sense of how travel time to school could affect academic and disciplinary outcomes.

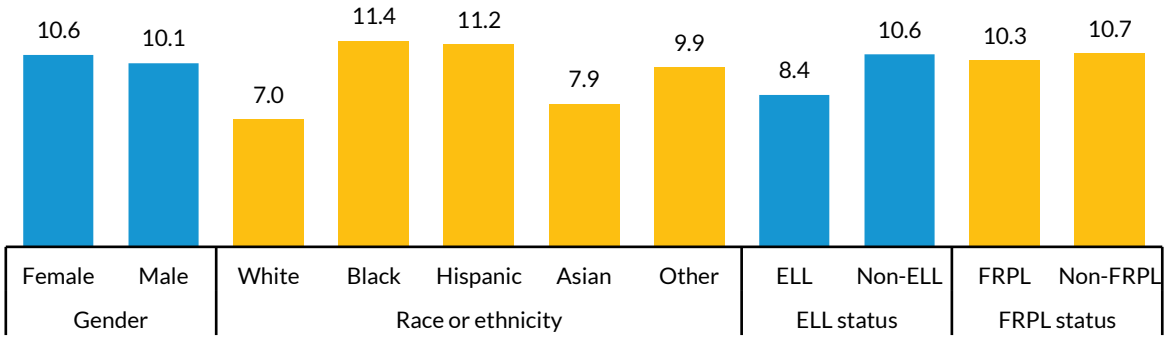
How Far Students Travel in DC

In our previous report, *The Road to School*, we provide data on how far students travel to school in Washington, DC, as well as in Denver, Detroit, New Orleans, and New York City (Urban Institute Student Transportation Working Group 2018). Broadly, students travel farther from home as they grow older. Black students travel farther than their white peers, and students who do not receive free or reduced-price lunch travel farther than those who do. There is little difference between male and female students, and students who are ELL tend to attend school closer to home than those who are not ELL (figure 2). As we follow our students across three school years (e.g., from kindergarten into first and second grades), these average drive times and the differences between them within demographic groups do not substantially shift.

FIGURE 2

How Far DC Students Travel to School, by Grade

Minutes of drive time, in traffic



Kindergarten students

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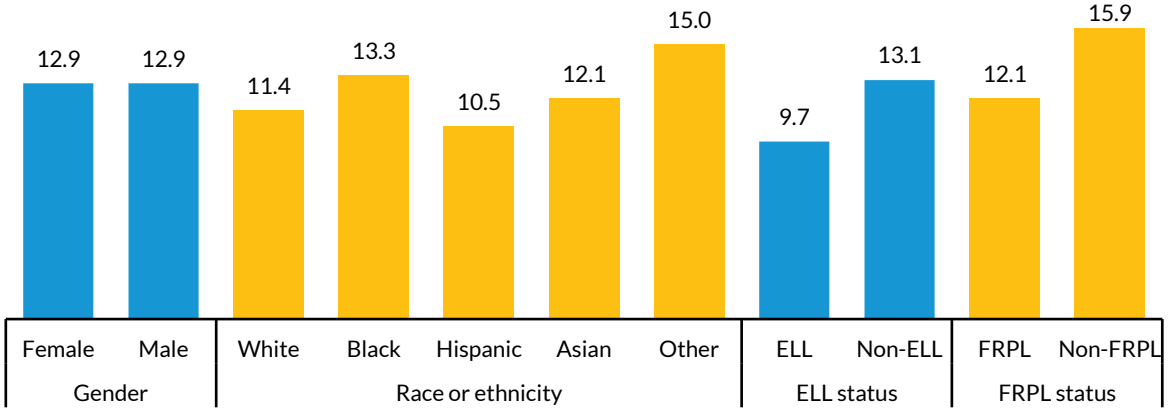

Sixth-grade students

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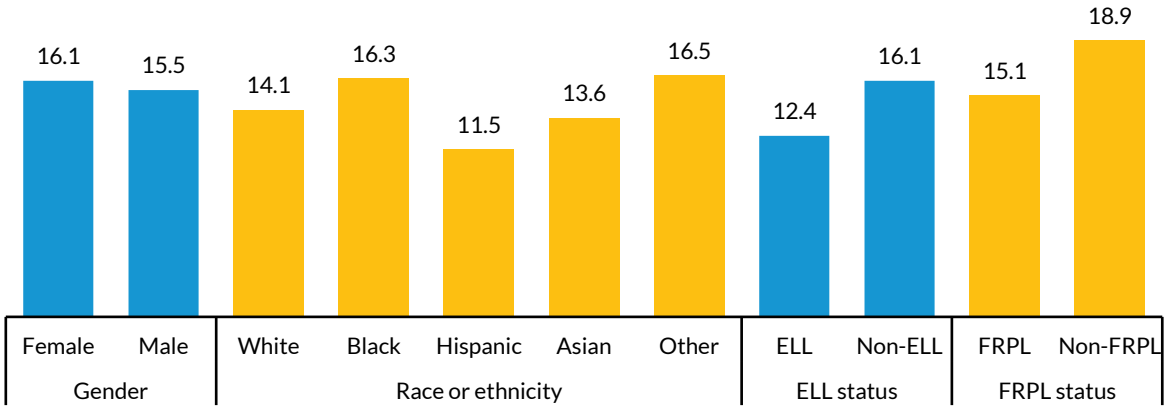

Ninth-grade students

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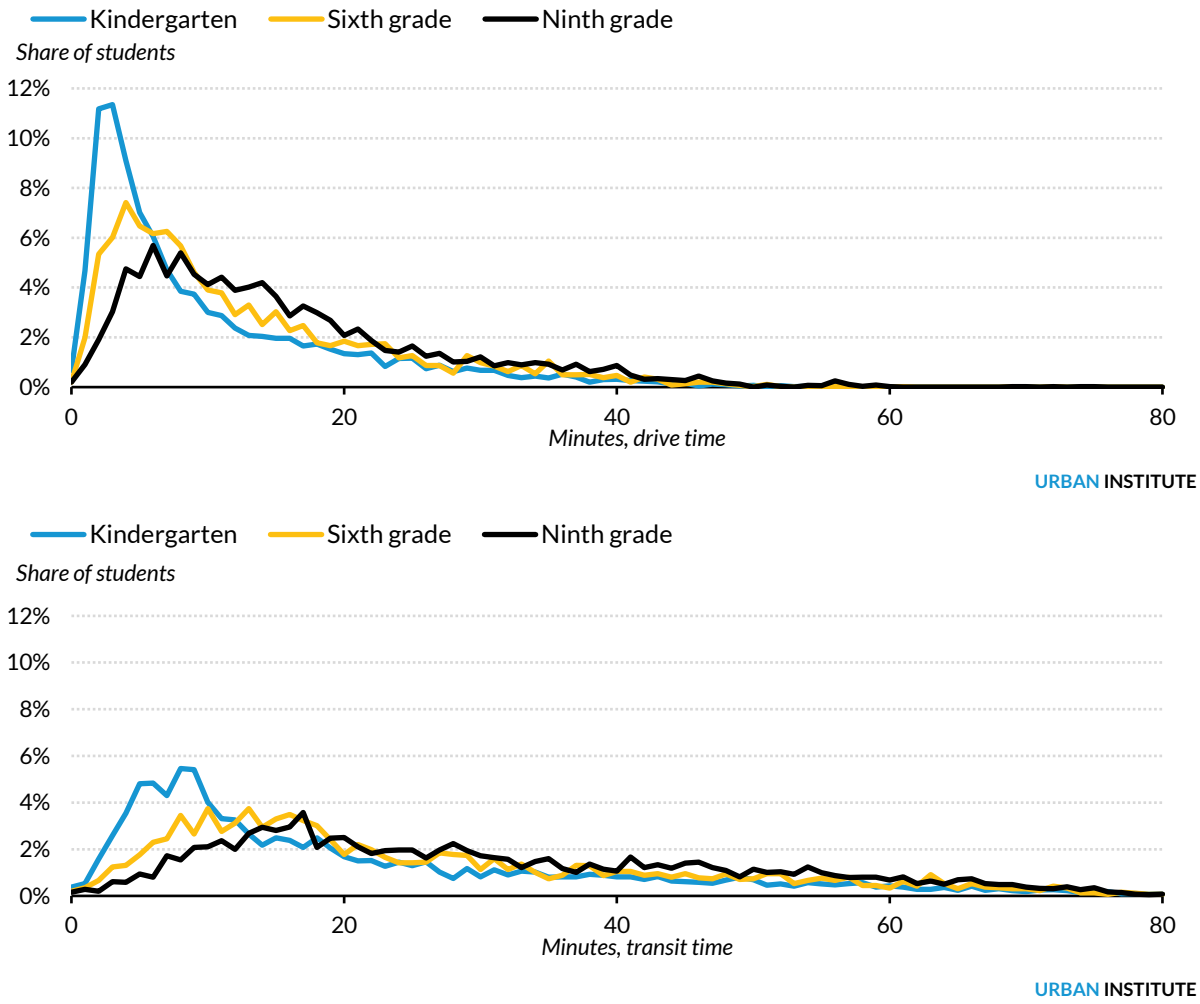
Source: Urban Institute analysis of DC students enrolled in the 2013–14 school year.
Note: ELL = English Language Learner; FRPL = free and reduced-price lunch.

