

Executive Summary

The purpose of this study is three-fold: first to develop measures of alternative types of student mobility; second to document the magnitudes of each type of mobility in aggregate and by student income, race/ethnicity, and immigrant status; and third to analyze how mobility of different types affects student academic performance.

By providing district-level statistics on alternative types of student mobility, this report may help policymakers decide which types of student mobility are important for districts to report regularly. Defining alternative measures may help both policymakers and researchers identify the types of mobility that are the most harmful to student performance and effectively design and target interventions.

The main findings of this study are that there is considerable mobility into NYC primary schools, considerable inter-year mobility for students staying in the district and some intra-year mobility. Furthermore, we found that over time between 6% and 7% enter into each grade of a cohort, and students move several times over their schooling history. In addition, the entrants and switchers have characteristics that are generally associated with harder-to-educate children. Finally, student mobility has a consistently negative effect, *ceteris paribus*, on 8th grade reading scores, although the statistical significance of the effect depends on the specification used in the analysis.

Mobility affects performance, and those who move frequently are in general the least well-off groups. Some policy implications of our findings given that mobility seems to affect academic performance are: first, “large-span” schools like K-8 schools could help foster performance as this would minimize student moves; second, addressing the academic needs of those students who switch could foster higher performance; third, targeting “high-switching” groups (black students, Hispanic students, poor students) in order to diminish their mobility could improve performance.

The Multiple Dimensions of Student Mobility and Implications for Academic Performance:
Evidence from New York City Elementary and Middle School Students

A Condition Report for the New York Education Finance Research Consortium

Amy Ellen Schwartz
Professor of Public Policy, Education and Economics
Director, Institute for Education and Social Policy
New York University

Leanna Stiefel
Professor of Economics
Wagner Graduate School
Associate Director, Institute for Education and Social Policy
New York University

Luis Chalico
Doctoral Candidate
Wagner Graduate School
New York University

I. Introduction

The purpose of this report is three-fold: first to develop measures of alternative types of student mobility; second to document the magnitudes of each type of mobility in aggregate and by student income, race/ethnicity, and immigrant status; and third to analyze how mobility of different types affects student academic performance. Although mobility is an oft-discussed phenomenon, inadequate attention has been paid to the alternative ways that it can be defined, how the alternatives differ and which alternatives appear to be of sufficient size to be of consequence to policy and practice.

Previous research on mobility often focuses on the impact of changing schools on an individual's academic achievement. As an example, Hanushek, Kain and Rivkin (2004) find that switching schools is harmful to student growth in performance in the year following a switch, even when switching is required because students reach the top grade offered at their school. Other researchers find that academic performance is lower among students who have changed schools in previous years, whatever the reason, (Alexander et al, 1996; Rumberger and Larson, 1998; Swanson and Schneider, 1999). Relatively little attention has been paid in the existing quantitative analyses to distinguishing between different types of mobility i.e., mid-year vs. between-year; annual vs. cumulative.

By providing district-level statistics on alternative types of student mobility, this report may help policymakers decide which types of student mobility are important for districts to report regularly. Defining alternative measures may help both policymakers and researchers identify the types of mobility that are the most harmful to student performance and effectively design and target interventions.

The main findings of this study are that there is considerable mobility into grades 2 through 8 from outside the New York City school district, across schools, across years for students staying in the district, and some mobility even across schools within academic years. Furthermore, over time, between 6% and 7% enter into each grade of a cohort, and students move several times over their schooling history in the city district. In addition, the entrants and frequent movers have characteristics that are generally associated with harder-to-educate children. Finally, student mobility has a consistently negative effect, *ceteris paribus*, on 8th grade reading scores, although the statistical significance of the effect is sensitive to the specification used in the analysis.

The report is organized as follows. In the second section, we describe the sources of data. In this section, as throughout the report, we present more detailed information in a separate box in the text. The third section introduces alternative measures of student performance, the fourth section presents magnitudes of annual mobility, and the fifth section does a cumulative mobility analysis. The sixth section analyzes moves in terms of the characteristics of new schools and moves coincident with significant moves in student residence, as measured by zip code changes. The seventh section analyzes the effects of alternative measures of mobility on student performance for New York City (NYC) elementary and middle school (hereafter primary schools) students and the last section concludes.

DEFINITION OF TERMS: STUDENTS

Switcher Student: Changed schools within the NYC public schools between periods, i.e. between academic years or between fall and spring academic terms. **Stayer Student:** Attended the same school in adjacent periods, i.e. between academic years or between fall and spring academic terms.

Entrant Student: Enrolled in a NYC primary school in a given year for first time

Exiter Student: Not enrolled in a NYC primary school in the following year.

Stable Student: Enrolled in NYC primary schools between academic years.

Continuously Registered Student: Enrolled in a NYC primary school in each year between 1996-97 and 2001-02.

DEFINITION OF TERMS: MOBILITY

Inter-Year Inter-District Mobility: Refers to mobility in or out of the NYC primary schools between years.

Inter-Year Inter-School Mobility: Refers to mobility between schools in NYC primary schools between years.

Intra-Year Inter-School Mobility: Refers to mobility between schools in NYC primary schools within academic years.

DEFINITION OF TERMS: MOBILITY ANALYSIS

Prospective Cohort Mobility: We follow a cohort of students who begin in a given grade and year (i.e., the third grade of 1995-1996) and map their mobility through eighth grade.

Retrospective Cohort Mobility: We trace the paths followed by a cohort of eighth grade students (i.e., the eighth grade of 2000-2001).

II. Data

The data for this project are based on student-level records for all first through eighth graders in NYC public schools for every year from 1996-97 through 2000-01. Most first graders were also present in Kindergarten, but during the majority of these years, we do not have complete records for Kindergarten students and thus we begin in first grade. These data are provided to New York University's Institute for Education and Social Policy by the NYC Department of Education. In addition, publicly available data from the *Annual School Reports* and from the *School Based Expenditure Reports*, prepared annually by the NYC Department of Education, are linked to each student's record in each year.

DATA DETAILS

The data on which this report is based contain over 650,000 New York City primary school pupils per year, with variables on each student's grade and school; test scores for third through eighth graders; demographic variables, including free and reduced price lunch status, gender, age, race/ethnicity, and country of birth; and educational characteristics such as limited English status. Among the student-level variables is a set of grade and school indicators at three points during each academic year (one in the fall term –October— and two in the spring –March and June) and student identification numbers that allow us to follow students over years and track them as they move from one school to another across and within academic years. The resulting data set has more than five million observations and more than one million students.

In addition, the student-level data are linked to detailed data on the New York City public schools that each of these students attends. The school-level data include information on the grade span of each school as well as on enrollment, average student characteristics in the school, teacher characteristics, spending and teacher/pupil ratios. These data include information on almost 1,000 schools and have more than 6,400 observations in the nine-year panel.

III. Defining Student Mobility

We assess mobility using both annual student mobility measures and cumulative student mobility analysis. Annual mobility measures changes around a single academic year (that is mobility before, during, and after an academic year). Cumulative mobility analysis measures changes over multiple academic years.

We measure annual mobility in three ways. The first annual measure identifies primary school students that are “exiters”. The second annual measure identifies switchers between academic years that is, inter-year switchers. The third annual measure identifies switchers during a given academic year, that is intra-year switchers. Annual measures are the most easily constructed, readily available and most likely to be cited in the press or in agency reports because they require only two years of data to calculate.

The first cumulative analysis we label “prospective cohort” because it follows a cohort of students who begin in a given grade and year (i.e., the third grade of 1995-1996) and maps their mobility through eighth grade - identifying the percentage of these students who make standard progress through grades, the percentage who are exiters, who are entrants, who skip grades, or who are retained in a grade. The second long-term analysis, labeled “retrospective cohort,” traces the paths followed by a cohort of eighth grade students (i.e., the eighth grade of 2000-2001) distinguishing the prevalence of different types of mobility over their primary school years.

KEY QUESTIONS ABOUT MOBILITY

ANNUAL MOBILITY MEASURES

Inter-Year Inter-District Mobility: What percentage of students are new entrants in each year? What percentage of students are exiters? What percentage are stable students who are continuously enrolled?

Inter-year School Mobility: Among the stable students, what percent of students are switchers between years?

Intra-year School Mobility: What percentage of students are switchers during a given academic year?

