Working Paper

How Diverse Schools Affect Student Mobility: Charter, Magnet, and Newly Built Institutions in Los Angeles

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The Los Angeles School Infrastructure Project (LASI) examines the benefits of the $27 billion investment in new schools and renovation by the Los Angeles Unified School District. Our research stems from a cooperative agreement between LAUSD and the University of California, Berkeley. Warm thanks go to Mary Filardo, Neil Gamble, Cynthia Lim, Guy Mehula, Babatunde Ogunwole, Rena Perez, Amanda Rios, Jeff Vincent, and Jeff White for their unwavering support and steady advice. This work has been supported by the Ford, Hewlett, and Spencer foundations and Policy Analysis for California Education. Additional project reports appear at *pace.berkeley.edu*. Special thanks to Corinne Arraez, Kathleen Maclay, and David Plank for their help in disseminating these findings. The authors are solely responsible for any errors of fact or interpretation.

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SUMMARY

We know that student achievement often suffers when children and families move, leaving behind their school and neighborhood, yet, in urban districts like Los Angeles, mobility is now encouraged by the development of mixed-markets of diverse schools, including charter, pilot, and magnet schools in. Over 60 new school facilities were opened as well during 2002-2008 period, thanks to a $27 billion construction program undertaken by the Los Angeles Unified School District (LAUSD). We first assess how student attributes and differing school organizations, varying by type and quality, influence the rates of student exit prior the end their school's grade cycle within elementary and secondary schools. We estimate the discrete influence of student factors and school types on the likelihood that pupils leave their school, using what are known as hazard-rate models, based on 4.5 million person-period observations.

We find contrasting patterns of student mobility along ethnic lines: African American and White students were more likely to exit their school, compared with Latino, non-English speaking, and foreign-born students, yet students attending overcrowded schools – disproportionately situated in low-income Latino neighborhoods – exited at higher rates. Charter and magnet school students left their schools at much lower rates, compared with peers in regular schools, after taking into account prior effects of family background. The opening of new high schools slowed student mobility substantially.

We then extend these statistical models to estimate which students were more likely to depart their old school and then enter a charter, magnet, or newly built school during the 2002-2008 period. We find that Latino students were more likely than Black or White peers to move to a newly built regular school, rather than entering a charter or magnet school, likely due to the successful targeting of new construction within areas that suffered from severely overcrowded schools. We discuss implications for conceptualizing student mobility – especially the capacity of charter and magnet schools to slow student mobility – as diverse portfolios of schools come to characterize urban areas like Los Angeles.

Luke Dauter and Bruce Fuller
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STUDENT MOBILITY IN
MIXED-MARKETS OF DIVERSE SCHOOLS

Almost one-sixth of the U.S. population moves during a typical two-year period (Census Bureau 2004). Mobility rates range higher for families with school-age children and differ by family ethnicity. Two in five Latino parents with a fourth-grader moved over the two-year period, 1996 and 1997, compared with 27 percent of (non-Latino) White students (Rumberger 2003). Two-fifths of all elementary-age children had changed schools at least once before reaching the fourth grade, and one-sixth had attended three or more schools, according to one earlier estimate (GAO 1994).

In the context of this mobility and persisting achievement gaps, research continues to expand on what family and school factors predict the likelihood that a student changes school midway through the grade sequence. This work (such as, Rumberger 2003) distinguishes between two varieties of student mobility: *strategic* transfers by parents in which the family moves to a better neighborhood or (perceived-to-be) higher quality school, and *reactive* transfers that occur when parents change jobs, search for affordable housing, or when a student is pushed-out of school.

The earliest research into mobility emphasizes its negative effects on children, after taking into account prior factors that shape the family's propensity to move (Rumberger and Larson 1998; Burkam, Lee, and Dwyer 2009). Much of this research has relied on conventional multivariate statistical techniques rather than quasi-experimental designs, which are necessary to control for prior confounding factors (an exception, Lauen 2009).

Still, the pattern of negative effects on student achievement and social relationships inside schools – with peers and teachers – is consistently observed. For young children, changing schools can add to everyday stress and maladaptive social behavior inside school (Gruman, Harachi, Abbott, Catalano, and Fleming 2008; Board on Children 2010). Mobility also appears to weaken peer relations and engagement with teachers, in turn suppressing learning (Lauen 2007; Ream and Rumberger 2008; Rumberger and Palardy 2005).

The authors of one review estimated that children who changed schools three times or more are one-third of a standard deviation more likely to drop out of high school, even after controlling for prior achievement (Reynolds, Chen, and Herbers 2009). Overall, this line of research remains agnostic as to whether these deleterious effects of mobility can be attributed to the two types of student movement, or whether effects differ between strategic or reactive action taken by parents or students themselves.

Do Education Markets Benefit from Student Mobility?

A more recent framing of mobility, born from school choice research and advocacy, casts student migration in a more positive light. Rising rates of mobility are to be expected as charter, magnet, and pilot schools spread, along with intra-district transfer options (for review, Fuller 2009). Within these diversifying markets of schools, parental choice and student movement are seen as desirable – leading to better child-school matches and fueling competition for pupils which will lift school quality.

Many urban school districts, including LAUSD, now facilitate this kind of mobility, seeing parental choice as key in holding onto middle-class parents, spurring pedagogical innovation, and raising quality. To relieve severe overcrowding, coming out of the 1990s, LAUSD has constructed many new campuses, adding to the mix. Strategic mobility may yield achievement benefits for students, at least for economically advantaged pupils, after taking into account prior selection processes (Lauen 2009; Ledwith 2009), yet with the spread of diverse school organizations, less is known about whether strategic choice by low-income parents yields discernible benefits for their children, relative to peers who remain in neighborhood schools.

Research has yet to examine how this colorful diversity of schools advances student mobility, including which students are more likely to exit which types of schools. Prior work has focused on familial and student-level determinants of mobility; moving beyond this conceptualization we also ask how school type, quality level, and the set of schools in local neighborhoods (ecology) may independently speed or slow student mobility. These questions are examined within LAUSD, the nation's second largest school district, over a seven-year period, 2002-2009.

Examining LAUSD, particularly over this time period, allows us to analyze student movement in the context of a rapidly changing large urban school district. A large number of new school facilities were opening during this period with the district spending $27 billion between 2000 and 2012 to build about 130 new school facilities, easing severe overcrowding, largely in schools serving low-income Latino families.

The count of authorized charter schools exploded from about 50 schools to 150 schools between 2002 and 2008. Magnet schools also remained popular in the eyes of parents, and semi-autonomous pilot schools were blossoming as well. We describe the institutional conditioning of parental choice and identify the forms and facets of school quality that influenced mobility in this colorful context of organizational diversity.

PUSHING AND PULLING – HOW FAMILIES, SCHOOLS, AND ORGANIZATIONAL ECOLOGIES SHAPE MOBILITY

We aimed to identify family- and school-level factors that explain the likelihood that students exit their school prior to the end of the grade, that is, before 'graduating' from their elementary or secondary school. We term this a *non-structural* exit, as distinguished from exiting a school after the final grade of that school. This study was motivated largely by the question of whether certain types of schools – charters, magnets, or newly built schools – acted to slow or hurry the rate of student mobility or churning across LAUSD schools.

Earlier Findings – Family and School Factors

Student or family characteristics, such as race and ethnicity, social-economic status, and residential status, as well as pupil performance – are known to predict mobility. School quality and type also shape mobility rates, with urban, minority dominated schools, as well as those with poorer quality or less well paid teachers, exhibiting higher likelihoods of student exit each year (Rumberger 2003). Other institutional factors may affect mobility rates, including the propensity of overcrowded facilities to display higher student mobility, as well as stricter rules related to suspension and expulsion, further boosting exit rates. So, we

hypothesize that both the qualities of schools and the mix of diverse schools within neighborhoods may independently shape the likelihood of student exit.

Earlier research consistently shows that children from lower-income families change schools more often than peers in better-off families. Similarly, students demonstrating more behavioral problems in elementary or secondary school are more likely to move (Alexander, Entwistle, and Dauber 1996; Kerbow 1996; Gruman, Harachi, Abbott, Catalano, and Fleming 2008; Pianta and Early 2001; Rumberger and Larson 1998). This line of work typically assumes that mobility stems largely from reactive transfers, where parents are responding to forces beyond their control or where schools push-out problematic students.