Although average driving times in traffic can reveal differences within groups, these summative numbers do not convey the substantial range of travel times for students in Washington, DC. Figure 3 illustrates the distribution of students by both driving and transit time to school. Roughly 44 percent of kindergarteners live within a five-minute drive from school, but just 13 percent live within a five-minute public transit commute. We observe similar trends among sixth-grade and ninth-grade students, where 27 and 15 percent of students, respectively, live within a five-minute drive, but just 6 percent and 3 percent of students could get to school within the same time by public transit. Figure 3 also highlights some of the longer commutes that students in DC might be making. Six percent of kindergarteners, 9 percent of sixth-graders, and 13 percent of ninth-graders live more than a half-hour drive from their school.

Kindergarten and sixth grade students enrolled in public charter schools tend to travel farther to school than TPS students (appendix table A.6). For example, the median travel time for PCS kindergarteners is 10.6 minutes, compared with 4.5 minutes for TPS kindergarteners. But some TPS students travel significant distances to school, with more than 10 percent traveling at least 20 minutes. Ninth-grade students have similar travel times, on average, regardless of whether they are enrolled in a TPS or a PCS.

FIGURE 3

Distribution of Students by Driving and Transit Travel Time to School



Source: Urban Institute analysis of DC students enrolled in the 2013–14 school year.

Time to School and Student Outcomes

We first examine how drive times from home to school are related to within-year transfers, between-year transfers, absenteeism, and test scores. We report the difference in expected outcomes between students at the 25th and 75th percentiles of drive times. Except for standardized test scores, the average values of these outcome variables can be found in table 1.

TABLE 1

Descriptive Statistics of Outcome Variables

	Within-Year Transfer Rate			Between-Year Transfer Rate			In-Seat Attendance Rate		
	Mean	SD	*N*	Mean	SD	*N*	Mean	SD	*N*
Kindergarten	6%	0.24	7,127	18%	0.39	7,034	90%	0.12	6,724
Sixth grade	7%	0.25	4,453	15%	0.36	4,374	89%	0.12	4,330
Ninth grade	15%	0.36	5,578	20%	0.40	5,479	76%	0.24	5,322

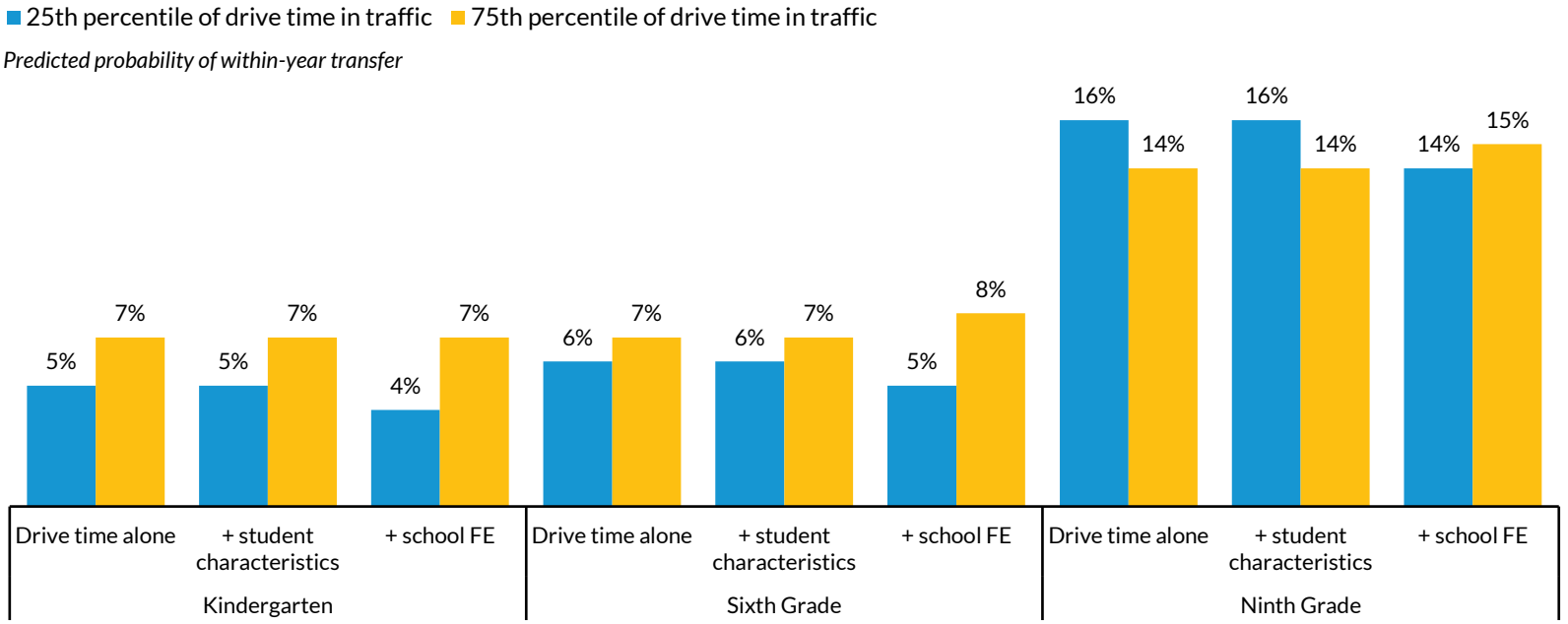
Source: Urban Institute analysis of DC Public Schools and DC Public Charter School Board data for the 2013–14 and 2014–15 school years.
Note: SD = standard deviation.

Within-Year Transfer Rate

Kindergarten and sixth-grade students who live farther from their first enrolled school are more likely to transfer during the school year. We estimate that a kindergarten student who lives a 15-minute drive from school (the 75th percentile of kindergarten drive times in traffic) is about 2.2 percentage points more likely to transfer schools than a kindergarten student who lives a 3-minute drive from school (25th percentile). For a sixth-grade student, living 18 minutes from school (75th percentile of sixth-grade drive times) is associated with a predicted 1.3 percentage-point increase in transfer rate over those living 5 minutes from school (25th percentile).

FIGURE 4

Likelihood of Transferring Schools during the 2013–14 School Year, by Grade and Drive Time



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Source: Urban Institute analysis of DC Public Schools and DC Public Charter School Board data for the 2013–14 school year.

Notes: FE = fixed effects. All these results are statistically significant at the 1 percent level, except for the second sixth-grade model and last ninth-grade model. These models are not statistically significant. The 25th and 75th percentiles of drive times vary by grade. For kindergarteners, the 25th and 75th percentiles are 3 and 15 minutes, respectively. For sixth-grade students, the 25th and 75th percentiles are 5 and 18 minutes, respectively. For ninth-grade students, the 25th and 75th percentiles are 7 and 21 minutes, respectively.

Student and school characteristics might be driving some of these predicted differences in within-year transfers. But even when controlling for student characteristics and the first school the student attended during the school year, we find a similar relationship (figure 4). Compared with peers attending the same school and with similar demographic characteristics, kindergarteners with a 15-minute drive to school are about 3.3 percentage points more likely to transfer than those with a 3-minute drive time (predicted likelihoods of transfer are 7.2 and 3.9 percent, respectively). Similarly, sixth-grade students with an 18-minute drive to school are about 2.3 percentage points more likely to transfer than those with a 5-minute drive to school, when compared with similar peers attending the same school (predicted transfer rates of 7.8 and 5.5 percent, respectively).

For ninth-grade students, the results follow a different pattern. Students who live farther are less likely to transfer schools within the school year, and this relationship holds when controlling for student characteristics. But when controlling for the first school the student attended in addition to student characteristics, the relationship between drive time and within-year transfer is no longer statistically significant. Students who live farther are predicted to be more likely to transfer, but the difference is small. One explanation for this could be that students who live closer to their school might be attending schools that tend to have higher within-year transfer rates.[12]

We report results for the 2013–14 school year, but we observe similar (though smaller in magnitude) results for within-school transfers in our cohort in the 2014–15 and 2015–16 school years.[13] A longer drive time is generally associated with an increased likelihood of within-year transfer among kindergarten and sixth-grade students. We find a similar effect when looking at the relationship between distance from school via public transit and likelihood of within-year transfer.

Between-Year Transfer Rate

Between-year transfer rates are higher than within-year transfer rates, especially for younger students. But just as living farther from school is associated with an increased likelihood of within-year transfer for kindergarten and sixth-grade students, we find a similar relationship between drive time and likelihood of transferring between school years.