CUMMULATIVE MOBILITY ANALYSIS

Prospective Cohort Mobility: What percentage of students in a cohort move in standard progress, move to a non-standard grade, are exiters and are entrants from 3rd to 8th grade?

Retrospective Cohort Mobility: What percentage of students are switchers within and across academic years in a cohort of eighth grade students (i.e., the eighth grade of 2000-2001), who have been in the system since an earlier grade (for example third in 1996-97) and have made standard progress?

IV. Annual Mobility

Inter-year Inter-District Mobility

Table 1 presents statistics on the distribution and characteristics of students by their inter-year inter-district mobility status, for both the 1996-97 and 2000-01 academic years.¹ The first row of the table indicates the distribution of students by their mobility status; the remaining rows show their mean characteristics. Column 1 presents information on the entire census of 1st through 8th grade students (that is, students in primary schools) enrolled in 1995-96; column 2 presents information on the students that exit following 1st through 7th; and column 3 presents information on 8th graders who exit (virtually all of these students are “exiting” to New York City public high schools).

Why is the information in Table 1 interesting? The table helps to trace the way in which inter-district mobility shapes the student body in NYC primary schools. As shown, 611,291 students were registered in primary schools in 1995-96; more than 110,000 of those students did not attend NYC primary schools by the following academic year. While more than half were 8th graders, primarily moving to high school, more than 50,000 students were 1st through 7th graders who exited by the fall of 1996 (the beginning of the 1996-97) academic year. Thus, there were roughly 500,000 “stayer” students enrolled in the 1996-97². They were joined by more than 85,000 new 1st graders who were either new entrants or last year kindergarteners, and almost 43,000 new entrants to grades 2-8. Thus, those who left grades 1-7 were replaced by only a slightly smaller number of ‘new’ students in grades 2-8 in the following year. In addition, there are fewer 8th grade exiters than 1st grade entrants.

¹ Note that this table reports on all 1st through 8th grade students including those in special education

² The stayers were largely in grades 2-8, however, stayers will also include a small number of students retained in grade 1 and, as always, in special education grades.

Notice that there are significant differences in these populations. As an example, 1st through 7th grade students who exit are less likely to be foreign-born than those who go to high school; and less likely to be female. At the same time, new first grade students are more likely to be white and less likely to be Asian than students entering 2nd through 8th grade.

Comparing 1996-97 and 2000-01, the new entrants were 6.8% of the 1st through 8th graders (col 6/col 7) in 1997 and 6.2% in 2001. Turnover, entrants (grades 1-7) plus exiters (grades 2-8), was between 14.8% and 13.5%, showing a slight decline over the four-year period.

INTER-YEAR DISTRICT MOBILITY BY RACE/ETHNICITY, POVERTY AND IMMIGRANT STATUS

Table 1 also provides mean characteristics of each group of students and these figures are revealing. Compared to all students, entrants in both 1997 and 2001 are slightly less likely to be white or girls, but more likely to be Asian and older and considerably more likely to be foreign-born, LEP and not have English spoken at home (column 6). In other words, the entrants have many characteristics that traditionally indicate a harder-to-educate group than all the students. On the other hand, again compared to all students, the exiters (column 2) are generally older, more likely to be boys and slightly more likely to be foreign-born.

Inter-year School Mobility

Tables 2a through 3b illustrate *Inter-year Inter-School Mobility* for academic years 1997 and 2001, by grade and race (Tables 2a and 2b) and by grade, poverty status and place of birth (Tables 3a and 3b). Note that for each pair of grades, only students who were present in both the current and the previous year are included; these measures are designed to indicate how much students in NYC primary schools change schools. This is interesting because it allows us to observe if students with different racial and socioeconomic profiles have different mobility patterns.

Switching patterns among all students are qualitatively similar in both years. Between 88% and 95% of students are stayers for all grades save for 5th graders and 6th graders. The 5th and 6th grades are when many NYC elementary schools end (see Rubenstein et al, 2007, and next section of this report). Between all other grades, the percent of switchers is rarely above 12%.

INTER-YEAR SCHOOL MOBILITY BY RACE/ETHNICITY, POVERTY AND IMMIGRANT STATUS

In both years, the patterns differ by race/ethnicity (Tables 2a and 2b). With a few exceptions, white and, to a slightly lesser extent, Asian students switch at significantly lower rates than black or Hispanic students until the end of 5th grade, when they switch at higher rates. Some of this difference is due to differences in schools attended and when they end. Schools are highly segregated by race/ethnicity in NYC (Stiefel, Schwartz and Ellen, 2006) and schools that end in 4th grade are more likely to be majority black or highly Hispanic than any other race/ethnicity. Nonetheless, despite the differences in schools attended, the data indicate that black and Hispanic students are more likely to switch schools than white or Asian students at almost every grade except after 5th.

Tables 3a and 3b illustrate inter-year school mobility by free lunch and by immigrant status. Poor students are switchers at higher rates than non-poor students in every grade pair except 5th to 6th, but immigrant students switch much like native-born, with some slight differences.

To further disentangle when switching schools is mandatory, Table 4 analyzes the nature of the moves made by a “quasi-cohort” of students.³ Beginning with the switchers (6,868 students in Table 2a, column 1 and the same number in Table 4, column 2, Total), Table 4 shows how many students made a mandatory switch.

DEFINITION OF TERMS: MANDATORY SWITCH

Mandatory Switch: Refers to mobility as a consequence of attending the last grade served by a school (for example in a 3-6 school, students need to switch to a different school to continue their 7th grade studies). We consider a switch as mandatory if 80% to 100% of the student’s cohort also switched.

Only 12.68% of the 6,868 of the 3rd grade switchers in 1996-97 were in a terminal grade, while the rest (97%) more than likely made voluntary moves (Table 4, column 2). On the other hand, for the 4th grade switchers, 45.19% of the students made mandatory moves (column 3, total); for 5th grade switchers, 92.42%; for 6th grade switchers, 81.29%; and from 7th grade switchers, 16.52%. The data in these tables confirm that fifth and sixth grades are common terminal grades for NYC primary schools.

³ This quasi-cohort is composed of students who moved from 3rd to 4th grade in 1996-97 (and 4th to 5th grade in 1997-98 and so on through the grades and years).

QUASI-COHORT OF STUDENTS WHO CHANGED SCHOOLS BY RACE/ETHNICITY, POVERTY AND IMMIGRANT STATUS

Table 4 also breaks out the mandatory switches between grades by race. In 3rd and 4th grade black and Hispanic students register more mandatory switches than white or Asian students. There are somewhat fewer mandatory switches in 5th grade for black students than for all other students. White students are less likely and Asian students more likely to have a mandatory switch in 6th grade.

In summary, except at the major endings of primary school, NYC primary students switch schools at rates around 12%. Poor students switch at slightly higher rates than non-poor, as do black and Hispanic students compared to white and Asian students.

Intra-year School Mobility

Tables 5a through 6b illustrate *Intra-year Inter-School Mobility* or the movement of NYC primary school students *within* the academic year, by grade, race/ethnicity, poverty and immigrant status, for 1995-96 and 2000-01. The study of this type of mobility is important because one could argue that within academic year switches can be more disturbing for the education of a student than between academic years.

In total, between 94% and 97% of students stay in the same school all year (Tables 5a and 5b, column 1). Nevertheless, the tables suggest that there is a significant amount of mobility between terms, in some cases as large as 6.71% of students (6th graders in 2000-01). There is variation in intra-year mobility over grades and it drops as students move through school (mobility is lower for 8th graders than for 3rd graders). A possible explanation for this is that as students grow older, they might be able to continue at a school even if the family changes its place of residency. There are also big differences in intra-year mobility by race: black and Hispanic students move at greater rates than white and Asian students.

INTRA-YEAR SCHOOL MOBILITY BY RACE/ETHNICITY, POVERTY AND IMMIGRANT STATUS

White and Asian students switch less frequently than black and Hispanic students, with black students switching most often, in both years (Tables 5a and 5b). Poor students switch more than non-poor students and, in the earlier year, foreign-born switch slightly more often than native-born, but in the later year the two groups are about equivalent or reversed for later grades (Tables 6a and 6b).