Finally, the position of the student within the school's grade cycle is likely to condition student movement. As a student progresses through the grade cycle at a particular school, they, and their family may develop social ties including relationships with peers and teachers. The argument here is that forces pushing and pulling students to leave a school will have an easier time overcoming these bonds the earlier a student is in a school's grade cycle.

Do Diversifying Schools Organizations Slow Mobility?

Another way to think about mobility stems from the argument that innovative, small, or less rule-bound schools organizations will act to engage students more thoroughly and in turn slow their likelihood of exit. For example, research over the past generation has asked whether charter, magnet, or Catholic schools exercise greater 'holding power' as they engage and lift students more effectively than conventional public schools.[1] Similarly, advocates of parental choice argue that liberalized markets of diversifying schools will allow for a better match among pupil, family, and school – defined by educational philosophy, discipline practices or demographic composition. Ultimately the quality, identity and reputation of particular types of schools may act to enrich student engagement and reduce mobility, but little evidence is yet available to support this argument (Bobonis and Finan 2009; Gruman et al. 2008; Lauen 2007).

The earlier work on student mobility has failed to keep pace with the colorful diversification of school organizations. By 2005 one in four students were no longer attending the school within their local catchment area (Fuller 2009). Indeed, going back to the 1950s reformers have advanced the notion that more diverse school organizations would facilitate pedagogical innovation, better match kids to schools, and spark competitive dynamics that would raise school quality overall.

This included the early pitch for parental choice by southern conservatives who aimed to preserve racially segregated schools in the 1950s. In contrast, federal support for magnet schools, begun as a voluntary desegregation device, continues to help attract students that vary along racial and class lines (Fuller, Elmore, and Orfield 1996). Charter schools represent a robust contemporary public mechanism for advancing a mixed-market of diverse school institutions, at least in large urban districts (Lubienski and Weitzel 2010; Nathan, 1996). The rise in parental demand and government affection for mixed education markets has contributed to the dramatic growth in charter schools, cross-town transfer options, magnet schools, and a handful of publicly funded voucher programs.

Neighborhood Mixes of Diverse Schools – Organizational Ecology

Reform activists typically conceive of organizational diversity on a district-wide or metropolitan basis. But parents may simply look across the kinds of proximal schools, situated in their own neighborhoods. Is it feasible that my child could attend a nearby charter or private school, compared with the proximal public school? At the same time, we know that L.A. parents have applied for magnet schools or charters that may be miles from home.

So, another facet of our study examines whether the local mix of schools further explains the likelihood that students exit their initial school prematurely. The exit behavior of a parent whose child attends an uninspiring regular school may differ depending upon the availability of a nearby charter or magnet school, for example. As charters and teacher-led pilot schools grow in number and reputation in Latino East Los Angeles, the prior norm of attending one's assigned school is giving way to awareness of options (Fuller 2010). At the same time, new (largely conventional) schools opened in many neighborhoods, 2002-2008, to relieve overcrowded schools in this densely populated area. This led to a reduction in mandatory bussing out to less-crowded schools in the Valley and less densely populated areas of L.A.

Finally, prior research suggests that the diverse mix of schools across neighborhoods will differ, based on their ethnic, social-class, and political dynamics (Henig, Hula, Orr, & Pedescleaux 1999; Rury & Mirel 1997). How a family negotiates their immediate organizational ecology of schools relates to their capacity to assess comparative data on schools, shop around, and cover transportation costs if they do forego their assigned school.

Ledwith (2010), for instance, found that parents living in more advantaged L.A. neighborhoods were more likely to participate in the district's open enrollment program. Lauen (2007) similarly found that higher achieving students in Chicago were less able to move from a conventional school to a magnet program, given the priority placed on enrollment diversity. In these ways, policy efforts to diversify L.A.'s mixed market of schools will be conditioned by the political-economy of specific neighborhoods. Parents in the Palisdades, for instance, face a differing mix of schools than their peers in the Southeast Cities. We argue that it's the relational nature of *sets of schools* within a neighborhood, not only qualities of the student's original school, which contribute to the likelihood of exit.

Los Angeles Context

The families served by LAUSD have changed dramatically over the past half-century. In 1965 almost two-thirds of the district's students were (non-Latino) Whites, about one-sixth each were Black or Latino children. By 2006 almost three-fourths of the district's 700,000-plus students were of Latino origin, spread across 885 schools (Kerchner, Menefee-Libey, Mulfinger, and Clayton 2008). The city of Los Angeles now hosts a larger share of adults who have never finished high school (24 percent) than any other U.S. metropolis (Suro and Singer 2002). Unable to keep up with enrollment growth, over 100 LAUSD schools went to year-round, multi-track schedules by the late 1990s. Up to 20,000 students were bussed out of the central city to outlying areas to help relieve overcrowding in predominantly Latino schools (Colmenar et al. 2005).

Middle-class flight from traditional public schools, across ethnic groups, has spurred new transfer options and the spread of new types of schools, including magnet and charter

schools. By 2009 a vibrant mixed-market of organizations was thriving across the L.A. district: 173 magnet programs, 161 charter schools. Over 60,000 families, opting to avoid their assigned school while staying in a public school, win a coveted intra-district transfer seat each year. A majority of children now attend private schools in LAUSD's most affluent areas, mainly on the west side (Kerchner et al. 2008).

Research Questions

Initial research on student mobility focused on the influence of family attributes in shaping the likelihood of *exiting* a school. This line of work also has begun to identify the mediating mechanisms that may operate inside transient families and school organizations that lead to greater mobility. We advance this work theoretically by recognizing the evolving mixed-market of schools in the L.A. context; including ecological predictors of student mobility in addition to individual-level student and family factors and school and organizational factors. Empirically we continue the extension of the literature on student mobility by looking not only at which factors affect exit from the child's original school, but also which may help to account for what type of school the child then enters.

First, we examine student and family demographic variables including gender, ethnic membership, social-class background, nativity, and home language as well participation in specialized programs such as English language development, gifted and talented (GATE), or special education. Second, we look at how the individual student's position in the grade structure helps to account for the likelihood of exit. On the one hand, looking at these factors will test what we already know about how student and family factors impact mobility. On the other, they provide controls for our examination of organizational and ecological factors.

After looking at individual factors, we turn to effects of school type and quality on mobility. Do student exit rates differ by school type after accounting for student level attributes? Specifically, are students attending a charter, magnet, or newly built school more likely to exit, compared with their peers in regular schools? Overcrowded conditions, for example, may drive parents from these schools. Some L.A. schools still operate on multiple, year-round shifts, display larger class sizes, and remain disproportionately staffed by less experienced teachers (Fuller et al. 2009; Graves 2009). Are students more likely to exit when attending schools with weaker quality indicators, including overcrowded conditions, higher pupil-teacher ratios, higher teacher turnover rates, and larger shares of non-credentialed teachers?

Moving from school-level factors to neighborhood-level ecology enables us to examine the extent to which mobility is further shaped by the mix of schools within specific communities. Do neighborhood conditions contribute to student exit rates, including the wealth and ethnic features of residents within the school's census block group, residential stability, and levels of civic participation? Does proximity, say, to a charter or newly built school, or to a school with higher quality indicators, affect the likelihood of student exit?

Explaining Student Mobility Rates and Destinations

We begin by examining the extent to which differences in school type and quality and neighborhood ecologies may affect the likelihood that students *exit* a school (prior to the final grade level, *non-structural exit*), after taking into account student and family attributes. Next,

we examine how individual and organizational factors help to explain the likelihoods of *entering* particular types of schools. We see the push to diversify school organizations in many districts as shifting how we think about the desirability of mobility, and the decision to leave a regular public school is likely influenced by attractive alternatives, at least for those parents engaged in strategic mobility. These exit and entry decisions are further conditioned by the ecology or comparison of feasible alternatives seen by the parent or student.

METHODS

Analytic Strategy

Estimating the likelihood of exiting a school. To study individual- and organization-level predictors of student mobility, we built a person-period data set from LAUSD administrative records, including reports on most student and teacher variables for each of two semesters, between the 2002-03 and 2008-09 school years.