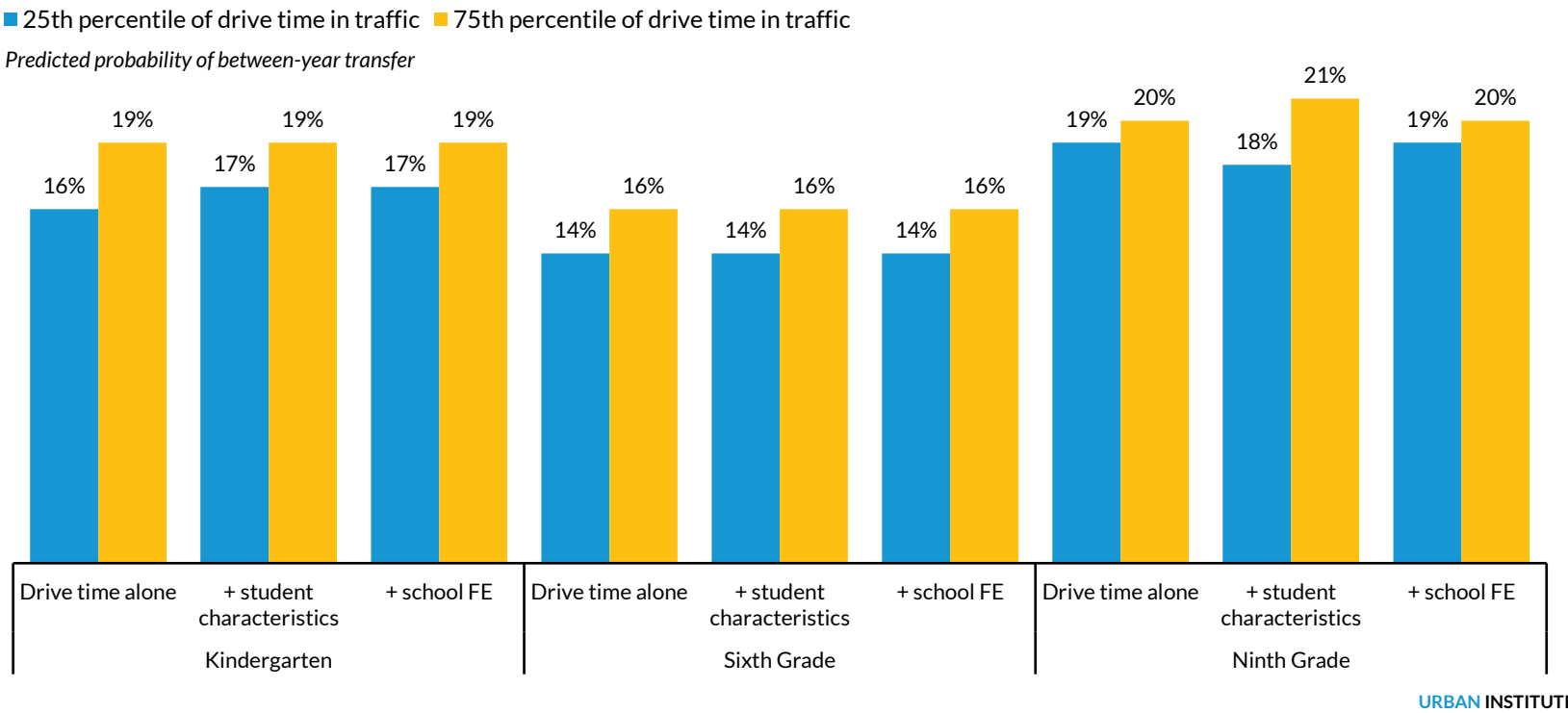
Without any controls, kindergarteners at the 75th percentile of drive time from their last attended school in 2013–14 (14 minutes) are predicted to be 3.1 percentage points more likely to transfer to a new school in 2014–15 than those at the 25th percentile (3 minutes) (figure 5). Introducing student characteristics as controls, the difference in transfer rates between those at the 75th percentile and the 25th percentile narrows to 2.4 percentage points. When we control for both student characteristics and

the last school attended in 2013–14, the gap remains about the same; kindergarteners with a 14-minute drive are 2.5 percentage points more likely to transfer between school years than those with a 3-minute drive.

Introducing controls into the models for sixth-grade and ninth-grade students generally does not decrease the difference in transfer rate between those who travel far and those who do not. Controlling for student characteristics and school, sixth-grade students with an 18-minute drive from their last 2013–14 school are predicted to be 2.6 percentage points more likely to transfer than those with a 5-minute drive. Similar to the analyses for within-year transfer, ninth-grade students with a 21-minute drive are slightly more likely to transfer than those with a 7-minute drive, but this relationship is not statistically significant. Just as before, we observe similar relationships for travel times by public transit and for the relationship between distance from last school attended in 2014–15 and likelihood of transfer to a new school in the 2015–16 school year.[14]

FIGURE 5

Likelihood of Transferring Schools between the 2013–14 and 2014–15 School Years, by Grade and Drive Time



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Source: Urban Institute analysis of DC Public Schools and DC Public Charter School Board data for the 2013–14 and 2014–15 school years.

Notes: FE = fixed effects. All these results are statistically significant at the 1 percent level, except for the first and last ninth-grade models. The first and last ninth-grade models are statistically significant only at the 5 percent level. The 25th and 75th percentiles of drive times vary by grade. For kindergarteners, the 25th and 75th percentiles are 3 and 14 minutes, respectively. For sixth-grade students, the 25th and 75th percentiles are 5 and 18 minutes, respectively. For ninth-grade students, the 25th and 75th percentiles are 7 and 21 minutes, respectively.

Days Absent

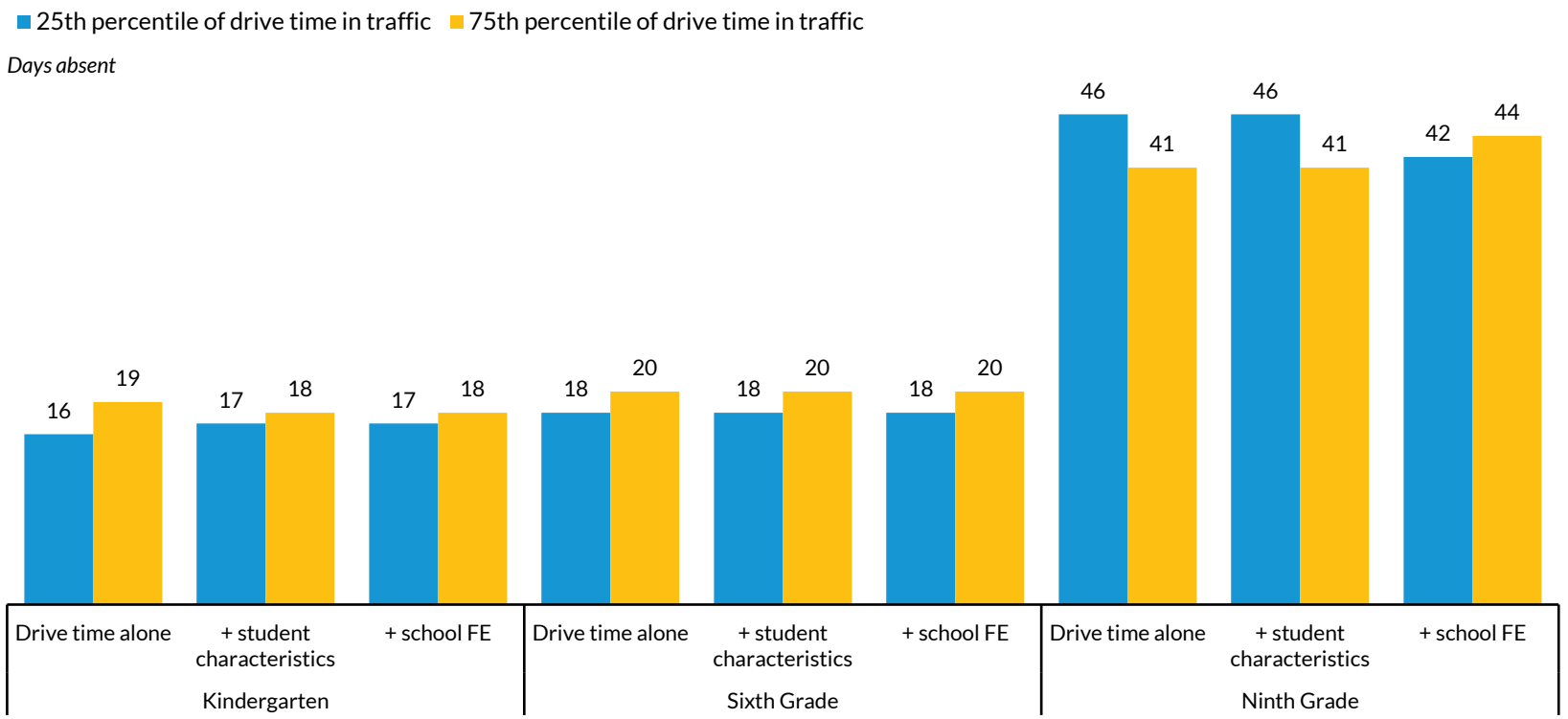
Just as distance to school may affect student mobility within and between school years, it is possible that living farther from school could also affect student attendance. We analyze the relationship between drive time and share of days attended using the DCPS definition of attendance (see the data and methods section). For ease of interpretation, we discuss our results by estimating the number of days the student would have been absent if they had attended a 180-day school year.

In kindergarten and sixth grade, living farther from the school attended for the longest period during the 2013–14 school year is associated with an increased likelihood of school absences. But controls for student characteristics and school attended narrow the gap in days absent among those who live farther and closer to school. Controlling for student characteristics and school, kindergarteners and sixth-grade students that travel far (75th percentile) on average miss one additional day of school compared with those who do not travel far (25th percentile) (figure 6).

Without any controls, ninth-grade students who live a 21-minute drive from their longest-enrolled school in the 2013–14 school year are absent about five fewer days a year than those with a 7-minute drive. This relationship holds when we introduce student characteristics. But when we include fixed school characteristics, the relationship reverses direction (and is still statistically significant). Controlling for student demographics and school characteristics, ninth-grade students who live farther from school are absent two more days a year than those who live closer to their school. Similar to the relationship between drive time and within-year transfers for ninth-grade students, this change in the direction of the relationship could be explained by students traveling farther to attend schools that have lower absence rates, perhaps because of differences in attendance policies and school norms.

FIGURE 6

Days Absent in the 2013–14 School Year, by Grade and Drive Time



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Source: Urban Institute analysis of DC Public Schools and DC Public Charter School Board data for the 2013–14 and 2014–15 school years.

Notes: FE = fixed effects. All these results are statistically significant at the 1 percent level, except for the last sixth-grade model and last ninth-grade model. These relationships are statistically significant only at the 5 percent level. The 25th and 75th percentiles of drive times vary by grade. For kindergarteners, the 25th and 75th percentiles are 3 and 14 minutes, respectively. For sixth-grade students, the 25th and 75th percentiles are 5 and 18 minutes, respectively. For ninth-grade students, the 25th and 75th percentiles are 7 and 21 minutes, respectively.