V. Cumulative Mobility

Prospective Cohort Analysis: Looking Forward from the Third Grade

Yet another way to understand student mobility is to follow a cohort of students as they progress over grades and years to see how many students enter and exit the cohort, from what sources (another district or

grade), and with what characteristics. This is interesting because it allows identification of different patterns of mobility by grade and year.

Table 7 illustrates the information provided by such a *Prospective Cohort Mobility* view, beginning in 1995-96 with 3rd graders and ending in 2000-01 with 8th graders. The number of students in a grade in any year can be decomposed into those who are new entrants to the district in the current year plus those who continue from the previous year (Table 7, column 4 = 1 + 2 +3) or those who continue into next year plus those who exit (Table 7, column 4 = 5 + 6+ 7).

Looking first at new entrants, Table 7 shows little pattern in terms of grades. Nevertheless, 4th graders receive the largest percentage of new entrants. Students entering from a “non-standard” grade, which would be mostly students who are retained, increase from 2.3% in both 4th and 5th grades to 4.5% in 6th and 7th grades, to 6.4% in 8th grade. Perhaps this last number is the most revealing – the percentage of retained students is increasing to quite a large magnitude by 8th grade.

PROSPECTIVE COHORT MOBILITY BY RACE/ETHNICITY, POVERTY AND IMMIGRANT STATUS

Do the students who enter, continue or exit differ by test scores, race/ethnicity, poverty, immigrant status and so on? The statistics in Tables A1 to A6 in Appendix A, which show for each grade the categories of students who make up the total, reveal some large differences. Comparing always to the characteristics of the total number of students in a grade/year, one sees that students who enter the district are much more likely to be foreign-born (55% by 8th grade), and be eligible for LEP services. Those who enter from a non-standard grade (probably retained in previous year) are more likely to be poor. Students who continue in standard progress to the next grade differ little from all students (they are the vast majority of all the students). Students who continue into another grade (mostly retained) are more likely to be black or Hispanic, poor and be eligible for LEP services. Finally, of the students who exit before the next year, those in 5th and 6th grades differ from the other years in that they are more likely to be white and less poor, compared to all the students. In other grades, the students who exit before the next year are generally a bit more likely to be foreign-born.

In terms of continuing students, between 88% and 89% of current year students are continued onto next year, while both 3rd grade (5.2%) and 6th grade (7.5%) show the largest percent of current students going into a grade other than standard (probably retained). The largest percentage of exiters is found in 5th grade (8.3%, presumably at the end of primary school), while the lowest number occurs in 6th grade (5.2%).

Retrospective Cohort Analysis: Looking Backwards from the Eighth Grade

Tables 8 and Table 9 measure school mobility across and within academic years for students who were in 8th grade in 2001-02. The analysis distinguishes between early and late entrants. Early entrants are defined as students who have been continuously registered since 1996-97, and entered before 5th grade. Late

entrants are defined as students who entered the system after 1996-97 or after 5th grade. Table 8 illustrates data for numbers of schools attended across years, where the school for the academic year is the one in which the student is registered in October. Table 9 shows data for within- academic year moves (not between academic year) for the same group of students. These tables also contain data by race/ethnicity.

DEFINITION OF TERMS: ENTRANTS AND MOVING YEARS

Early entrants: 8th graders in 2000-01 who have been continuously registered since 1996-97, and entered before fifth grade.

Late entrants: Students who entered the system after 1996-97 or after 5th grade.

Moving years: Number of years in which the student switched intra-year at least once.

Looking at the early entrants in Table 8, the vast majority (65.38%) attended two schools, with the next highest percentage attending three schools (24.7%). These patterns differ some across race/ethnicity, however. White and Asian students in contrast to black and Hispanic students more often attend only two schools (75.38% of all white early entrants for example), while black and Hispanic students are more likely to attend three or even four schools. No group is very likely to stay in one school (typically a K-8), although white and Hispanic students are more likely than all to do so.

Again focusing on the early entrants in Table 9, having zero “moving years” is the most common pattern (77.25% of all early entrants) and even higher for white and Asian students (around 87%). Nevertheless, 17.2% of all early entrants move at least in one year and 6% move in more than one year. More frequent within-year moves are more prevalent among students who are black (8% two or more moving years) or Hispanic (6% two or more moving years).

VI. Characteristics of “New” Schools; Residential and School Moves

Having documented the magnitude of various kinds of mobility for NYC primary school students, we now dig deeper to find some possible “reasons” for the moves. Two of these possible reasons are first to relocate to a school with different characteristics – for example one with higher achieving students or with a different racial mix – and second, to change schools as a consequence of a residential move. Although we cannot determine if these were the reasons students changed schools, we are able to present evidence that would be consistent with each.

Do Students Move to Schools with Different Student Characteristics than the School they Left?

Moves to schools with higher achieving students could be seen as “good” moves to the extent that peers matter to a student’s own performance, or that parents judge such schools to be well-functioning due to

their test scores, or some other reason. In addition, some NCLB sanctions involve offering parents such choices and, although our data predate these sanctions, our findings may be revealing in terms of how many moves made are consistent with the kind that NCLB would encourage.

To perform this analysis, we look at the characteristics of “sending” and “receiving” grades for 3rd grade and 6th grade switchers. For 3rd graders, we look at moves between 1995-96 and 1996-97; for 6th graders we look between 1998-99 and 1999-2000. We then compare the characteristics of the new and the old grades.⁴ We look at the mean math and reading scores, the percent of white and the percent of black students. Note that moves between 3rd and 4th are likely to be voluntary, since most schools do not end in 3rd grade, while moves between 6th and 7th are more likely to be mandatory, since many schools end in 6th grade (see Table 4, which shows that 81% were likely to make mandatory moves between 6th and 7th grades). Tables 10 and 11 show these results.

From Table 10, we see that of the 6,868 3rd grade switchers in 1996-97, 56% move to a worse performing school (school where the 4th graders scored lower than the 3rd graders in the sending schools). White and Asian students, however, did not follow this pattern – 59% and 62% of these students, respectively, moved to better performing school. In terms of 4th grade racial composition, slightly more than half the switchers ended in a 4th grade that had a higher percent of white students. This was more prevalent for white and Asian students. Only black student switchers moved to schools with a lower percent of white students. Looking at the moves from the point of view of the percent of black students, only white student switchers moved to schools with lower percents of black students.

Table 11 shows analogous data for 6th grade switchers in 1998-99. Of the 18,960 switchers, 68% moved to schools with lower scoring grades, a considerably higher percentage than the 56% of the 3rd grade switchers. In 6th grade, all four racial/ethnic groups moved similarly to the average, all moving to worse performing schools. In terms of racial composition, similar to the earlier grade, somewhat over half (56%) of students moved to 7th grades that had a higher percentage of white students than their sending 6th grades. This was true for all racial/ethnic groups except white students, where 49% made such a move. On the other hand, over half (54%) of all students, moved to 7th grade having a higher percent of black students, although this was not true for black students themselves, where only 39% made such moves.

To What Extent Are Student Moves Mirroring Residential Moves?

In order to analyze the distance that students move when they change schools, and in particular to ascertain the extent to which moves involved residential moves, we use student’s residential zip code to measure whether switchers remained in the same zip code or not and whether they remained in the same borough or not. If they changed zip codes, they also changed residence, although they may have changed

⁴ For those students who switched (say between 3rd and 4th grades), we calculate the mean reading test score (z score) of 3rd graders in the sending schools, the mean reading test score (z score) of 4th graders in the receiving schools in the following year and compare the two.

residence if they remained in the same zip code as well. To be conservative, we only assume a change of residence with a change of zip code. If they changed borough, they made a “long” residential move. This is interesting because it will allow us to observe if residential changes are correlated with school switches.

In Table 12, we see that 46% of the 3rd grade switchers also changed zip codes, while 17% changed boroughs as well. The zip code and borough movers were less likely to be white or Asian; the borough movers were also less likely to be white or Asian.