We estimate exit after each semester, given our focus on the likelihood that a student leaves a given school before the end of the grade cycle (non-structural exit). Hazard time is counted from the initial observation of a student at a given school until exit, and multiple spells are counted if the student experiences more than one non-structural exit between periods of structural exit (at the end of a school's grade cycle). Once a student undergoes structural exit the spell counter is reset, in part to minimize risk of bias associated with the left-censoring of student enrollment and possible moves.[2]

Estimating the likelihood of entering a charter, magnet, or newly built school. After identifying the factors that influence the risk of exiting a school, we aimed to understand what subset of factors help in predicting the types of schools to which students migrate. Sizeable shares of mobility may be linked to the parental strategy of finding a higher quality school, especially in L.A.'s diversifying mix of schools. So, the second-stage analysis involves building competing-risks models to identify individual- and organization-level factors that help in predicting migration to a charter, magnet, or newly built school.

School levels. LAUSD operates over 800 schools that reflect a variety of grade structures. We divided schools into primary, elementary, middle, secondary, and mixed categories based upon their lowest and highest grade level; we ran estimation models for students attending elementary, middle, or secondary school. Our typology identified two types of schools that were excluded: early education centers, including preschools that did have grades above kindergarten, and schools with grade ranges that spanned primary, elementary, middle, or secondary grade ranges. We also set aside students enrolled in regional occupational and adult education programs. Just over 90% of student-semester observations occurred within schools that operated traditional grades structures, as detailed in Appendix 1.[3]

LAUSD and Neighborhood Census Data

The universe of data for all LAUSD students, teachers, and schools included certain populations that were not relevant for our study, including students in mixed-grade schools and those attending regional occupational programs, as detailed above. In addition, charter schools were initially slow in providing basic data requested by LAUSD. So, our analysis disproportionately includes students attending conversion charter schools, that once operated

as a regular public schools prior to applying for an independent charter. If a student left the school district, or moved to a school that did not provide enrollment data to the district office, they were dropped from the data. Most start-up charters, not previously operating as a regular public school, did not report basic data during our period of study, 2002-2008.

Additional students were dropped if they displayed duplicate ID numbers, could not be matched to a school, or their reported grade level was outside the grade structure reported by their school. Finally, students who were held back or skipped grades at any point were dropped. After these exclusions, 74% of the available student-semesters remained in our working data set. After identifying all predictors for the hazard models, missing values for students over the time series were not uncommon. The usable observations in the final hazard models included 47% of the student-semesters in the original universe data, equaling 4.5 million observations over the 2002-2008 period.

LAUSD's administrative records are reported by school principals up to the district office. This data system yields demographic information on students and teachers, along with features of teachers' preparation and experience. At the secondary level, the data situate each student within each course taken and the teacher leading the course. Annual test score data are available for reading (in English) and mathematics, and for additional subjects at the secondary level. We merged demographic data from the 2000 census for each block group in which a school was located. This allowed us to test for relationships between neighborhood attributes and student mobility, placing kids and families in their immediate social ecologies. We coded the latitude and longitude of each school enabling us to test relationships related to distances to nearby schools and corresponding quality levels.

Variables

Student mobility outcomes. We first estimated the likelihood that a student exits their school prior to the end of the school's grade cycle. This can occur either mid-year or between consecutive school years over the 14 discrete semesters in the time series (fall and spring for each of seven school years). Yet because our dependent variable is the difference in school between t_0 and t_1, we have 13 possible observations for each student If the student moved to another LAUSD school, they remained in the sample, and we continued to track them over the remaining portion of the time-series. If a student reaches the spring semester of the highest grade at their school, the exit variable is right censored.[4] On the right hand side of the models we include eight groups of independent variables: time variables, demographic variables, bussing, school-types, school quality measures, neighborhood characteristics, district-wide variables, and local ecological variables.

Semesters and calendar time. In addition to the covariates representing the baseline hazard function, we incorporated additional variables related to time. We controlled on the fall semester (spring is the reference group), and whether or not the first period of a given spell takes place in the spring semester. The estimated coefficients reflect the descriptive patterns detailed below: most mobility occurs between years, not mid-year. We also control for calendar time, entering dummy variables for each school year after the first. For certain models we constrain the coefficients due to small cells and structural zeros.

Student demographics. A variety of demographic measures are available, including student gender, ethnicity, nativity, home language, classification as "limited English

proficient", eligibility for Title I compensatory education services and subsidized meals, and participation in a special education or GATE program.

Travel and bussing. Principals reported whether each student resided in the catchment area of the school, or whether the student had transferred into the school from the outside. This included students whose parents had voluntarily petitioned to transfer schools; students involuntary bussed out of overcrowded schools; and students who transferred under provisions of the No Child Left Behind law. We include dummy variables for students who attended non-assigned schools and students who were bussed involuntarily, testing whether these prior moves condition additional moves downstream. Where a student attends a school with a grade structure that differs from her neighborhood school, reaching the highest grade of their *neighborhood* school could encourage exit from their current school. To account for this, we include a dummy variable indicating if each student period is one in which that student reaches the end of their neighborhood school's grade structure.

Type of school organization. Given our focus on how institutional forms may affect mobility, we include the type of school in which each student was currently enrolled when estimating exit. We coded whether each student was enrolled in a newly built (opened from fall 2002, forward), charter, or magnet school. When estimating entry to one of these three types of schools, we include dummy variables indicating whether they exited from one of these three schools (regular LAUSD schools being the reference group for all models).

School quality. We coded whether the student was enrolled in one of two types of overcrowded school. The first type includes *previously overcrowded* schools that experienced enrollment relief after a new school was opened nearby since Phase 1 of LAUSD's construction program began in 2001. The second type includes *still overcrowded schools,* which had yet to benefit from a new campus during the 2002-2008 period.

Additional school-quality indicators include the school's enrollment size, the mean ratio of students to teachers and actual class sizes (secondary schools only, based on the course-level data), the percentage of teachers who were fully credentialed (not designated as 'temporary' or 'intern'), and the percentage of teachers who exited the student's school at the end of the prior year.[5] A companion paper led by Prof. Xiaoxia Newton examines factors associated with teacher turnover.

Neighborhood attributes and civic participation. We selected several variables at the block-group level from the 2000 census to describe neighborhood. These predictors include the ethnic composition of the block-group (percentages of major groups), median household income, and the share of census respondents who had moved within the past five years. Finally, we compiled voter turnout data on LAUSD or statewide school construction bonds, matching voting precincts to block-groups, and weighting the share of each block-group made up of multiple block groups.[6] This yielded a proxy for civic participation at the block-group level, that is, the share of registered voters who turned out to cast a ballot on school bond initiatives (earlier project reports detail voter behavior).

Shifting ecology of the district-wide mix of schools. We included in the estimation models the count of and enrollment in newly built and charter schools coming on line each year over the time-series (so called, time-varying covariates).[7] This illuminates how changes in the mix of organizations may contribute to mobility via widening options for parents and students.

Neighborhood-level ecology of school organizations. Along this conceptual line, we included the distance in miles between the school in which a student was currently enrolled and the nearest school that included the student's present grade level, as well as distance to the closest newly built school and charter school.[8]

Modeling Student Exit

We estimated the likelihood of exit through two related modeling strategies. First, we estimated the likelihood of student exit with a discrete-time hazard function over the full time series, including time-invariant and time-varying covariates. The first between-year exit in our time-series could occur between 2002-03 and 2003-04; the final between-year exit could occur between 2007-08 and 2008-09. Each student was tracked over the full time-series, provided that they did not graduate, drop out of school, or leave LAUSD. The model is:

$$logit\ h(m_{itpsn}) = \{[+\alpha_1 T_1 + \ldots + \alpha_T T_T] + [\gamma_2 Y_2 + \ldots + \gamma_Y Y_Y] + \theta F_{it} + \delta S_p\} + \sum_{a=1}^{a} \beta_a I_{aitp} + \sum_{b=1}^{b} \beta_a B_{bitp} + \sum_{c=1}^{c} \beta_c S_{citp} + \sum_{d=1}^{d} \beta_d Q_{ditps} + \sum_{e=1}^{e} \beta_e N_{eitpn} + \sum_{f=1}^{f} \beta_f X_{fitp} + \sum_{g=1}^{g} \beta_g D_{gitps} + \varepsilon_{it}$$

Where m_{itpsn} is a binary variable representing nonstructural exit for student *i* at time *t* in spell *p* from school *s* in neighborhood *n*. Our model begins with time dummies $T_{1\ldots T}$ representing each period of survival time to failure. We add calendar time dummies $Y_{2\ldots Y}$ and a time varying dummy for fall semesters F_{it} as well as a spell-varying dummy indicating the season the spell began S_p. We then add sets of covariates in groups with I_{aitp} representing individual level variable *a*, B_{bitp} representing bussing variable *b*, S_{citp} representing school-type variable *c*, Q_{ditps} representing school quality variable *d*, N_{eitpn} representing neighborhood variable *e*, X_{fitp} representing district wide count variable *f*, and D_{gitps} representing local ecological variable *g*.