Standardized Test Scores

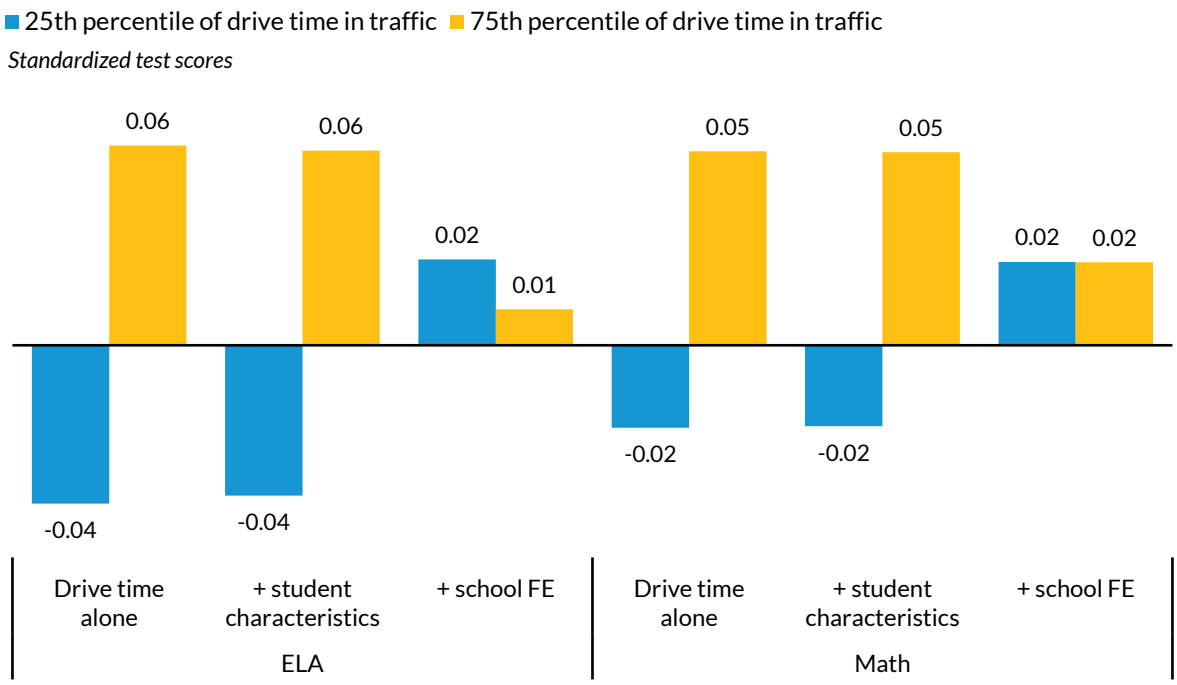
Based on our results, younger students who live farther from school are predicted to be more likely to transfer schools, and both younger and older students who live farther from school are predicted to have more absences. Increases in mobility and absences might in turn affect a student's standardized test scores. To examine this potential impact, we look at the relationship between driving distance from school and performance on sixth-grade English language arts and math standardized tests. Although we have some test scores for ninth-grade students, we have more complete data on sixth-grade students. About 88 percent of sixth-grade students in our data have test scores, compared with 43 percent of ninth-grade students (kindergarteners are not tested).

Contrary to what might be expected given our previous results, the relationship between drive time from school and test scores, before including any controls, is positive across both English language arts and math standardized tests. Compared with students who live close to school, students who live far from school are predicted to score roughly 0.10 standard deviations higher on reading tests and about 0.08 standard deviations higher on math tests (figure 7). These relationships hold when controlling for student characteristics. But when we control for fixed school characteristics, such as whether the school has consistently high test scores, the relationship between drive time to school and test scores becomes statistically insignificant.

These results suggest that students who attend more distant schools could have unmeasured characteristics, such as increased levels of family support or motivation, that outweigh the potential negative effects of a longer distance to school, such as increased school switching and higher absenteeism. Specifically, students who live farther from school do not score significantly higher or lower than their classmates who live closer to the same school. The absence of an association between distance traveled and test scores is somewhat surprising in light of the fact that students who travel farther to school have higher rates of transfer and absence.

FIGURE 7

Math and Reading Test Scores, Standardized for Sixth-Grade Students, by Drive Time



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Source: Urban Institute analysis of DC Public Schools and DC Public Charter School Board data for the 2013–14 and 2014–15 school years.

Notes: ELA = English language arts; FE = fixed effects. The first two models of each test score are statistically significant at the 1 percent level. But the last model of each test is not statistically significant. For sixth-grade students, the 25th and 75th percentiles of drive time are 5 and 18 minutes, respectively. Test scores are standardized, with a mean of zero and a standard deviation of one.

Where Students Go When They Change Schools

Students may change schools for many reasons. Some switch schools within or between years for positive or neutral reasons (e.g., admission into a higher-quality school or a residential move), but others switch because of negative reasons (e.g., difficulties with transportation to current school or disciplinary problems that prompt a move). Because we find that travel time to school is generally associated with increased within- and between-year mobility, we look at whether families attend closer schools when they transfer and whether they move to a school that is in high demand or is one of their in-boundary traditional public schools.

In some cases, a school change is accompanied by an address change, which we account for in our calculation of travel times to school and in our assessment of attending an in-boundary school. In our

data, we have a record if students are transferred to an incarcerated youth program or an alternative school in a detention center. Less than 1 percent of sixth-grade within-year transfers and 22 percent of ninth-grade within-year transfers were transferred into these programs at some point during the 2013–14 school year. We do not observe substantial differences in our results when we exclude these students, and we retain these students to provide a more complete picture of student transfers.

For the following analyses, we provide results only for students who are recorded as leaving one DC public school (traditional or charter) and enrolling in another. Students who move out of the DC public schools (e.g., to a neighboring district, to homeschooling, or to private school) are not included, even though they make up a substantial portion of our recorded school transfers, because we do not know where they enrolled. Among kindergarteners, 65 percent of within-year transfers in 2013–14 and 24 percent of transfers between the 2013–14 and 2014–15 school years are students transferring out of DC public schools. For sixth- and ninth-grade students, 68 percent and 51 percent of within-year transfers and 21 percent and 16 percent of between-year transfers are students transferring out of DC public schools, respectively.

Moving to High-Demand Schools

To define high-demand schools, we use waiting list data from the middle year of our dataset, the 2014–15 school year.[15] We define a high-demand school as one where the number of students on the waiting list for the entry-level grade is at least a fourth the size of the number of students in that grade (e.g., a school with a starting grade of kindergarten and an enrollment of 40 kindergarteners would need to have a waiting list of at least 10 students to be counted as high demand). Under this definition, we identify 65 schools (roughly a third of our schools) as high-demand schools: 50 (of 125) elementary schools, 8 (of 33) middle schools, and 7 (of 26) high schools.

In general, when a kindergarten or sixth-grade student transferred within year to another DC public school, she moved to a school closer to home in terms of driving time (69 percent of kindergarteners and 58 percent of sixth-grade students moved closer in 2013–14). Students who moved to more distant schools when they transferred within the 2013–14 school year were more likely to transfer to high-demand schools in kindergarten (30 percent versus 19 percent of those who moved to closer schools) and sixth grade (30 percent versus 13 percent).

Ninth-grade students who transferred within year were about equally as likely to attend a school closer to home as one farther from home, and ninth-grade students who moved to more distant schools within the 2013–14 school year were about equally as likely to attend high-demand schools as those

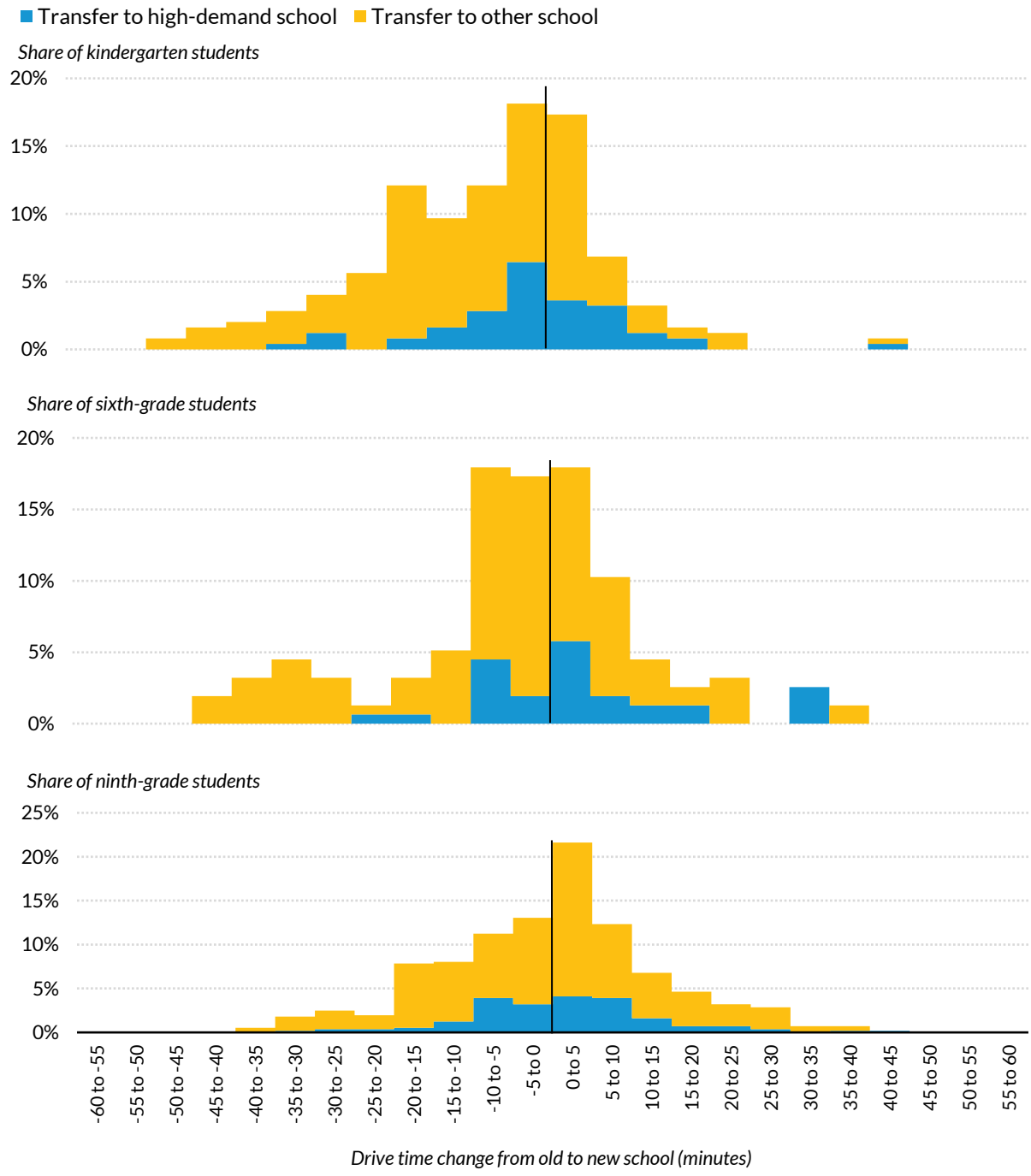
who moved to closer schools (22 percent versus 21 percent). Students who moved to high-demand schools are highlighted in figure 8, which shows the change in travel times among those who switched schools within the 2013–14 school year.