On the other hand, a much lower percentage of 6th grade switchers changed zip codes – 16% (see Table 13). This lower percentage reflects that many of the switchers in this grade are changing schools because their 6th grade is a terminal grade. In such cases, the moves are not voluntary and are more likely to be to schools that feed from the elementary schools. White and Asian students are slightly less likely to move from zip codes (14%) while black student are slightly more likely (17%). In terms of borough moves, only 4.5% of switchers change boroughs, with white and Asian students slightly less likely to do so than black or Hispanic students.⁵

VII. Mobility and Student Performance

Analysis Plan

Thus far, this report has illustrated that there is considerable mobility into NYC primary schools, inter-year inter-school mobility for students staying in the district and some intra-year mobility. In addition, over time, between 6% and 7% are new entrants into the district and students move several times over their schooling history. Finally, the entrants and switchers have characteristics that are generally associated with harder-to- educate children. Still, we do not know how these various types of mobility affect student performance, which research suggests might be one of the most important potential consequences of moving. In particular, we have little idea of what the effects are when we control for other associated variables that are also known to affect performance. In this section, we analyze the effects of numbers of schools attended and numbers of moves made for early entrants at the end of 8th grade. We present the results for early entrants and for reading test scores, but include tables with results for proficiency passing rates (rather than scores) and for late entrants in an appendix.⁶

In these analyses, we estimate equations of test score determination that include controls for student socio-demographic status, education programs, and importantly, types of mobility, as alternatively measured in the first part of the analysis. The general form of the estimated equation is as follows for any given academic year:

$$Y_{ij} = \beta_0 + \beta_1 X_i + \beta_2 M_i + \varphi_j + \varepsilon_{ij}. \quad (1)$$

⁵ Tables B1 and B2 in Appendix B break switcher students down by zip code moves and peer test scores.

⁶ Tables C1 to C4 in Appendix C.

Where Y_{ij} represents the test score of student i in school j ; X_i represents a vector of student characteristics that include race, socioeconomic status, age, gender, nativity, English proficiency, program status, such as special education, and past performance (when value added specifications are used); M_i is a measure(s) of student mobility; φ_j represents school fixed effects and ε is the usual error term. We are especially interested in the β_2 coefficient that measures the effect of mobility on performance.

These analyses are performed for eighth graders (middle schoolers) in 2001-02 who are “early entrants” – that is, who have been in the NYC school district since at least 1996-97 (potentially since 3rd grade) and have entered before 5th grade, allowing them to have accumulated a potentially large number of school moves.⁷

Results

Table 14 shows four specifications of equation (1), with 8th grade reading test score (in standardized form) as the dependent variable and a lagged reading test score for the 3rd grade for the same student included as an independent variable so that all specifications are “long” value-added ones. That is, they all indicate the change in reading scores between 8th grade and 3rd grade, as a function of demographic, school, and mobility variables. The first two columns do not control for characteristics of the 8th grade school attended, while the last two columns do so by adding school “fixed effects” or dummy variables representing each school attended. Standard errors are corrected for clustering by school and homoskedasticity.⁸

The demographic and school program variables affect 8th grade reading in the same direction as they do in other studies of student performance. Black, Hispanic, poor, and older students perform worse than their counterparts, *ceteris paribus*, while Asian, female, foreign-born and students attending more often perform better. Students who are eligible for LEP services and receive them (score below 40% on the lab test) perform better than those who are eligible and do not receive them (score above 40% on the lab test). In this context, we include two general measures of student mobility. First, the number of schools attended is an indication of inter-year mobility. Second, the number of years in which a student moved at least once during an academic year is a measure of intra-year mobility. We will refer to this second measure as “*moving years*.” Columns 1 and 3 include these two measures as total numbers of schools attended and of moving years, while columns 2 and 4 indicate the precise numbers of schools and of moving years.

Student mobility has a consistently negative effect, *ceteris paribus*, on 8th grade reading scores, although the statistical significance varies. In equation 1, for example, every additional school attended lowers 8th grade reading scores by .054 standard deviations. Changing schools three times on the way to 8th grade would reduce performance by .162 standard deviations, about the same as the effect of being eligible

⁷ “Late entrants,” who entered after 1996-97 or after fifth grade, will not have had as many years to move, but will still be an important group, representing the large numbers of students who move into the NYC district at later grades, especially immigrant students. These late entrants may exhibit different relationships between types of mobility and performance compared to early entrants and results of these analyses are presented in table C2 in Appendix C.

⁸ Fifth graders results are shown in Table C3 in Appendix C.

for the free lunch program (-.165 in this same equation). The number of moving years also has a negative but statistically insignificant effect.

When the effects of numbers of schools attended and moving years are separately estimated, each additional school attended move decreases performance more. The more schools attended, the worse is the student's performance. The number of moving years has a statistically significant (negative) effect when the student moved in one or in three years.

When school fixed effects are added to the specification in order to control for both observable and unobservable differences in 8th grade school resources and characteristics, the signs of the variables remain the same, although the statistical significance differs. In equation 3, number of schools attended is no longer significant (although its sign is still negative), but moving years is significant and larger than in the previous, non-fixed effect specification. When numbers of schools and moving years are more fully delineated in column 4, again one and three moving years have a significant negative effect, with the size of the coefficients larger than in equation 2.

VIII. Conclusions

In this study we developed measures of alternative types of student mobility; documented the magnitudes of each type of mobility in aggregate and by student income, race/ethnicity, and immigrant status; and analyzed how mobility of different types affects student academic performance.

The main findings of this study are that there is considerable mobility into NYC primary schools, considerable inter-year mobility for students staying in the district and some intra-year mobility. Furthermore, we found that over time between 6% and 7% enter into each grade of a cohort, and students move several times over their schooling history. In addition, the entrants and switchers have characteristics that are generally associated with harder-to-educate children. Finally, student mobility has a consistently negative effect, *ceteris paribus*, on 8th grade reading scores, although the statistical significance of the effect depends on the specification used in the analysis.

Mobility affects performance, and those who move frequently are in general the least well-off groups. Some policy implications of our findings given that mobility seems to affect academic performance are: first, "large-span" schools like K-8 schools could help foster performance as this would minimize student moves; second, addressing the academic needs of those students who switch could foster higher performance; third, targeting "high-switching" groups (black students, Hispanic students, poor students) in order to diminish their mobility could improve performance.

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Table 1: Inter-Year Inter-District Mobility: frequency distribution and mean characteristics of students by mobility status, 1st to 8th grade, 1995-96 to 1996-97 and 1999-00 to 2000-01

	1996			Stayers	1997		
	All Students	1-7 Grade Exiters	8 th Grade Exiters		New 1 st Grade	New 2-8 Grade	All Students
	(1)	(2)	(3)		(4)	(5)	(6)
N. Obs.	611,291	50,448	63,773	497,070	85,454	42,628	625,152
White	0.17	0.17	0.17	0.17	0.16	0.14	0.16
Black	0.36	0.35	0.35	0.36	0.34	0.34	0.36
Hispanic	0.38	0.40	0.36	0.38	0.39	0.37	0.38
Asian	0.09	0.08	0.10	0.09	0.10	0.14	0.10
Age	10.84	10.69	14.61	10.37	6.35	10.37	9.82
Female	0.49	0.45	0.51	0.49	0.50	0.46	0.49
Foreign Born	0.18	0.19	0.28	0.16	0.11	0.45	0.17
Free Lunch Elig.	0.60	--	--	0.74	0.77	0.78	0.75
Red. Price Lunch	0.05	--	--	0.07	0.06	0.06	0.07
LEP	0.14	0.15	0.13	0.14	0.17	0.36	0.14

	2000			Stayers	2001		
	All Students	1-7 Grade Exiters	8 th Grade Exiters		New 1 st Grade	New 2-8 Grade	All Students
	(1)	(2)	(3)		(4)	(5)	(6)
N. Obs.	660,698	52,982	65,147	542,569	80,085	40,970	663,624
White	0.15	0.14	0.17	0.15	0.15	0.13	0.15
Black	0.35	0.36	0.35	0.35	0.32	0.35	0.35
Hispanic	0.39	0.40	0.35	0.39	0.40	0.37	0.39
Asian	0.11	0.09	0.13	0.11	0.12	0.14	0.11
Age	10.91	10.96	14.54	10.46	6.40	10.37	9.97
Female	0.49	0.45	0.51	0.49	0.50	0.45	0.49
Foreign Born	0.16	0.17	0.26	0.15	0.09	0.41	0.15
Free Lunch Elig.	0.75	0.74	0.69	0.76	0.72	0.72	0.73
Red. Price Lunch	0.07	0.07	0.08	0.07	0.07	0.07	0.08
LEP	0.11	0.10	0.11	0.11	0.11	0.30	0.10

Notes: i) The first row of the table indicates the distribution of students by their mobility status; the remaining rows show their mean characteristics.