Second, when estimating the likelihood of *entering* a newly built, charter, or magnet schools, we extended this discrete-time hazard model into a discrete-time competing risks model. While looking at nonstructural exit alone is highly informative, when students and families actually decide to leave a particular school, we assume they do so with a destination in mind. That is, they consider the organizational ecology within a community or region within which they make choices among possible schools. By extending the model in this way, we are able to examine not only the factors contributing to nonstructural exit, but also how these factors influence the destination that may prompt exit.

Under this extension, the basic structure of the model above remains the same with the left hand side of the equation transformed from m_{itpsn} representing a binary exit/non-exit variable to a polytomous variable representing non-exit or nonstructural exit to one of 4 the mutually exclusive categories outlined above, and $logit\ h(m_{itpsn})$ is transformed into $\log\left(\frac{R_{itpsn}=m}{R_{itpsn}=0}\right)$ or the log odd of exiting into one of the four response categories *m* versus the base category 0 representing no exit.

Finally, our data set involves left censoring through "delayed entry", as described above. To check whether left-censoring may affect the robustness quality of our models, we run

duplicate models at each school level including only students who attend the lowest grade of their school, or who are observed moving into a school, eliminating left-censored cases. We report hazard models for elementary and secondary school students only; models for middle-school students are available from the authors upon request

FINDINGS

Descriptive Patterns

Let's first visualize key elements of the geographically large Los Angeles school district, along with locations of new schools and where overcrowding has persisted since the early 1990s. Figure 1 displays the location of all schools, including newly built campuses opened between 2002 and 2008, as well as older facilities. LAUSD's school construction program has been progressively targeted on relieving overcrowded, largely in low-income Latino neighborhoods. We see that most new schools opening in the heavily Latino northern section of the San Fernando Valley, the downtown area (largely the Pico-Union District), and south of downtown, including South Central (previously called Watts), and the Southeast Cities area, stretching south from downtown.

The school construction program has included few new schools in predominantly African American sections of the South Central area, where overcrowding has been less severe than rapidly growing Latino communities. Black migration out of South Central began in the 1980s, perhaps hurried by the so-called Rodney King riots in 1992. As early as 1990, the share of residents in South Central of African-American origin had fallen to just under half (Bobo, Oliver, Johnson, and Valenzuela 2000; Vargas 2006). This may influence the mobility of students from African American families.