In contrast to our within-year transfer cases, kindergarten and sixth-grade students who transferred between school years tend to move to schools farther from their home (57 percent of kindergarteners and 56 percent of sixth-grade students moved farther between the 2013–14 and 2014–15 school years). But there is little discernable correlation between attending a closer or more distant school in the new year and attending a high-demand school (figure 9).

FIGURE 8

Distribution of Drive Time Changes for Students Who Transferred within the 2013–14 School Year

Categorized by transfers to a high-demand school



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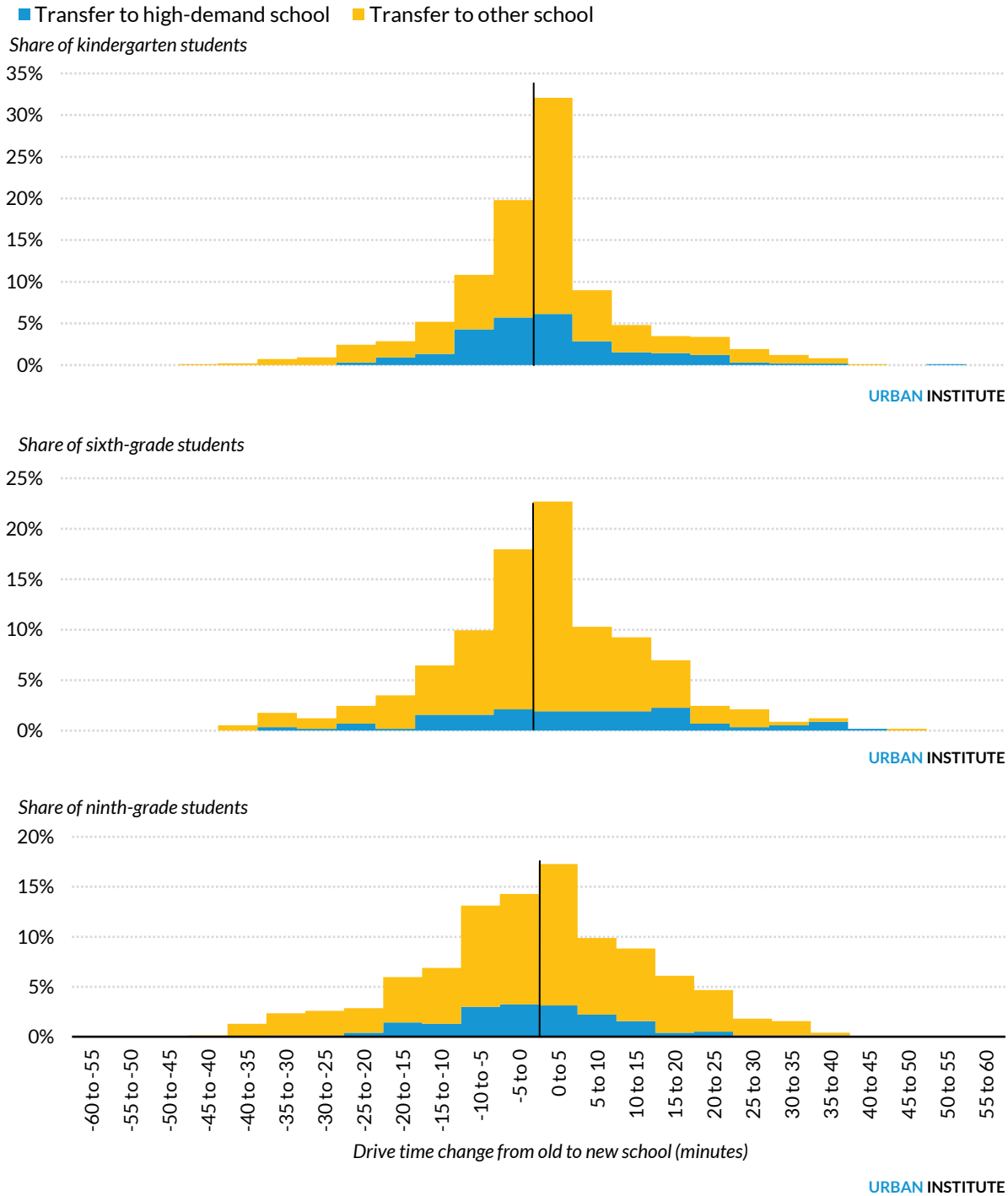
Source: Urban Institute analysis of DC Public Schools and DC Public Charter School Board data for the 2013–14 school year.

FIGURE 9

Distribution of Drive Time Changes for Students Who Transferred between the 2013–14 and 2014–15 School Years

Categorized by transfers to a high-demand school



Source: Urban Institute analysis of DC Public Schools and DC Public Charter School Board data for the 2013–14 and 2014–15 school years.

Moving to In-Boundary Schools

In Washington, DC, all students have access to at least one in-boundary school. In-boundary schools are traditional public schools that are within a student's home enrollment zone boundary or that a student has a right to attend via a school feeder pattern (e.g., a set of elementary schools that "feed" into a single middle school). We rely on the 2013–14 school boundaries to assign students to their in-boundary schools.[16] The Office of the Deputy Mayor for Education and DCPS began implementing new school boundaries and feeder patterns in the 2015–16 school year, the last year of our three-year panel. As a result, we focus on changes within and between the 2013–14 and 2014–15 school years.

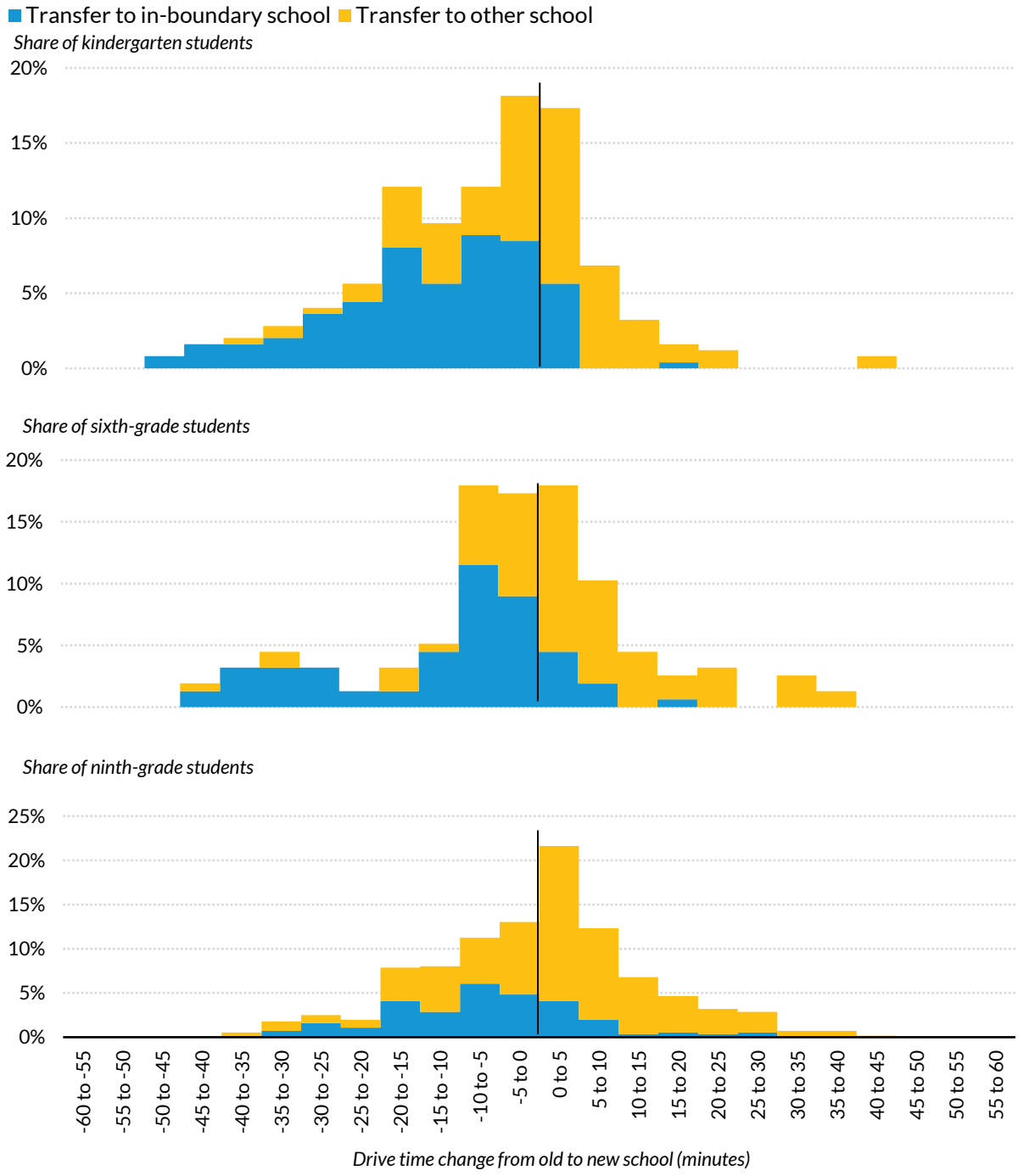
Across all grades and during both the 2013–14 and 2014–15 school years, students who transferred to a closer school were more likely to be transferring to an in-boundary school. In the first year of our sample, 65 percent of kindergarteners, 67 percent of sixth-grade students, and 46 percent of ninth-grade students who moved to a school closer to home moved to their in-boundary school. Although this result might be expected, an examination of the distribution of the change in drive times provides additional context (figure 10). Students making a large change, from a distant school to a much closer school, are more likely to enroll in their in-boundary school. Moreover, we observe that some students move to an in-boundary school, even though it means going slightly farther than the distance to their first school.