i) This table reports on all 1st through 8th grade students including those in special education.

ii) The number of students in Column 1 = Column 2 + Column 3 + Column 4. The number of students in Column 7 = Column 4 + Column 5 + Column 6

Table 2a: Inter-Year Inter-School Mobility by Grade and Race; 1995-96 to 1996-97

		All Students	White	Black	Hispanic	Asian
1 st grade	Stayers %	88.9	93.73	86.31	88.14	92.97
	Switchers %	11.1	6.27	13.69	11.86	7.03
	All Students	75,208	12,362	26,104	29,098	7,323
2 nd grade	Stayers %	88.5	93.77	85.47	87.86	92.8
	Switchers %	11.5	6.23	14.53	12.14	7.2
	All Students	69,567	11,923	24,386	26,002	6,988
3 rd grade	Stayers %	89.4	93.56	87.52	88.29	92.77
	Switchers %	10.6	6.44	12.48	11.71	7.23
	All Students	64,902	11,614	22,631	23,951	6,474
4 th grade	Stayers %	87.6	94.05	86.67	83.78	92.8
	Switchers %	12.4	5.95	13.33	16.22	7.2
	All Students	62,165	11,216	21,961	22,543	6,209
5 th grade	Stayers %	38.1	26.23	42.2	40.44	36.33
	Switchers %	61.9	73.77	57.8	59.56	63.67
	All Students	60,021	10,835	21,151	21,753	6,086
6 th grade	Stayers %	62.0	74.63	58.14	61.87	53.03
	Switchers %	38.03	25.37	41.86	38.13	46.97
	All Students	58,086	10,598	20,804	20,606	5,885
7 th grade	Stayers %	94.8	97.3	93.45	94.38	97.01
	Switchers %	5.2	2.7	6.55	5.62	2.99
	All Students	58,898	10,644	20,985	20,958	5,990

Note: i) The total number of students (“All Students”) for each grade is the number that attends both 95-96 and 96-97 and that are in X grade in 95-96 and in X+1 grade in 96-97.

ii) Shaded rows highlight the academic grades that are typically transition grades to middle-schools: 5th and 6th grade.

Table 2b: Inter-Year Inter-School Mobility by Grade and Race; 1999-00 to 2000-01

		All Students	White	Black	Hispanic	Asian
1 st grade	Stayers %	89.6	92.92	87.94	89.14	91.62
	Switchers %	10.4	7.08	12.06	10.86	8.38
	All Students	71,414	10,786	23,550	28,250	8,358
2 nd grade	Stayers %	88.6	93.12	86.16	87.93	92.1
	Switchers %	11.4	6.88	13.84	12.07	7.9
	All Students	70,913	11,030	23,922	27,393	8,248
3 rd grade	Stayers %	90.46	94.15	88.55	90.03	92.65
	Switchers %	9.54	5.85	11.45	9.97	7.35
	All Students	71,590	10,989	24,413	27,724	8,187
4 th grade	Stayers %	87.61	93.23	86.98	84.35	92.09
	Switchers %	12.39	6.77	13.02	15.65	7.91
	All Students	68,779	11,145	23,309	25,827	8,263
5 th grade	Stayers %	31.09	20.32	33.74	33.29	31.49
	Switchers %	68.91	79.68	66.26	66.71	68.51
	All Students	65,573	10,865	22,561	23,991	7,976
6 th grade	Stayers %	70.43	79.82	66.86	71.04	65.66
	Switchers %	29.57	20.18	33.14	28.96	34.34
	All Students	63,733	10,732	21,853	23,225	7,763
7 th grade	Stayers %	92.99	95.87	91.7	92.17	94.72
	Switchers %	7.01	4.13	8.3	7.83	5.28
	All Students	60,203	10,798	20,449	21,413	7,402

Note: i) The total number of students (“All Students”) for each grade is the number that attends both 99-00 and 00-01 and that are in X grade in 95-96 and in X+1 grade in 96-97.

ii) Shaded rows highlight the academic grades that are typically transition grades to middle-schools: 5th and 6th grade.

Table 3a: Inter-Year Inter-School Mobility by Grade, Poverty Status, and Place of Birth; 1995-96 to 1996-97

		Poor (Eligible for Free Lunch)	Non-Poor	Foreign Born	Native Born
1 st grade	Stayers %	87.75	92.64	88.31	88.97
	Switchers %	12.25	7.36	11.69	11.03
	All Students	57,081	15,397	7,838	67,366
2 nd grade	Stayers %	87.45	92.28	88.43	88.54
	Switchers %	12.55	7.72	11.57	11.46
	All Students	52,056	14,708	8,922	60,645
3 rd grade	Stayers %	88.39	92.38	88.68	89.54
	Switchers %	11.61	7.62	11.32	10.46
	All Students	48,246	14,219	9,487	55,414
4 th grade	Stayers %	86.16	91.8	87.85	87.53
	Switchers %	13.84	8.2	12.15	12.47
	All Students	45,034	14,470	10,729	51,436
5 th grade	Stayers %	39.94	33.44	34.52	38.95
	Switchers %	60.06	66.56	65.48	61.05
	All Students	42,324	14,031	11,828	48,193
6 th grade	Stayers %	60.7	64.93	65.59	60.98
	Switchers %	39.3	35.07	34.41	39.02
	All Students	39,766	13,793	12,509	45,577
7 th grade	Stayers %	94.42	96.36	95.68	94.56
	Switchers %	5.58	3.64	4.32	5.44
	All Students	41,601	11,385	14,273	44,625

Note: i) The total number of students (“All Students”) for each grade is the number that attends both 95-96 and 96-97 and that are in X grade in 95-96 and in X+1 grade in 96-97.

ii) Shaded rows highlight the academic grades that are typically transition grades to middle-schools: 5th and 6th grade.

Table 3b: Inter-Year Inter-School Mobility by Grade, Poverty Status and Place of Birth; 1999-00 to 2000-01

		Poor (Eligible for Free Lunch)	Non-Poor	Foreign Born	Native Born
1 st grade	Stayers %	88.99	92.51	88.9	89.67
	Switchers %	11.01	7.49	11.1	10.33
	All Students	52,385	14,182	6,585	64,829
2 nd grade	Stayers %	87.83	91.46	88.8	88.57
	Switchers %	12.17	8.54	11.2	11.43
	All Students	53,274	14,583	7,564	63,349
3 rd grade	Stayers %	89.62	93.33	90.42	90.46
	Switchers %	10.38	6.67	9.58	9.54
	All Students	54,350	14,901	9,175	62,415
4 th grade	Stayers %	86.51	91.11	87.29	87.67
	Switchers %	13.49	8.89	12.71	12.33
	All Students	51,492	14,913	10,119	58,660
5 th grade	Stayers %	32.16	26.78	28.57	31.62
	Switchers %	67.84	73.22	71.43	68.38
	All Students	49,061	14,259	11,483	54,090
6 th grade	Stayers %	69.33	73.71	71.71	70.1
	Switchers %	30.67	26.29	28.29	29.9
	All Students	46,278	14,287	12,951	50,782
7 th grade	Stayers %	92.26	95.13	93.29	92.91
	Switchers %	7.74	4.87	6.71	7.09
	All Students	42,152	13,785	13,310	46,893

Note: i) The total number of students (“All Students”) for each grade is the number that attends both 99-00 and 00-01 and that are in X grade in 95-96 and in X+1 grade in 96-97.

ii) Shaded rows highlight the academic grades that are typically transition grades to middle-schools: 5th and 6th grade.

Table 4: Distribution of Mandatory Switches by Grade and Race; 1996-97 to 2000-01

	From 3 rd to 4 th (in 96-97)		From 4 th to 5 th (in 97-98)		From 5 th to 6 th (in 98-99)		From 6 th to 7 th (in 99-00)		From 7 th to 8 th (in 00-01)	
	Switchers	% Mandatory	Switchers	% Mandatory	Switchers	% Mandatory	Switchers	% Mandatory	Switchers	% Mandatory
Total	6,868	12.68	5,598	45.18	39,987	92.42	18,960	81.25	4,220	16.52
White	754	3.71	413	13.56	8,334	95.13	2,160	78.1	443	20.99
Black	2,816	13.03	2,125	40.8	13,167	89.86	7,554	80.18	1,696	9.79
Hispanic	2,804	15.69	2,713	55.44	13,926	92.8	6,686	80.45	1,677	21.53
Asian	468	7.05	319	29.15	4,472	93.69	2,523	89.14	391	18.67

Notes: i) Each cell shows (from top to bottom) frequency, row percentage, and column percentage.

ii) A switch is considered a “Mandatory Switch” if 80% to 100% of the student’s cohort also switched.

iii) Totals might not add, as students tagged as “other race” are omitted from the table (less than 1% of total students).