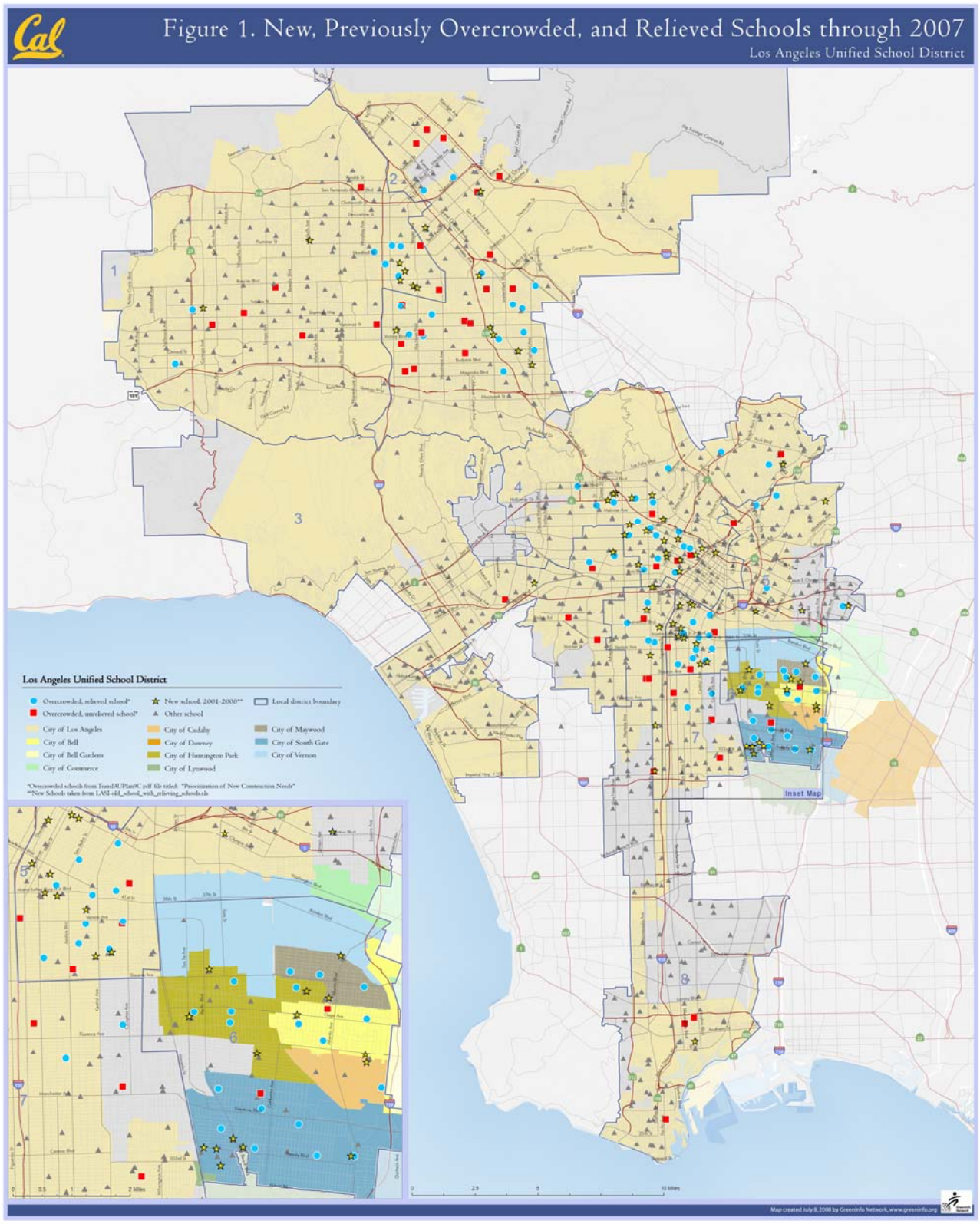

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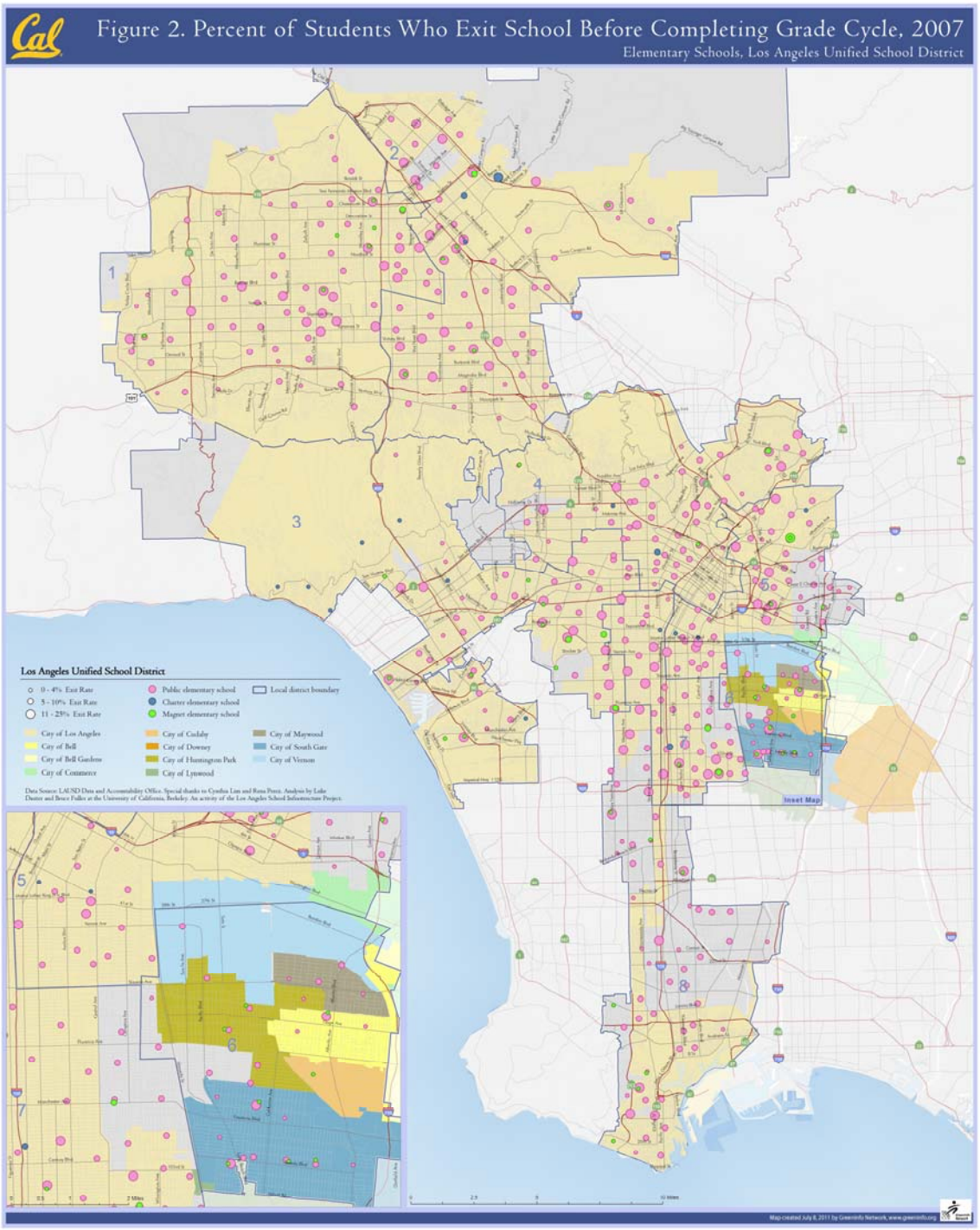
Figure 2 shows a snapshot of the geographic distribution of student mobility out of elementary schools. Looking at the map, a few things become clear. First, while there are far fewer magnet and charter schools than regular public schools, these schools have lower student mobility than their regular counterparts. Geographically speaking, it looks as though by 2007, schools that had seen relief had less mobility than those in areas still suffering from overcrowding.



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Rates of student exit/mobility. We begin with a basic description of student exit rates for elementary, middle, and secondary school students. The periods when students are most at-risk of exiting is related to the grade structure of the school. Overall, the proportion of students experiencing non-structural exit in any given period is less than 5%. This rate,

however, ranges higher in the first semesters after a student begins a new school, compared with later periods of attending the same schools.

Table 1: Student movement over survival time

	Elementary						Middle						Secondary					
Period	Non-structural move		Structural move		Stay		Non-structural move		Structural move		Stay		Non-structural move		Structural move		Stay	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Period 1	31,062	4.3%	34,241	4.7%	659,135	91.0%	7,248	2.0%	3,467	1.0%	351,708	97.0%	5,732	1.8%	437	0.1%	316,174	98.1%
Period 2	40,141	7.2%	15,302	2.7%	504,882	90.1%	14,173	4.9%	32,811	11.4%	241,810	83.7%	11,738	4.8%	27,687	11.4%	204,008	83.8%
Period 3	16,611	3.5%	36,773	7.7%	425,272	88.8%	2,968	1.3%	2,327	1.0%	228,536	97.7%	1,681	0.9%	1,244	0.6%	191,856	98.5%
Period 4	17,175	4.8%	14,032	3.9%	328,193	91.3%	7,023	3.9%	29,455	16.3%	144,500	79.8%	4,659	3.0%	24,629	15.9%	125,391	81.1%
Period 5	10,554	3.4%	36,796	11.8%	263,410	84.8%	1,151	0.8%	1,549	1.1%	138,524	98.1%	672	0.6%	894	0.7%	119,872	98.7%
Period 6	7,969	3.7%	9,362	4.4%	196,079	91.9%	-	0.0%	90,770	100.0%	-	0.0%	1,347	1.4%	22,528	23.6%	71,736	75.0%
Period 7	4,593	2.5%	29,405	15.9%	150,767	81.6%	.	.	.	.	.	.	137	0.2%	808	1.2%	68,982	98.6%
Period 8	3,283	2.9%	4,884	4.2%	106,875	92.9%	.	.	.	.	.	.	-	0.0%	51,179	100.0%	-	0.0%
Period 9	1,267	1.3%	23,083	23.1%	75,692	75.7%	.	.	.	.	.	.	.	.	.	.	.	.
Period 10	898	1.8%	3,282	6.5%	46,123	91.7%	.	.	.	.	.	.	.	.	.	.	.	.
Period 11	309	0.7%	17,064	40.8%	24,426	58.4%	.	.	.	.	.	.	.	.	.	.	.	.
Period 12	9	0.2%	-	0.0%	5,065	99.8%	.	.	.	.	.	.	.	.	.	.	.	.

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Student attributes. Table 2 reports descriptive characteristics of the student sample in 2007-08, the second to last year of the time-series. This year provides the most recent picture, while allowing us to report between-year changes for some variables. We see the predominance of Latino families and children in LAUSD schools, representing about three-fourths of all elementary and middle-school students, and 70% of secondary school students. Less than one-tenth of all students were Black; less than one-tenth were White. The foreign-born student population ranges from 9% of elementary school students to 17% of secondary students. About 34% of elementary students indicated that their home language is English, compared with just 28% of secondary school students.

About 40% of elementary students were officially designated at limited English proficient, compared with 18% of secondary students. Just 8% of elementary students were enrolled in a GATE program, rising to 17% of secondary students. Special education students made up about 7% of elementary and secondary students. Fully 85% of elementary students were eligible for Title I services, declining to 70% when considering secondary students. Subsidized meals are available to about three-fourths of students at each level.

About 18% of elementary students attended a school other than their assigned neighborhood school. This proportion climbs across grade levels to involve about one-third of all secondary students. This is partially explained by about 9% attending a charter or magnet school. (LAUSD considers students attending conversion charters to be attending their assigned school, if residing in the catchment area.) Additional shares participated in cross-town transfer programs within the district, or were bussed to a less crowded school (involuntary transfer). Fully one-fifth of all students attended a previously overcrowded school that had seen enrollment relief, with a newly built school opening nearby. Another one-tenth attended an overcrowded school that had yet to see relief.

Table 2: Demographics of LAUSD student body (Spring 2008)

	Variables	Elementary N	Elementary %	Middle N	Middle %	Secondary N	Secondary %
Student Demographics	*Female*	94,878	37.2%	56,498	48.4%	51,097	51.8%
	Hispanic	189,431	74.3%	87,926	75.3%	68,735	69.6%
	Black	24,235	9.5%	10,459	9.0%	10,171	10.3%
	White	23,955	9.4%	9,916	8.5%	10,504	10.6%
	Asian	10,267	4.0%	4,814	4.1%	5,473	5.5%
	Other	7,209	2.8%	3,618	3.1%	3,835	3.9%
	Foreign born	24,805	9.7%	16,927	14.5%	16,918	17.1%
	Speaks English at home	85,968	33.7%	30,774	26.4%	27,827	28.2%
Student Program Participation	*Limited English proficiency*	104,307	40.9%	30,794	26.4%	17,342	17.6%
	GATE	20,156	7.9%	20,079	17.2%	17,000	17.2%
	Special education	19,365	7.6%	11,943	10.2%	6,935	7.0%
	Title I student	217,413	85.2%	50,684	43.4%	69,396	70.3%
	Meal assistance	188,937	74.1%	91,095	78.0%	71,321	72.2%
Travel	*Non-neighborhood school*	46,257	18.1%	26,656	22.8%	32,275	32.7%
	Bussing program	14,264	5.6%	14,086	12.1%	18,305	18.5%
	Involuntary bussing	250	0.1%	540	0.5%	861	0.9%
	Residental structural change	33,309	13.1%	33,210	28.4%	20,380	20.6%
School Types	*Magnet*	5,382	2.1%	0	0.0%	3,581	3.6%
	Charter	8,352	3.3%	1,874	1.6%	3,549	3.6%
	New school	10,352	4.1%	5,378	4.6%	11,058	11.2%
	Regular schools	231,011	90.6%	109,481	93.8%	80,530	81.6%
School Quality	*Previously overcrowded*	42,116	16.5%	16,692	14.3%	29,116	29.5%
	Still overcrowded	19,295	7.6%	14,852	12.7%	11,417	11.6%

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School switching. Table 3 shows the attributes of those non-structural movers broken down by movement out and movement in by type of school. The left half of Table 3 breaks down students who exited a school of each type by pupils' demographic characteristics. The right half of the table does the same for those entering schools of each type after a non-

structural exit. The rows labeled 'School Types' display qualities of the school that students moved to on the left half of the table, and the qualities of the schools these students are moving from on the right half of the table.