Among students who transferred schools between the 2013–14 and 2014–15 school years, we observe that students moving closer to home are also more likely to be moving to in-boundary schools. But students moving closer between school years were about half as likely to attend their in-boundary schools, relative to those moving closer during the 2013–14 school year. Thirty-seven percent of kindergarteners, 35 percent of sixth-graders, and 37 percent of ninth-graders who moved closer between school years ended up at an in-boundary school in the new school year (figure 11).

FIGURE 10

Distribution of Drive Time Changes for Students Who Transferred within the 2013–14 School Year

Categorized by transfers to the student's in-boundary school



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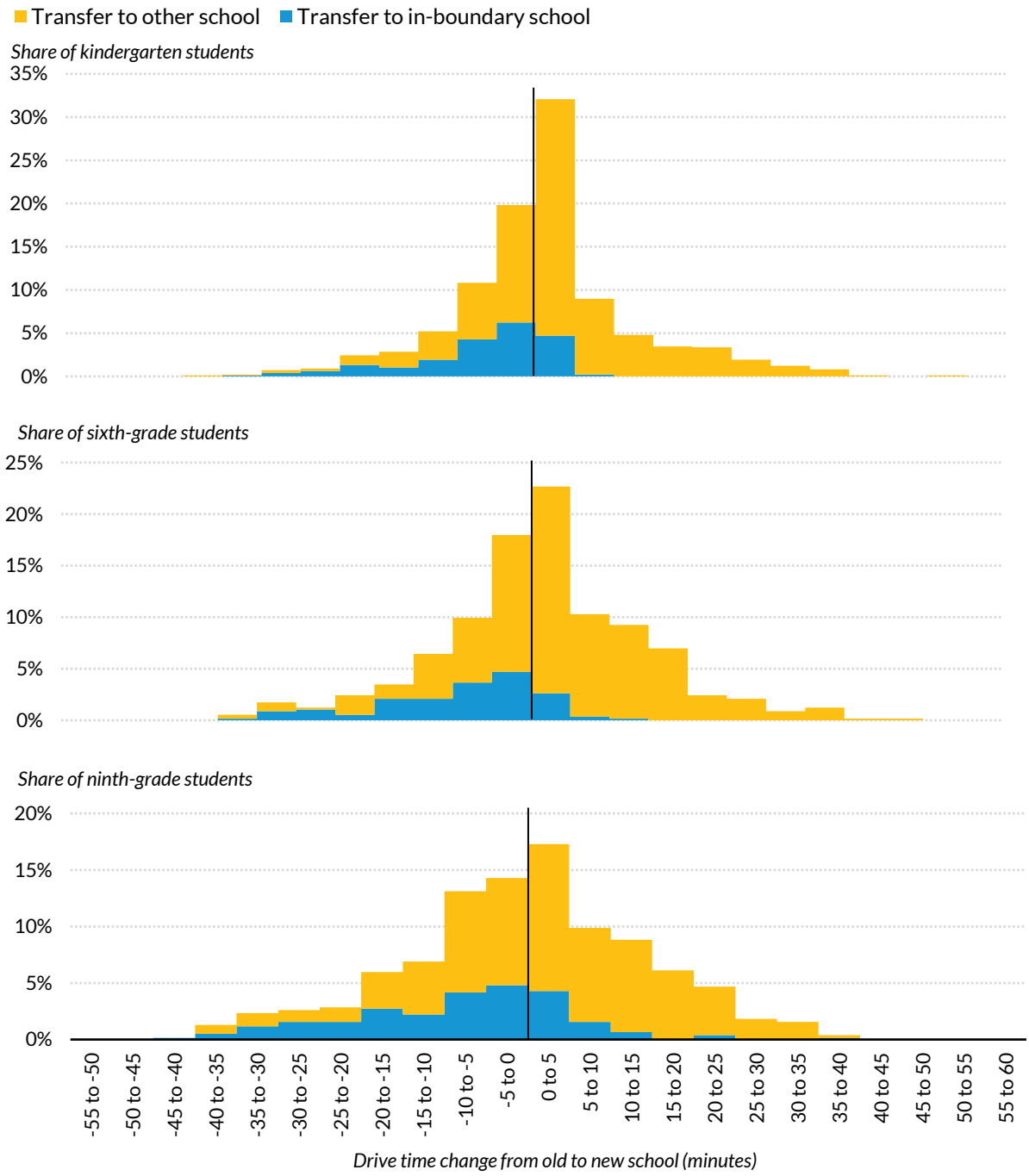
Source: Urban Institute analysis of DC Public Schools and DC Public Charter School Board data for the 2013–14 school year.

FIGURE 11

Distribution of Drive Time Changes for Students Who Transferred between the 2013–14 and 2014–15 School Years

Categorized by transfers to the student's in-boundary school



URBAN INSTITUTE

Source: Urban Institute analysis of DC Public Schools and DC Public Charter School Board data for the 2013–14 school year.

Conclusions

Like students in other cities with substantial school choice, students in Washington, DC, often look beyond their neighborhood school and enroll in a more distant traditional public or public charter school. We find that a longer commute to school is associated with an increased likelihood of transfer, both during the school year and between school years, for younger students. A longer commute is also associated with a slight increase in absenteeism for all students. Despite these negative associations with distance to school, when we look at student achievement among sixth-graders, we find relatively little difference in test score outcomes between schoolmates who travel different distances to the same school. One explanation is that the same unobservable factors that may prompt a family to enroll in a more distant school might make students less vulnerable to the potentially negative impacts of a longer travel time (increased likelihood of transfer and absence).

When students transfer schools in DC, they often move closer to home and are likely to enroll in their in-boundary school if they are transferring within the school year. Although some students do transfer into high-demand schools, particularly between school years, most transfer students do not move into these schools.

Our findings focus on the 2013–14, 2014–15, and 2015–16 school years, but DC has made substantial changes to its school choice and transportation policies during and after this period. New school boundaries were implemented for the 2015–16 school year, and all DCPS and most public charter schools have used the My School DC lottery since 2014, which helps ensure a more efficient allocation of classroom seats according to parent preference. My School DC's school finder now provides a wealth of information about a school's location, hours, and transportation options (nearby Metrobus and Metrorail service and a link to map a route to the school in Google Maps).

In addition, DCPS has developed a program to teach second-grade students how to ride a bicycle (DC Public Schools' Biking in the Park), and the DC Department of Transportation runs a Safe Routes to School program to improve safety for students who walk or bike to school. DC implemented a Kids Ride Free on Rail program in the fall of 2016, allowing students to commute to school via both Metrobus and Metrorail. A few public charter schools have implemented yellow bus routes to transport more distant students to school.

Even with these improvements, DC could pursue additional policies to mitigate the potential student-level costs of transportation and further improve outcomes, particularly for disadvantaged students. These policy levers fall into three general categories:

- **School selection and assignment.** DC officials have considered implementing a "walkability" preference for charter schools in the My School DC lottery for students who live closer to a charter school than their in-boundary school. This preference could increase the feasibility of nearby options for some students but could also lead to families selecting housing in these zones (much the way that families select homes in desirable DCPS enrollment zones). One potential policy lever could be to implement a proximity preference only for "at-risk" students (e.g., students who are low income, in foster care, or homeless) so that students who are least likely to have the means to travel farther have a better chance at going to a nearby school.
- **Transportation options.** Charter schools could continue to experiment with yellow bus routes as a means of reaching a broader set of students, particularly for younger students who cannot ride public transit alone. Schools could also partner together to run dedicated "shuttles" from one neighborhood to another or enact fees on a sliding scale based on family income. Another potential solution would be to provide low-income families who have young students that travel a substantial distance to school with a small number of emergency vouchers for transportation (e.g., a voucher for a cab or for a rideshare service). A broader solution would be to provide yellow bus transportation for a wider set of students, such as younger students who do not live within walking distance from school. Other cities, including New Orleans and New York City, have policies like this (Urban Institute Student Transportation Working Group 2017). But policymakers need to weigh the benefits of a yellow bus system with the significant costs of operating it, and a potential first step would be to study the costs and benefits (in terms of reduced travel times) of different policy options, including both modifications to existing public transit routes and the creation of yellow bus routes.
- **School capacity and location.** The flip side of helping students get to schools they want to attend is to create more in-demand schools closer to where students live. In the long run, city policymakers could consider how to increase the number of high-quality seats, such as by expanding capacity at in-demand schools at the original site or with a "satellite" campus in another part of the city. These policy decisions depend on the ability of high-demand schools to expand (or the degree to which new, high-quality schools can be created) and the availability of real estate to house new or growing schools.