Table 5a: Intra-Year Inter-School Mobility by Grade and Race; 1995-96

Grade		All Students	White	Black	Hispanic	Asian
1 st grade	Stayers %	93.93	96.77	92.93	93.12	96.32
	Switchers %	6.07	3.23	7.07	6.88	3.68
	Total	87,935	14,084	30,639	34,717	8,101
2 nd grade	Stayers %	94.4	96.75	93.54	93.65	96.49
	Switchers %	5.6	3.25	6.46	6.35	3.51
	Total	82,795	13,737	29,082	31,702	7,916
3 rd grade	Stayers %	96	98.08	95.1	95.45	97.68
	Switchers %	4	1.92	4.9	4.55	2.32
	Total	73,642	12,758	25,952	27,627	7,023
4 th grade	Stayers %	96.27	98.24	95.53	95.67	97.57
	Switchers %	3.73	1.76	4.47	4.32	2.43
	Total	69,198	12,261	24,433	25,546	6,700
5 th grade	Stayers %	96.79	98.4	96.29	96.1	98.09
	Switchers %	3.21	1.6	3.7	3.9	1.91
	Total	67,300	12,218	23,558	24,651	6,640
6 th grade	Stayers %	96.69	97.21	96.18	96.57	98
	Switchers %	3.31	2.79	3.82	3.43	2
	Total	65,400	11,817	23,382	23,461	6,493
7 th grade	Stayers %	96.62	98.42	95.8	96.13	98.21
	Switchers %	3.38	1.58	4.2	3.87	1.8
	Total	65,841	11,508	23,568	23,920	6,469
8 th grade	Stayers %	97	98.86	96.32	96.31	98.71
	Switchers %	3.01	1.14	3.68	3.69	1.29
	Total	65,265	11,248	22,978	23,510	6,643

Note: i) A student is a “stayer” if he/she attended the same school on October, May, and June during the 1995-96 academic year. A student is a “switcher” otherwise.

ii) The total number of students is the number of students of grade X that attended the NYC Elementary School district during the 1995-96 academic year.

Table 5b: Intra-Year Inter-School Mobility by Grade and Race; 2000-01

Grade		All Students	White	Black	Hispanic	Asian
1 st grade	Stayers %	94.36	96.51	92.91	94.18	96.32
	Switchers %	5.64	3.49	7.1	5.82	3.68
	Total	85,335	12,261	27,512	34,830	9,955
2 nd grade	Stayers %	94.5	97.07	92.92	94.37	96.35
	Switchers %	5.5	2.93	7.08	5.64	3.65
	Total	82,782	11,895	27,742	33,144	9,479
3 rd grade	Stayers %	94.27	97.08	92.59	93.99	96.81
	Switchers %	5.73	2.91	7.41	6.01	3.19
	Total	82,748	12,092	28,496	32,464	9,307
4 th grade	Stayers %	94.51	96.88	93.32	94.13	96.39
	Switchers %	5.49	3.12	6.68	5.87	3.61
	Total	81,131	11,972	27,774	31,832	9,206
5 th grade	Stayers %	93.33	96.14	92.13	92.34	96.39
	Switchers %	6.67	3.86	7.87	7.66	3.61
	Total	78,641	12,112	26,969	30,045	9,232
6 th grade	Stayers %	93.29	96.15	91.12	93.24	96.04
	Switchers %	6.71	3.86	8.88	6.75	3.96
	Total	74,323	11,806	25,992	27,397	8,903
7 th grade	Stayers %	95.09	97.07	93.5	95.14	96.96
	Switchers %	4.9	2.93	6.5	4.86	3.04
	Total	72,622	11,653	25,193	26,780	8,788
8 th grade	Stayers %	96.17	98.09	95	95.75	98.07
	Switchers %	3.84	1.9	4.99	4.25	1.93
	Total	68,521	11,591	23,676	24,683	8,390

Note: i) A student is a “stayer” if he/she attended the same school on October, May, and June during the 2000-01 academic year. A student is a “switcher” otherwise.

ii) The total number of students is the number of students of grade X that attended the NYC Elementary School district during the 2000-01 academic year.

Table 6a: Intra-Year Inter-School Mobility by Grade, Poverty Status and Place of Birth; 1995-96

Grade		Poor (Free Lunch Eligible)	Non-Poor	Foreign Born	Native Born
1 st grade	Stayers %	94.55	97.67	92.9	94.05
	Switchers %	5.44	2.33	7.1	5.95
	Total	60,590	15,632	9,309	78,620
2 nd grade	Stayers %	94.96	97.52	93.63	94.52
	Switchers %	5.05	2.47	6.37	5.48
	Total	56,108	14,983	11,064	71,728
3 rd grade	Stayers %	95.51	98.07	95.54	96.07
	Switchers %	4.49	1.92	4.46	3.93
	Total	51,702	14,481	10,878	62,762
4 th grade	Stayers %	95.79	98.13	95.7	96.39
	Switchers %	4.21	1.87	4.3	3.61
	Total	47,263	14,650	12,155	57,043
5 th grade	Stayers %	96.4	98.17	96.59	96.84
	Switchers %	3.6	1.83	3.41	3.16
	Total	43,899	14,156	13,400	53,900
6 th grade	Stayers %	96.51	97.52	96.87	96.63
	Switchers %	3.49	2.48	3.13	3.37
	Total	41,526	14,000	14,270	51,129
7 th grade	Stayers %	96.64	97.89	96.88	96.54
	Switchers %	3.36	2.11	3.12	3.46
	Total	43,544	11,596	16,004	49,837
8 th grade	Stayers %	91.37	90.64	97.53	96.79
	Switchers %	8.62	9.36	2.47	3.21
	Total	1,136	171	17,871	47,391

Note: i) A student is a “stayer” if he/she attended the same school on October, May, and June during the 1995-96 academic year. A student is a “switcher” otherwise.

ii) The total number of students is the number of students of grade X that attended the NYC Elementary School district during the 1995-96 academic year.

Table 6b: Intra-Year Inter-School Mobility by Grade, Poverty Status and Place of Birth; 2000-01

Grade		Poor (Free Lunch Eligible)	Non-Poor	Foreign Born	Native Born
1 st grade	Stayers %	93.72	96.1	94.13	94.38
	Switchers %	6.28	3.91	5.88	5.62
	Total	61,968	17,111	7,967	77,368
2 nd grade	Stayers %	94.04	96.29	94	94.56
	Switchers %	5.96	3.71	6	5.44
	Total	62,235	17,105	9,151	73,631
3 rd grade	Stayers %	93.73	96.13	94.24	94.27
	Switchers %	6.27	3.86	5.76	5.72
	Total	62,314	17,432	10,477	72,271
4 th grade	Stayers %	94.04	96.31	94.56	94.5
	Switchers %	5.96	3.69	5.44	5.5
	Total	60,951	17,312	12,010	69,121
5 th grade	Stayers %	92.68	95.72	93.55	93.29
	Switchers %	7.32	4.28	6.45	6.71
	Total	58,231	17,401	13,173	65,468
6 th grade	Stayers %	92.72	95.13	94.08	93.1
	Switchers %	7.28	4.87	5.92	6.9
	Total	53,101	16,736	14,499	59,824
7 th grade	Stayers %	94.62	96.46	95.78	94.89
	Switchers %	5.38	3.54	4.22	5.11
	Total	50,573	15,839	16,234	56,388
8 th grade	Stayers %	95.62	97.81	97.07	95.88
	Switchers %	4.37	2.19	2.92	4.12
	Total	46,147	14,960	16,604	51,917

Note: i) A student is a “stayer” if he/she attended the same school on October, May, and June during the 2000-01 academic year. A student is a “switcher” otherwise.

ii) The total number of students is the number of students of grade X that attended the NYC Elementary School district during the 2000-01 academic year.