Table 3: Characteristics of students exiting and entering between Spring 2007 and Fall 2008 by school type

		Movers out								Movers in							
		New		Magnet		Charter		Regular schools		New		Magnet		Charter		Regular schools	
	Variables	Elem	Sec	Elem	Sec	Elem	Sec	Elem	Sec	Elem	Sec	Elem	Sec	Elem	Sec	Elem	Sec
Student Demographics	*Female*	34.5%	47.2%	28.7%	52.9%	36.6%	50.7%	30.5%	51.1%	23.2%	45.1%	28.7%	70.0%	33.5%	48.3%	31.4%	50.8%
	Hispanic	84.2%	83.6%	24.0%	29.4%	72.8%	47.8%	71.8%	63.7%	87.9%	87.6%	47.2%	75.0%	69.1%	56.9%	72.7%	63.5%
	Black	5.5%	7.1%	49.6%	50.0%	10.6%	39.1%	13.8%	17.8%	3.9%	8.8%	16.9%	15.0%	14.1%	20.7%	14.2%	18.2%
	White	2.1%	4.0%	13.2%	14.7%	10.6%	10.1%	7.9%	9.7%	3.6%	2.1%	20.0%	5.0%	11.4%	6.9%	7.0%	9.7%
	Asian	6.3%	0.9%	4.7%	2.9%	2.8%	1.4%	3.4%	5.2%	2.7%	0.0%	9.3%	5.0%	3.8%	13.8%	3.1%	4.6%
	Other	.	4.3%	8.5%	2.9%	3.3%	1.4%	3.1%	3.6%	1.9%	1.6%	6.7%	0.0%	1.6%	1.7%	3.0%	3.9%
	Speaks English at home	22.8%	22.2%	78.3%	55.9%	37.8%	53.6%	39.4%	33.9%	20.2%	15.0%	57.9%	27.5%	43.8%	34.5%	38.9%	35.0%
Student Program Participation	*GATE*	.	11.4%	10.1%	11.8%	3.7%	13.0%	4.5%	13.3%	1.0%	7.8%	11.2%	15.0%	7.0%	8.6%	4.1%	13.6%
	Special education	12.4%	9.3%	10.1%	8.8%	4.5%	5.8%	9.9%	7.5%	8.4%	9.8%	3.8%	5.0%	4.4%	8.6%	10.7%	7.5%
	Title I student	94.6%	86.1%	88.4%	58.8%	66.7%	33.3%	83.6%	70.7%	68.1%	75.6%	80.8%	67.5%	75.9%	70.7%	85.6%	71.3%
School Types	*Non-neighborhood school*	28.5%	42.9%	71.3%	97.1%	41.5%	52.2%	29.0%	37.8%	47.1%	32.6%	29.6%	35.0%	27.7%	50.0%	28.2%	40.3%
	New school	7.2%	7.4%	0.8%	0.0%	4.9%	2.9%	6.4%	8.9%	4.4%	12.4%	2.3%	30.0%	4.8%	8.6%	4.0%	14.0%
	Magnet	3.7%	3.7%	6.2%	0.0%	6.9%	0.0%	6.4%	1.5%	0.1%	0.0%	0.7%	0.0%	1.2%	1.7%	0.8%	1.6%
	Charter	3.6%	1.5%	4.7%	2.9%	9.8%	5.8%	2.8%	2.5%	1.1%	1.0%	1.6%	0.0%	4.8%	6.9%	1.3%	3.1%
	Regular schools	85.5%	87.3%	88.4%	97.1%	78.5%	91.3%	84.4%	87.1%	94.4%	86.5%	95.4%	70.0%	89.2%	82.8%	93.9%	81.3%

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Even as the overall diversity in the school district grew over the course of the 2000s, the non-structural exit rates remained relatively steady. School year to school year rates ranged from 7% to 10% over the time period studied. As expected, within school year mobility rates were much lower ranging from 1% to 2% over the period.

Simple hazard rates for school subgroups. Let's examine how the likelihood of student exit varies depending on the type of school in which students are enrolled across survival and calendar time. Figure 2 shows the hazard of exit by grade level over survival time and calendar time (not taking into account student attributes or other covariates). The saw-tooth pattern of the graph over survival time stems from the much lower exit rates in fall semesters. This graph makes it apparent that, regardless of grade level, the hazard of exit is far higher earlier on in the risk period. The graph over calendar time shows that hazard rates are generally higher for elementary schools over calendar time, but these rates change little over the time period in question.

Figure 3: Empirical hazard rates by grade level over survival time and calendar time