Each of these policy options requires careful consideration of likely benefits to students and costs to taxpayers. This report provides revealing descriptive information on the outcomes of students who vary widely in their expected travel times to school. But it does not capture students who attended a nearby school because their families felt that desirable but farther options were not feasible. Policy

efforts that expand access to more distant school options should ensure that students from different backgrounds are on as level a playing field as possible.

Appendix

TABLE A.1

Student Sample Distribution by Grade and Year

2013–14		2014–15		2015–16		2013–14		2014–15		2015–16		2013–14		2014–15		2015–16	
K	7,159	K	170	1st	153	6th	4,459	6th	117	6th	<10	9th	5,588	9th	1,257	9th	506
				2nd	<10					7th	92					10th	184
				Other	13					8th	16					11th	175
		1st	6,561	1st	100					Other	<10					12th	34
				2nd	5,975			7th	4,092	7th	57					Other	358
				3rd	<10					8th	3,815			10th	3,690	9th	23
				Other	480					9th	18					10th	239
		Other	428	K	<10					Other	202					11th	3,195
				1st	<10			8th	44	8th	<10					12th	72
				2nd	65					9th	40					Other	161
				3rd	9					Other	<10			11th	151	9th	<10
				Other	348			Other	206	7th	<10					10th	<10
										8th	45					11th	29
										9th	<10					12th	104
										Other	158					Other	14
														Other	490	9th	35
																10th	21
																11th	33
																12th	14
																Other	387

Source: Urban Institute analysis of DC Public Schools and DC Public Charter School Board data for the 2013–14, 2014–15, and 2015–16 school years.

TABLE A.2

Within-Year Transfer Rate

Relationship between driving duration in traffic and likelihood of within-year transfer in the 2013–14 school year, by grade

	Kindergarten			Sixth Grade			Ninth Grade		
	Basic	+ student char.	+ school FE	Basic	+ student char.	+ school FE	Basic	+ student char.	+ school FE
Driving duration in traffic (minutes)	0.193***	0.180***	0.289***	0.101**	0.067	0.178***	-0.088**	-0.127***	0.082
	(0.032)	(0.034)	(0.045)	(0.040)	(0.043)	(0.063)	(0.039)	(0.042)	(0.057)
Free and reduced-price lunch eligible		4.013***	0.929		0.198	-2.913**		2.534**	-4.466***
		(0.782)	(1.298)		(1.131)	(1.387)		(1.255)	(1.219)
Black or African American		1.371*	-0.218		3.671***	1.666		6.130***	3.545**
		(0.830)	(0.952)		(1.086)	(1.223)		(1.534)	(1.520)
Hispanic or Latino		0.341	1.763		-0.121	-0.781		-5.483***	-0.635
		(1.197)	(1.643)		(1.278)	(2.138)		(1.511)	(2.354)
Asian		3.275	4.213*		0.922	-0.031		0.083	3.108
		(2.272)	(2.308)		(2.140)	(1.618)		(2.576)	(2.734)
Other race or ethnicity		0.528	0.202		7.109**	7.949***		-0.544	0.193
		(1.307)	(1.348)		(2.772)	(2.714)		(2.219)	(2.242)
Special education enrollment		-0.682	-0.796		2.439**	2.391**		7.902***	3.966***
		(0.922)	(0.919)		(1.154)	(1.161)		(1.416)	(1.395)
English Language Learner		-2.625***	-2.834***		-1.350	-1.720		-4.922***	-7.156***
		(0.805)	(0.919)		(1.329)	(1.401)		(1.478)	(1.720)
Female		-0.642	-0.917*		-2.310***	-2.416***		-4.004***	-2.443***
		(0.561)	(0.556)		(0.770)	(0.765)		(0.950)	(0.917)
School FE	No	No	Yes	No	No	Yes	No	No	Yes
Student's home ward FE	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Constant	3.970***	0.557	3.446	5.574***	1.500	13.667***	16.295***	8.964***	36.961***
	(0.374)	(1.120)	(2.979)	(0.604)	(1.430)	(4.142)	(0.799)	(2.129)	(5.463)
Observations	7,127	7,127	7,127	4,453	4,453	4,453	5,578	5,578	5,578
R^2	0.006	0.017	0.055	0.002	0.017	0.053	0.001	0.038	0.142

Source: Urban Institute analysis of DC Public Schools and DC Public Charter School Board data for the 2013–14 school year.

Notes: "Other race or ethnicity" includes Native Hawaiians and Pacific Islanders, American Indians and Alaska Natives, multiracial people, and people of unknown race or ethnicity. FE = fixed effects. *** p <0.01; ** p <0.05.

TABLE A.3

Between-Year Transfer Rate

Relationship between driving duration in traffic and likelihood of transfer between the 2013–14 and 2014–15 school years, by grade

	Kindergarten			Sixth Grade			Ninth Grade		
	Basic	+ student char.	+ school FE	Basic	+ student char.	+ school FE	Basic	+ student char.	+ school FE
Driving duration in traffic (minutes)	0.281*** (0.049)	0.222*** (0.052)	0.229*** (0.056)	0.148*** (0.055)	0.162*** (0.059)	0.208*** (0.073)	0.117** (0.047)	0.178*** (0.050)	0.121** (0.061)
Free and reduced-price lunch eligible		4.282*** (1.299)	1.437 (1.709)		3.585** (1.515)	3.298** (1.617)		6.33*** (1.495)	1.391 (1.508)
Black or African American		2.768** (1.399)	1.311 (1.52)		4.964*** (1.729)	1.567 (1.695)		9.433*** (1.837)	3.441* (1.795)
Hispanic or Latino		0.288 (2.14)	0.566 (2.65)		12.844*** (2.784)	-1.956 (3.076)		22.610*** (3.402)	0.821 (3.216)
Asian		-4.096 (2.797)	-0.223 (2.674)		3.710 (4.143)	1.909 (3.687)		-5.514** (2.405)	-3.338 (2.584)
Other race or ethnicity		0.041 (2.31)	-0.423 (2.116)		8.243** (3.655)	7.378** (3.483)		-0.173 (2.879)	0.603 (2.888)
Special education enrollment		-4.668*** (1.435)	-2.197* (1.324)		3.456** (1.545)	0.869 (1.38)		3.617** (1.085)	2.072 (1.398)
English Language Learner		-5.555*** (1.345)	-4.159*** (1.432)		-2.315 (2.442)	-3.022 (2.018)		-6.102*** (1.944)	-5.858*** (1.873)
Female		0.699 (0.921)	0.157 (0.815)		-0.574 (1.087)	0.120 (0.974)		-3.617*** (1.085)	-2.968*** (0.998)
School FE	No	No	Yes	No	No	Yes	No	No	Yes
Student's home ward FE	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Constant	15.306*** (0.637)	6.963*** (1.784)	10.575** -4.559	13.317*** (0.855)	3.396 (2.403)	15.106*** (5.362)	17.792*** (0.898)	8.011*** (2.517)	20.050*** (5.626)
Observations	7,034	7,034	7,034	4,374	4,374	4,374	5,479	5,479	5,479
R^2	0.005	0.027	0.266	0.002	0.018	0.237	0.001	0.030	0.211

Source: Urban Institute analysis of DC Public Schools and DC Public Charter School Board data for the 2013–14 and 2014–15 school years.

Notes: "Other race or ethnicity" includes Native Hawaiians and Pacific Islanders, American Indians and Alaska Natives, multiracial people, and people of unknown race or ethnicity.

*** p <0.01; ** p <0.05; * p <0.1.

TABLE A.4

In-Seat Attendance

Relationship between driving duration in traffic to the school that the student attended most and attendance in the 2013–14 school year, by grade

	Kindergarten			Sixth Grade			Ninth Grade		
	Basic	+ student char.	+ school FE	Basic	+ student char.	+ school FE	Basic	+ student char.	+ school FE
Driving duration in traffic (minutes)	-0.136*** (0.016)	-0.085*** (0.016)	-0.060*** (0.018)	-0.091*** (0.019)	-0.086*** (0.019)	-0.060** (0.025)	0.189*** (0.028)	0.190*** (0.029)	-0.077** (0.034)
Free and reduced-price lunch eligible		-0.806** (0.401)	-3.182*** (0.588)		-1.445*** (0.492)	-2.917*** (0.565)		-7.729*** (0.804)	-1.909** (0.729)
Black or African American		-4.028*** (0.34)	-1.491*** (0.326)		-4.558*** (0.474)	-3.157*** (0.501)		-2.359** (1.076)	-2.468** (1.049)
Hispanic or Latino		-6.543*** (0.740)	0.743 (0.876)		-4.635*** (0.804)	-0.075 (1.207)		5.070*** (1.394)	0.659 (2.055)
Asian		-0.065 (0.510)	0.720 (0.587)		2.155*** (0.767)	1.724** (0.801)		3.622 (2.273)	1.319 (1.858)
Other race or ethnicity		-1.077 (0.585)	-0.575 (0.566)		-2.330** (1.169)	-1.697 (1.090)		-0.198 (1.778)	-0.552 (1.608)
Special education enrollment		0.487 (0.441)	-0.260 (0.400)		-1.724*** (0.506)	-1.799*** (0.473)		-10.077*** (0.923)	-7.629*** (0.835)
English Language Learner		0.747* (0.414)	0.221 (0.405)		0.657 (0.691)	0.428 (0.703)		5.322*** (1.101)	5.947*** (1.134)
Female		-0.577** (0.279)	0.229 (0.235)		0.279 (0.350)	0.244 (0.320)		1.179* (0.634)	-0.153 (0.551)
School FE	No	No	Yes	No	No	Yes	No	No	Yes
Student's home ward FE	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Constant	91.539*** (0.189)	94.830*** (0.515)	96.711*** (1.003)	90.624*** (0.271)	95.736*** (0.750)	94.582*** (1.522)	72.953*** (0.574)	81.911*** (1.567)	62.318*** (2.871)
Observations	6,724	6,724	6,724	4,330	4,330	4,330	5,322	5,322	5,322
R^2	0.013	0.081	0.338	0.007	0.052	0.218	0.008	0.110	0.354

Source: Urban Institute analysis of DC Public Schools and DC Public Charter School Board data for the 2013–14 school year.