Table 7: Prospective Cohort Mobility: Distribution of students by mobility status, 3rd to 8th grade

		Continued from the Previous Grade (1)	New Entrants to District (2)	Entered Grade from Non- standard Grade (3)	Number of Registered Students (4)	Continued to Next Grade (5)	Continued to Other Than Next Grade (6)	Exited (7)
3 rd Grade	1995-96	--	--	--	73,642	64,902	3,819	4,921
		--	--	--	100%	88.1%	5.2%	6.7%
4 th Grade	1996-97	64,902	5,219	1,657	71,778	64,448	2,281	5,049
		90.4%	7.3%	2.3%	100%	89.8%	3.2%	7.0%
5 th Grade	1997-98	64,448	4,133	1,611	70,192	61,459	2,901	5,832
		91.8%	5.9%	2.3%	100%	87.6%	4.1%	8.3%
6 th Grade	1998-99	61,459	4,172	3,121	68,752	59,960	5,190	3,602
		89.4%	6.1%	4.5%	100%	87.2%	7.5%	5.2%
7 th Grade	1999-00	59,960	4,869	3,067	67,896	60,203	2,781	4,912
		88.3%	7.2%	4.5%	100%	88.7%	4.1%	7.2%
8 th Grade	2000-01	60,203	3,940	4,378	68,521	--	--	--
		87.9%	5.8%	6.4%	100%	--	--	--

Notes: i) In order to get the number of students (4), add the number of continuing students from the previous year (1) to the number of entering students (2) from the current year and the number of students that entered from a nonstandard grade (3).

ii) Column 4 also equals columns 5 + 6 + 7.

iii) Shown percentages are relative to column 4 of the corresponding row.

Table 8: Retrospective Cohort Mobility: number of schools attended by 8th graders; by entrance status and race; 2001-02

# of total schools attended	All Students		White		Black		Hispanic		Asian	
	Late Entrants	Early Entrants	Late Entrants	Early Entrants	Late Entrants	Early Entrants	Late Entrants	Early Entrants	Late Entrants	Early Entrants
1	8,157 57.05	1,858 3.4	1,297 59.77	333 3.67	2,378 54.92	655 3.41	2,506 54.73	724 3.58	1,856 60.48	142 2.38
2	4,730 33.08	35,680 65.38	720 33.18	6,837 75.38	1,454 33.58	11,532 60.1	1,523 33.26	12,606 62.27	1,009 32.88	4,632 77.78
3	1,173 8.2	13,480 24.7	138 6.36	1,669 18.4	390 9.01	5,268 27.46	461 10.07	5,459 26.97	180 5.87	1,060 17.8
4	205 1.43	3,018 5.53	14 0.65	212 2.34	90 2.08	1,440 7.51	77 1.68	1,240 6.13	23 0.75	112 1.88
5	30 0.21	534 0.89	1 0.05	19 0.21	18 0.42	292 1.52	10 0.22	214 1.06	1 0.03	9 0.15
Total	14,297 100	54,570 100	2,170 100	9,070 100	4,330 100	19,187 100	4,579 100	20,243 100	3,069 100	5,955 100

Notes: i) Each cell shows (from top to bottom) frequency, and column percentage.

ii) The table shows only results for continuously registered students that attended NYC education system during the period 1997-2002 (at most they could have attended 6 schools as measured by the October BDS).

iii) Early entrants are defined as students who have been continuously registered since 1996-97, and entered before 5th grade. Late entrants are defined as students who entered the system after 1996-97 or after 5th grade.

Table 9: Retrospective Cohort Mobility: number of “moving years” of 8th graders; by entrance status and race; 2001-02

# of total “moving years”	All Students		White		Black		Hispanic		Asian	
	Late Entrants	Early Entrants	Late Entrants	Early Entrants	Late Entrants	Early Entrants	Late Entrants	Early Entrants	Late Entrants	Early Entrants
0	12,214 85.43	42,156 77.25	1,934 89.12	7,857 86.63	3,558 82.17	13,727 71.54	3,825 83.53	15,328 75.72	2,761 89.96	5,164 86.72
1	1,783 12.47	9,370 17.17	209 9.63	1,005 11.08	638 14.73	4,010 20.9	636 13.89	3,688 18.22	288 9.38	638 10.71
2	255 1.78	2,307 4.23	26 1.2	162 1.79	109 2.52	1,063 5.54	100 2.18	947 4.68	19 0.62	130 2.18
3	36 0.25	580 1.06	1 0.05	40 0.44	17 0.39	291 1.52	17 0.37	229 1.13	1 0.03	20 0.34
4	8 0.06	127 0.23	0 0.00	6 0.07	7 0.16	77 0.4	1 0.02	40 0.2	0 0.00	3 0.05
5	1 0.01	23 0.04	0 0.00	0 0.00	1 0.02	14 0.07	0 0.00	9 0.04	0 0.00	0 0.00
6	0 0.00	7 0.01	0 0.00	0 0.00	0 0.00	5 0.03	0 0.00	2 0.01	0 0.00	0 0.00
Total	14,297 100	54,570 100	2,170 100	9,070 100	4,330 100	19,187 100	4,579 100	20,243 100	3,069 100	5,955 100

Notes: i) Each cell shows (from top to bottom) frequency, and column percentage.

ii) Moving years are defined as the number of years in which the student switched intra-year at least once.

iii) The table shows only results for continuously registered students that attended NYC education system during the period 1997-2002 (at most they could have 6 moving years).

iv) Early entrants are defined as students who have been continuously registered since 1996-97, and entered before 5th grade. Late entrants are defined as students who entered the system after 1996-97 or after 5th grade.

Table 10: Characteristics of Schools of 3rd Grade switchers; 1995-96 to 1996-97

Race	Average Peer Test Scores		% of White students		% of Black students	
	Lower	Higher	Less White Students	More White Students	Less Black Students	More Black Students
Total	3,862 56.23	3,006 43.77	3,282 47.79	3,586 52.21	3,486 50.76	3,382 49.24
White	309 40.98 8	445 59.02 14.8	258 34.22 7.86	496 65.78 13.83	458 60.74 13.14	296 39.26 8.75
Black	1,784 63.35 46.19	1,032 36.65 34.33	1,503 53.37 45.8	1,313 46.63 36.61	1,385 49.18 39.73	1,431 50.82 42.31
Hispanic	1,576 56.21 40.81	1,228 43.79 40.85	1,352 48.22 41.19	1,452 51.78 40.49	1,400 49.93 40.16	1,404 50.07 41.51
Asian	180 38.46 4.66	288 61.54 9.58	157 33.55 4.78	311 66.45 8.67	224 47.86 6.43	244 52.14 7.21

Notes: i) Each cell shows (from top to bottom) frequency, row percentage, and column percentage (except the first row that shows frequency and row percentage only).

ii) To determine if a student switched to a better school we do the following: 1) We find the students that attended 3rd grade in 96 and 4th grade in 97. 2) We find which students switched from school. 3) For the students that switched school, we find the mean test score of the students in 3rd grade in the student's old school (mean reading test score of 3rd graders by school in 96). 4) For the students that switched school, we find the mean test score of the students in 4th grade in the student's new school (mean reading test score of 4th graders by school in 97). 5) We compare the mean test score of the student school in 3rd grade with the student mean test score of the students in 4th grade and then we say that a student moved to a better school if the mean test score in 4th grade is greater than the mean test score in 3rd grade.

iii) To determine if a student switched to a school with greater percentage of White/Black students, we followed the steps described in "ii)" above but focusing on percentage of students of certain race.

iv) Totals might not add, as students tagged as "other race" are omitted from the table (less than 1% of total students).

v) There were a total of 6,868 3rd grade switchers from 1995-96 to 1996-97. 754 (10.98%) were white, 2,816 (41.00%) were black, 2,804 (40.83%) were Hispanic, and 468 (6.81) were Asian.