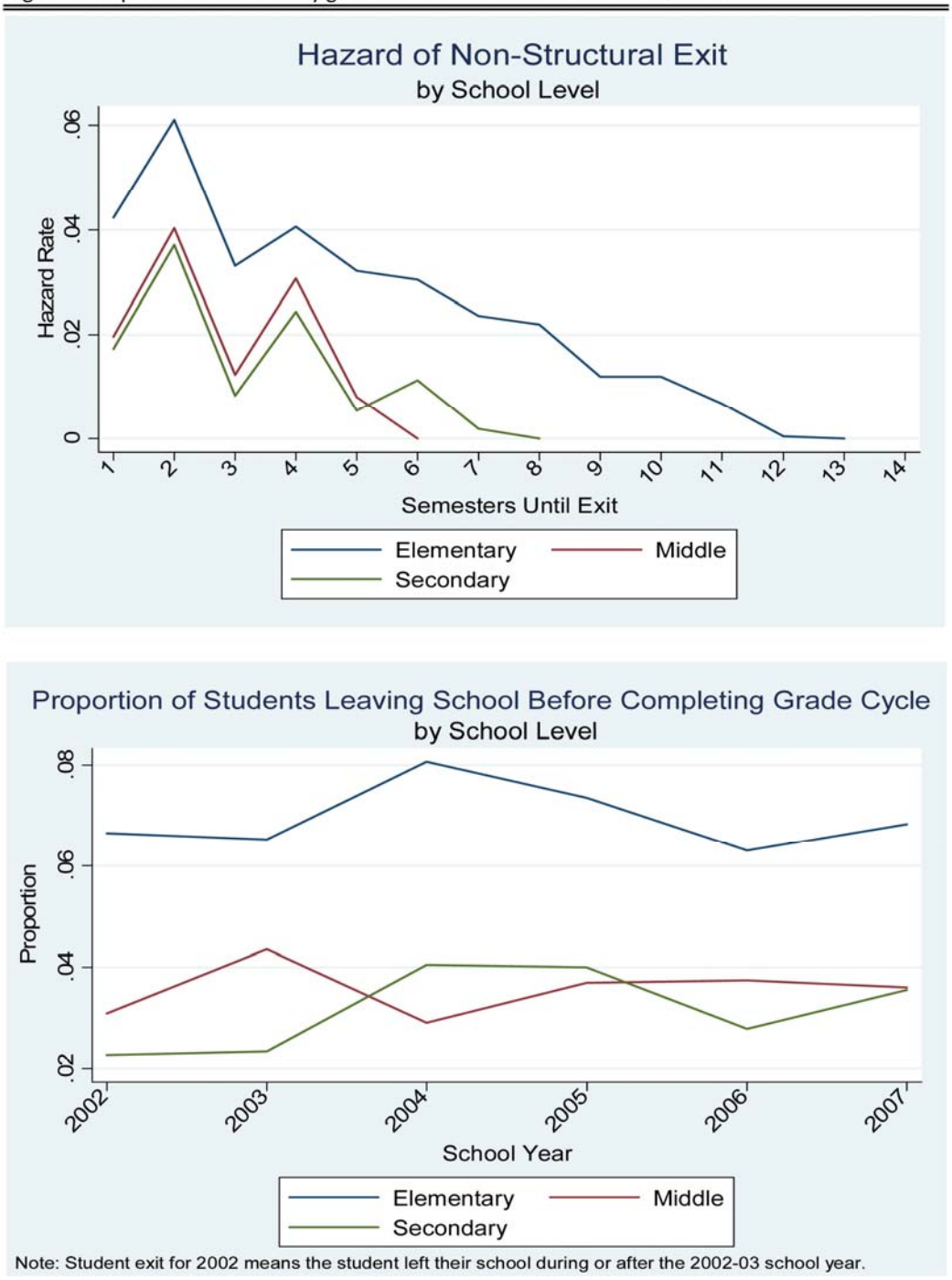

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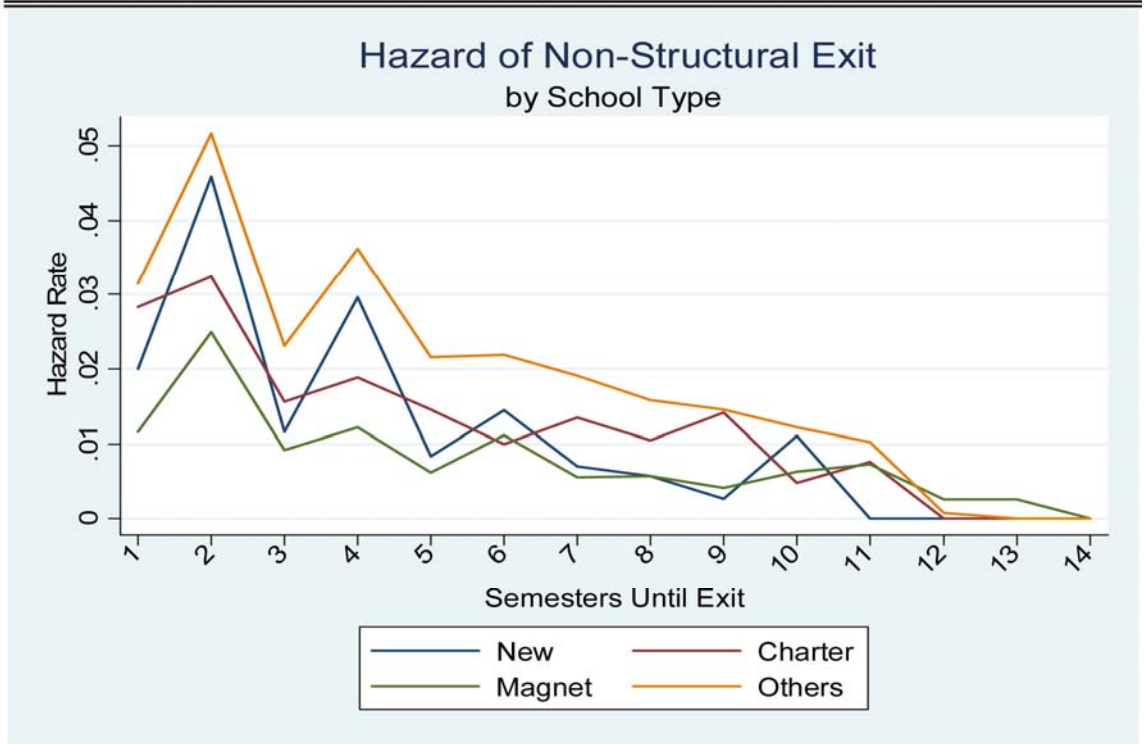
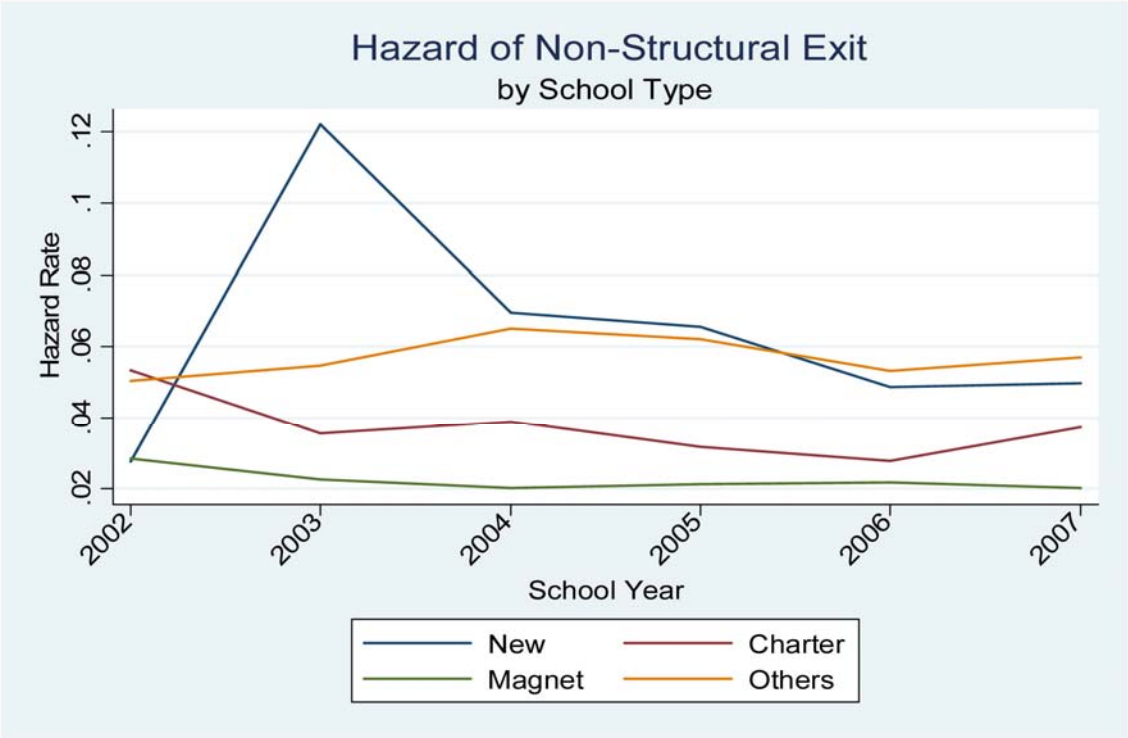
Figure 3 compares exit rates for newly built, charter, magnet schools, and regular (all other) LAUSD schools. Generally, we can see that exit rates tend to be lower across survival time for students attending the first three types, compared with regular schools (with no covariates). Over calendar time we see that newly built and regular schools display a higher

steady state hazard than charters or magnets, that is, students in the former two types of schools were more likely to exit than peers attending latter two types.

Figure 4: Empirical hazard rates by school type over survival time and calendar time





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School quality and neighborhood characteristics. Table 4 shows means and standard deviations for continuous independent variables. Differences appear among the four school types. Newly built elementary schools, for instance, show lower mean enrollment levels than charter, magnet or other regular school counterparts. But moving up to secondary schools, we see that charters and magnets have the lowest mean enrollments. Elementary class sizes are steady at about 22 across the types, but we see differences at the secondary level with magnet schools exhibiting the lowest class sizes, averaging 24 students, and newly built schools exhibiting the highest at 30. The primary difference in the proportion of fully credentialed teachers is between charter schools and others with charters having a much lower percentage.