Notes: "Other race or ethnicity" includes Native Hawaiians and Pacific Islanders, American Indians and Alaska Natives, multiracial people, and people of unknown race or ethnicity.

*** p <0.01; ** p <0.05; * p <0.1.

TABLE A.5

Standardized Test Scores

Relationship between driving duration in traffic and standardized English language arts and math assessment scores for sixth-grade students in the 2013–14 school year

	ELA			Math		
	Basic	+ student char.	+ school FE	Basic	+ student char.	+ school FE
Driving duration in traffic (minutes)	0.008***	0.007***	-0.001	0.006***	0.006***	-0.000
	(0.002)	(0.001)	(0.002)	(0.002)	(0.001)	(0.002)
Free and reduced-price lunch eligible		-0.416***	-0.250***		-0.429***	-0.255***
		(0.038)	(0.044)		(0.038)	(0.043)
Black or African American		-0.442***	-0.446***		-0.625***	-0.608***
		(0.042)	(0.045)		(0.046)	(0.052)
Hispanic or Latino		-0.133**	-0.368***		-0.456***	-0.437***
		(0.060)	(0.079)		(0.065)	(0.086)
Asian		-0.113	-0.156		0.073	0.024
		(0.100)	(0.101)		(0.104)	(0.098)
Other race or ethnicity		-0.166**	-0.227***		-0.238***	-0.241***
		(0.068)	(0.069)		(0.088)	(0.083)
Special education enrollment		-0.980***	-0.956***		-0.860***	-0.833***
		(0.038)	(0.036)		(0.033)	(0.032)
English Language Learner		-0.851***	-0.846***		-0.682***	-0.700***
		(0.079)	(0.077)		(0.072)	(0.071)
Female		0.210***	0.206***		0.076***	0.069***
		(0.026)	(0.025)		(0.026)	(0.025)
School FE	No	No	Yes	No	No	Yes
Student's home ward FE	No	Yes	Yes	No	Yes	Yes
Constant	-0.084***	0.738***	0.294**	-0.054**	1.019***	0.500***
	(0.026)	(0.059)	(0.122)	(0.026)	(0.060)	(0.112)
Observations	3,800	3,800	3,800	3,820	3,820	3,820
R^2	0.007	0.366	0.437	0.004	0.355	0.434

Source: Urban Institute analysis of DC Public Schools and DC Public Charter School Board data for the 2013–14 school year.

Notes: "Other race or ethnicity" includes Native Hawaiians and Pacific Islanders, American Indians and Alaska Natives, multiracial people, and people of unknown race or ethnicity. ELA = English language arts; FE = fixed effects.

*** p <0.01; ** p <0.05; * p <0.1.

TABLE A.6

Distribution of Drive Times, by Grade and Charter School

Minutes in traffic

		Percentile				
		10th	**25th**	**50th**	**75th**	**90th**
Kindergarten	All	2.0	3.2	6.4	14.5	24.8
	TPS	1.7	2.6	4.5	9.9	21.5
	PCS	3.0	5.8	10.6	18.8	29.0
Sixth grade	All	2.9	5.1	9.3	17.7	28.8
	TPS	2.7	4.3	7.6	15.1	25.4
	PCS	3.3	6.8	12.0	20.4	30.8
Ninth grade	All	4.4	7.3	13.0	21.1	32.5
	TPS	4.3	7.2	12.9	21.3	34.3
	PCS	4.5	7.7	13.2	20.6	28.8

Source: Urban Institute analysis of DC Public Schools and DC Public Charter School Board data for the 2013–14 school year.
Note: PCS = public charter school; TPS = traditional public school.

Notes

[1] Digest of Education Statistics 2015, table 206.40.

[2] Abigail Hauslohner, "DC Students Will Be Riding Metro for Free This Year," *Washington Post*, August 17, 2015, https://www.washingtonpost.com/local/dc-politics/dc-students-will-be-riding-metro-for-free-this-year/2015/08/17/e81027d2-44e6-11e5-8ab4-c73967a143d3_story.html?utm_term=.e81bf372a8d8.

[3] Michael Alison Chandler, "As DC Gentrifies, Some Charter Schools Aim to Reach Broader Spectrum," *Washington Post*, December 4, 2015, https://www.washingtonpost.com/local/education/charter-schools-appealing-to-more-diverse-families-as-dc-gentrifies/2015/12/03/1d79c3f8-8dab-11e5-acff-673ae92ddd2b_story.html?utm_term=.c9efad43b2ee. In the 2013–14 and 2014–15 school years, DC Public Schools provided yellow bus service for 43 students in fulfillment of a No Child Left Behind provision that granted students the ability to transfer out of failing schools and to receive district assistance with transportation. Michael Alison Chandler, "District Children Lose the Buses That Took Them to High-Performing Schools," *Washington Post*, August 21, 2015, https://www.washingtonpost.com/local/education/district-families-lose-buses-to-higher-performing-schools/2015/08/21/7903f11e-476d-11e5-8e7d-9c033e6745d8_story.html?utm_term=.4b3b41036616.

[4] Emma Brown, "Gray Administration Wants to Establish Unified Lottery for DC Public and Charter Schools," *Washington Post*, May 30, 2013, https://www.washingtonpost.com/local/education/gray-administration-wants-to-establish-unified-lottery-for-dc-public-and-charter-schools/2013/05/30/1bc661b4-c95a-11e2-8da7-d274bc611a47_story.html?utm_term=.b65028e2495d.

[5] "FAQ," My School DC, accessed July 11, 2018, http://www.myschooldc.org/faq/faqs.

[6] "FAQ," My School DC.

[7] Transit times include the option to walk instead of taking transit, in cases where walking is faster.

[8] One school, The SEED School of Washington, DC, had a school year that fell outside this window. We counted students who transferred at the end of the SEED school year as between-year transfers rather than within-year transfers.

[9] "Guide to the New PARCC Assessment," DC Office of the State Superintendent of Education, last updated August 14, 2014, https://osse.dc.gov/publication/guide-new-parcc-assessment-parents.

[10] We produce similar findings when we run a nonlinear (probit) model. For ease of interpretation, we report linear (ordinary least squares) models.

[11] We exclude students with special education needs who are enrolled in schools outside DC.

[12] Among ninth-grade students, we observe students attending the Youth Services Center and Incarcerated Youth Program. Nearly all students in these programs are classified as transfers in our data, because they transfer into or out of these programs within the 2013–14 school year. When we run the same analyses without students who are attending these two schools, the same trends appear, with the relationship between drive time and within-year transfer going from negative to null after controlling for school.

[13] These results are available from the authors upon request.

[14] These results are available from the authors upon request.

[15] This was also the first year the My School DC lottery was in place, so the number of students on a school's waiting list is a function of the number of students who preferred that school over their initial assigned school. A few charter schools (accounting for just over 10 percent of charter school seats) did not take part in the My School DC lottery in the 2014–15 school year. Nonparticipant waiting list data are not comparable with the My

School DC data, and some schools opted not to participate because they serve specialized populations (see Emma Brown, "Most DC Schools to Participate in Unified Enrollment Lottery Starting Next Year," *Washington Post*, October 8, 2013, https://www.washingtonpost.com/local/education/most-dc-schools-to-participate-in-unified-enrollment-lottery-starting-next-year/2013/10/08/4f65c2e8-3021-11e3-8906-3daa2bcde110_story.html). Rather than make a judgement call using nonstandard waiting list data or other measures, we code these schools as "not in demand," with the caution that our demand variable is a loose approximation. Two to 10 percent of within- and between-year student moves, dependent on year and move type, are to nonparticipant schools. Moves to nonparticipant schools are most common for within-year transfers in the 2014–15 and 2015–16 school years (7.2 and 9.8 percent of within-year transfers, respectively).

[16] We assign students' home addresses to school boundaries using shapefiles from the 2013–14 administration of the National Center for Education Statistics' School Attendance Boundary Survey. We supplemented these shapefiles with corrections based on maps provided by the Office of the State Superintendent of Education. See "Current DCPS School(s) of Right for Elementary, Middle, and High School Students, 2013–14," DC Office of the Deputy Mayor for Education, accessed July 11, 2018, https://dme.dc.gov/sites/default/files/dc/sites/dme/publication/attachments/Current%20School%28s%29%20Right%20ES%20MS%20HS%20Students.pdf.

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