Table 11: Characteristics of Schools of 6th Grade Switchers; 1998-99 to 1999-00

Race	Average Peer Test Scores		% of White students		% of Black students	
	Lower	Higher	Less White Students	More White Students	Less Black Students	More Black Students
Total	12,834 67.69	6,126 32.31	8,364 44.11	10,596 55.89	8,763 46.22	10,197 53.78
White	1,416 65.56 11.03	744 34.44 12.14	1,091 50.51 13.04	1,069 49.49 10.09	704 32.59 8.03	1,456 67.41 14.28
Black	4,996 66.14 38.93	2,558 33.86 41.76	3,085 40.84 36.88	4,469 59.16 42.18	4,571 60.51 52.16	2,983 39.49 29.25
Hispanic	4,656 69.64 36.28	2,030 30.36 33.14	3,157 47.22 37.75	3,529 52.78 33.31	2,755 41.21 31.44	3,931 58.79 38.55
Asian	1,746 69.2 13.6	777 30.8 12.68	1,019 40.39 12.18	1,504 59.61 14.19	718 28.46 8.19	1,805 71.54 17.7

Notes: i) Each cell shows (from top to bottom) frequency, row percentage, and column percentage (except the first row that shows frequency and row percentage only).

ii) To determine if a student switched to a better school we do the following: 1) We find the students that attended 6th grade in 99 and 7th grade in 00. 2) We find which students switched from school. 3) For the students that switched school, we find the mean test score of the students in 6th grade in the student's old school (mean reading test score of 6th graders by school in 99). 4) For the students that switched school, we find the mean test score of the students in 7th grade in the student's new school (mean reading test score of 7th graders by school in 00). 5) We compare the mean test score of the student school in 6th grade with the student mean test score of the students in 7th grade and then we say that a student moved to a better school if the mean test score in 7th grade is greater than the mean test score in 6th grade.

iii) To determine if a student switched to a school with greater percentage of White/Black students, we followed the steps described in "ii)" above but focusing on percentage of students of certain race.

iv) Totals might not add, as students tagged as "other race" are omitted from the table (less than 1% of total students).

v) There were a total of 18,960 6th grade switchers from 1998-99 to 1999-00. 2,160 (11.39%) were white; 7,554 (39.84%) were black; 6,686 (35.26%) were Hispanic; and 2,523 (13.31) were Asian.

Table 12: 3rd Grade Switchers by Residence Switching Status, 1995-96 to 1996-97

Race	Zip Code		Borough	
	Same Zip Code	Different Zip Code	Same Borough	Different Borough
Total	3,702 53.9	3,166 46.1	5,726 83.37	1,142 16.63
White	435 57.69 11.75	319 42.31 10.08	658 87.27 11.49	96 12.73 8.41
Black	1,478 52.49 39.92	1,338 47.51 42.26	2,285 81.14 39.91	531 18.86 46.5
Hispanic	1,535 54.74 41.46	1,269 45.26 40.08	2,356 84.02 41.15	448 15.98 39.23
Asian	242 51.71 6.54	226 48.29 7.14	406 86.75 7.09	62 13.25 5.43

Notes: i) Each cell shows (from top to bottom) frequency, row percentage, and column percentage (except the first row that shows frequency and row percentage only).

ii) To determine if switcher students changed his/her zip code (borough) of residence: 1) We find the students that attended 3rd grade in 96 and 4th grade in 97. 2) We find which students switched from school. 3) For the students that switched school, we find their zip code (borough) of residence while 3rd grade. 4) For the students that switched school, we find their zip code (borough) of residence while in 4th grade. 5) We compare the zip codes (boroughs) before and after the switch.

iii) Totals might not add, as students tagged as “other race” are omitted from the table (less than 1% of total students).

iv) There were a total of 6,868 3rd grade switchers from 1995-96 to 1996-97. 754 (10.98%) were white, 2,816 (41.00%) were black, 2,804 (40.83%) were Hispanic, and 468 (6.81%) were Asian.

Table 13: 6th Grade Switchers by Residence Switching Status, 1998-99 to 1999-00

Race	Zip Code		Borough	
	Same Zip Code	Different Zip Code	Same Borough	Different Borough
Total	15,970 84.23	2,990 15.77	18,111 95.52	849 4.48
White	1,849 85.6 11.58	311 14.4 10.4	2,079 96.25 11.48	81 3.75 9.54
Black	6,244 82.66 39.1	1,310 17.34 43.81	7,174 94.97 39.61	380 5.03 44.76
Hispanic	5,677 84.91 35.55	1,009 15.09 33.75	6,368 95.24 35.16	318 4.76 37.46
Asian	2,169 85.97 13.58	354 14.03 11.84	2,455 97.3 13.56	68 2.7 8.01

Notes: i) Each cell shows (from top to bottom) frequency, row percentage, and column percentage (except the first row that shows frequency and row percentage only).

ii) To determine if switcher students changed his/her zip code (borough) of residence: 1) We find the students that attended 6th grade in 99 and 7th grade in 00. 2) We find which students switched from school. 3) For the students that switched school, we find their zip code (borough) of residence while 6th grade. 4) For the students that switched school, we find their zip code (borough) of residence while in 7th grade. 5) We compare the zip codes (boroughs) before and after the switch.

iii) Totals might not add, as students tagged as “other race” are omitted from the table (less than 1% of total students).

iv) There were a total of 18,960 6th grade switchers from 1998-99 to 1999-00. 2,160 (11.39%) were white; 7,554 (39.84%) were black; 6,686 (35.26%) were Hispanic; and 2,523 (13.31%) were Asian.

Table 14: Reading test scores, 8th graders 2001-2002, continuously registered early entrants, value added

	(1)	(2)	(3)	(4)
3 rd Grade Test Score	0.598*** (0.005)	0.599*** (0.005)	0.558*** (0.005)	0.558*** (0.005)
Black	-0.335*** (0.011)	-0.335*** (0.011)	-0.298*** (0.013)	-0.298*** (0.013)
Hispanic	-0.279*** (0.011)	-0.278*** (0.011)	-0.218*** (0.013)	-0.218*** (0.013)
Asian	0.094*** (0.014)	0.097*** (0.014)	0.090*** (0.015)	0.090*** (0.015)
Free Lunch	-0.165*** (0.009)	-0.168*** (0.009)	-0.141*** (0.010)	-0.141*** (0.010)
Reduced Price Lunch	-0.066*** (0.013)	-0.067*** (0.013)	-0.066*** (0.013)	-0.066*** (0.013)
Age	-0.112*** (0.007)	-0.112*** (0.007)	-0.101*** (0.007)	-0.102*** (0.007)
Female	0.166*** (0.006)	0.166*** (0.006)	0.163*** (0.006)	0.162*** (0.006)
Foreign Born	0.155*** (0.010)	0.157*** (0.010)	0.150*** (0.010)	0.150*** (0.010)
Took Lab	-1.117*** (0.087)	-1.111*** (0.087)	-1.070*** (0.083)	-1.071*** (0.083)
LEP	0.386*** (0.067)	0.382*** (0.067)	0.349*** (0.064)	0.349*** (0.063)
Lab Percentile	0.015*** (0.001)	0.014*** (0.001)	0.014*** (0.001)	0.014*** (0.001)
No English at Home	0.075*** (0.009)	0.076*** (0.009)	0.062*** (0.009)	0.062*** (0.009)
Attendance	0.015*** (0.000)	0.015*** (0.000)	0.013*** (0.000)	0.013*** (0.000)
# schools attended	-0.054*** (0.005)		-0.008 (0.006)	
2 schools attended		-0.203*** (0.016)		-0.008 (0.025)
3 schools attended		-0.246*** (0.017)		-0.032 (0.026)
4 schools attended		-0.258*** (0.021)		-0.004 (0.029)
5 schools attended		-0.276*** (0.038)		0.000 (0.042)
# moving years	-0.006 (0.006)		-0.023*** (0.006)	
1 moving year		-0.022*** (0.008)		-0.033*** (0.008)
2 moving years		0.009 (0.019)		-0.014 (0.019)
3 moving years		-0.088* (0.050)		-0.124** (0.049)
4 moving years		0.043 (0.121)		-0.026 (0.112)
5 moving years		0.187 (0.163)		0.184 (0.230)
Constant	0.361*** (0.134)	0.440*** (0.135)	0.216 (0.134)	0.213 (0.135)
Observations	51129	51129	51117	51117
R-squared	0.51	0.51	0.55	0.55
School Fixed Effects	No	No	Yes	Yes

Notes: i) Robust standard errors in parentheses

ii) * significant at 10%; ** significant at 5%; *** significant at 1%

iii) Early entrants are defined as students who have been continuously registered since 1996-97, and entered before 5th grade.

iv) "Moving Years" are defined as the years in which a student switched intra-year at least once.