Table 4: School and neighborhood chararcteristics (Spring 2008)

Variable	School Type	Elementary			Middle			Secondary		
		Mean	SD	N	Mean	SD	N	Mean	SD	N
Enrollment	New school	645	134	19	1,618	421	4	1,020	1,017	18
	Magnet	670	240	9	.	.	.	1,159	555	4
	Charter	575	413	17	1,028	930	2	1,128	1,059	5
	Regular schools	648	318	425	1,161	796	111	989	1,243	139
Class size	New school	21	4	19	31	1	4	25	11	18
	Magnet	21	4	9	.	.	.	30	8	4
	Charter	20	3	16	24	8	2	25	8	5
	Regular schools	22	5	424	27	6	111	17	11	138
Teachers fully credentialled (%)	New school	98.3%	2.8%	19	82.1%	5.5%	4	81.9%	9.0%	17
	Magnet	97.6%	3.3%	9	.	.	.	87.0%	5.4%	4
	Charter	90.7%	16.1%	17	92.9%	0.0%	2	80.2%	9.5%	5
	Regular schools	97.4%	3.1%	425	87.8%	6.3%	111	87.7%	9.8%	139
Teachers Leaving (%)	New school	15.5%	8.0%	19	16.5%	5.4%	3	18.3%	13.1%	16
	Magnet	14.7%	6.1%	9	.	.	.	14.7%	7.8%	4
	Charter	19.0%	16.0%	17	13.0%	0.0%	2	26.8%	33.6%	5
	Regular schools	15.2%	6.5%	425	16.8%	6.1%	111	16.0%	8.8%	139
Distance to next nearest school	New school	0.38	0.18	19	0.65	0.28	4	0.38	0.41	18
	Magnet	0.79	0.10	9	.	.	.	0.68	0.55	4
	Charter	0.76	0.55	17	0.19	0.00	2	0.28	0.45	5
	Regular schools	0.57	0.34	425	0.57	0.95	111	0.15	0.24	139
Enrollment of next nearest school	New school	878	313	19	730	886	4	1,058	1,350	18
	Magnet	442	166	9	.	.	.	1,027	1,661	4
	Charter	633	456	17	1,028	0	2	1,129	1,207	5
	Regular schools	612	376	425	981	823	111	1,183	1,254	139
Median household income	New school	$ 62,417	$ 33,894	19	$ 54,870	$ 26,728	4	$ 52,493	$ 30,202	18
	Magnet	$ 39,384	$ 18,682	9	.	.	.	$ 45,445	$ 2,159	4
	Charter	$ 50,781	$ 27,932	17	$ 50,433	$ -	2	$ 49,043	$ 12,772	5
	Regular schools	$ 45,476	$ 23,297	425	$ 46,627	$ 24,972	111	$ 45,472	$ 21,385	139
Population Latino (%)	New school	31.0%	27.6%	19	43.2%	35.5%	4	38.6%	30.6%	18
	Magnet	54.8%	34.0%	9	.	.	.	38.2%	19.0%	4
	Charter	34.9%	22.4%	17	47.6%	0.0%	2	41.0%	23.8%	5
	Regular schools	44.0%	28.0%	425	43.9%	28.3%	111	46.3%	28.6%	136
Population Black (%)	New school	3.1%	1.6%	19	2.4%	0.9%	4	3.0%	1.8%	18
	Magnet	2.6%	1.6%	9	.	.	.	2.6%	1.6%	4
	Charter	2.7%	1.7%	17	2.5%	0.0%	2	3.9%	2.3%	5
	Regular schools	3.7%	3.0%	425	3.4%	3.2%	111	3.9%	3.9%	136

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Hazard-rate Model Results for Student Exit

*Estimating odds of exit by **elementary school pupils***. Table 5 reports multivariate estimates of the likelihood that elementary students exited their school before reaching their school's final grade (non-structural exit, as before). After controlling for period, semester, and calendar time (covariates are not shown), the eight sets of variables are entered in blocks beginning with student attributes and ending with descriptors of the local ecology. For the sake of brevity, coefficients for controls are not shown but confirm the descriptive patterns detailed above. We see that female students were slightly less likely to exit than male students.

In the final model, the odds that Black students exited were 40% greater than for Latinos (the reference group). The odds of White students exiting were lower than the odds for Latinos before controlling for school level variables, and about 8% higher after controlling for school type and quality, although this declines when later variables are entered.

Students who speak English at home were more likely to exit than those that did not with odds ranging from 14% greater to 18% greater as covariates are added. Conversely, foreign-born students were also more likely to exit with rates ranging from 25% greater in the initial model to 34% greater in the final model. Though these two results are seemingly at odds, it's possible they are the result of two different types of movement with English speakers better able to navigate the public school system and exercise choice and foreign-born students more likely to be reactively mobile.

Title I students appear to exit at higher rates, although this effect disappears after adding covariates measuring counts of new and charter schools over time. On the other hand, students qualifying for lunch subsidies were not significantly more or less likely to exit until counts of and enrollment in charters and new schools are controlled for, after which the model shows these students are 5% more likely to exit. Students receiving special education services tended to exit at a somewhat higher rate: odds are 39% higher in the initial model and fall to 16% higher after more covariates are added. Ultimately, these findings suggest that mobility is not simply a function of a particular social class but rather that, in an urban setting like L.A., both advantaged and less advantaged groups are at risk of mobility.

Model 2 includes predictors related to a student's recent experience of traveling outside their assigned catchment area. These covariates show some interesting effects on student exit. Students attending a non-neighborhood school are about twice as likely to exit their school, and students being bussed *involuntarily* out of an overcrowded school were about three times as likely to exit their school (often moving to a newly built school). On the other hand, students who were being *voluntarily* bussed outside the catchment area were about 70% *less likely* to exit, showing strong family loyalty to their chosen school.

Model 3 reports associations for the types of schools attended by students. We see that the odds of exit are much lower for students who attended school other than traditional public schools. Students attending magnet schools were 68% less likely to exit, and students attending affiliated charter schools were 70% to 80% less likely to exit after controlling for student characteristics. Independent conversion charters also slowed exit, about 40% lower than peer in regular LAUSD schools. The most common type of charter – independent start-ups – also displayed lower exit rates, about 20%) lower.[9] Students in overcrowded schools or previously overcrowded schools which have seen some relief since new school construction are almost 30% more likely to exit.

School quality indicators are entered in Model 4, showing significant association with exit likelihoods. The odds of exit are much greater for students attending schools with higher rates of teacher turnover (5% greater for each 1% increase in turnover rate). This may be partially associated with the opening of newly built schools, although covariates control on the count of such schools each year. On the other hand, students in schools with a higher proportion of credentialed teachers also have higher exit likelihoods. The odds of exit are also lower in schools with higher class sizes. It may be that the mix or ecology of school

options is more constrained in neighborhoods with lower quality schools, slowing student exit. Similarly, students in classes with higher student teacher ratios show lower exit odds.

Table 5: Elementaryschool discrete time hazard estimates for non-strutural exit

	Independent Variables	Model 1 or/se	Model 2 or/se	Model 3 or/se	Model 4 or/se	Model 5 or/se	Model 6 or/se	Model 7 or/se	Model 8 or/se
Student Demographics and Program Participation	*Female*	0.974***	0.972***	0.972***	0.973***	0.973***	0.973***	0.973***	0.977*
		0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.009
	Black	1.280***	1.299***	1.378***	1.388***	1.392***	1.407***	1.405***	1.405***
		0.018	0.019	0.02	0.02	0.02	0.021	0.021	0.026
	White	0.984	0.962*	1.02	1.080***	1.066***	1.086***	1.098***	1.059*
		0.017	0.017	0.018	0.02	0.019	0.02	0.02	0.025
	Asian	1.044*	1.044*	1.068**	1.091***	1.060**	1.073**	1.068**	1.085**
		0.021	0.022	0.023	0.023	0.023	0.023	0.023	0.031
	Other	1.046*	1.063**	1.079***	1.124***	1.121***	1.128***	1.130***	1.130***
		0.023	0.024	0.024	0.025	0.025	0.026	0.026	0.034
	Foreign born	1.255***	1.257***	1.251***	1.259***	1.257***	1.287***	1.287***	1.337***
		0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.021
	Speaks English at home	1.137***	1.103***	1.142***	1.150***	1.151***	1.157***	1.158***	1.175***
		0.014	0.014	0.014	0.014	0.014	0.015	0.015	0.018
	Title I student	1.168***	1.149***	1.081***	1.051*	1.055**	1.032	1.029	1.044
		0.023	0.023	0.022	0.021	0.021	0.021	0.021	0.027
	Meal assistance	0.995	1.004	0.989	0.987	0.988	1.043***	1.043***	1.084***
		0.009	0.01	0.009	0.009	0.009	0.01	0.01	0.014
	Limited English proficiency	1.021*	1.027**	1.006	0.981	0.980*	0.982	0.981	0.996
		0.01	0.011	0.01	0.01	0.01	0.01	0.01	0.013
	GATE	0.881***	0.930***	0.920***	0.958*	0.952*	0.982	0.983	1.008
		0.018	0.019	0.019	0.02	0.02	0.02	0.02	0.028
	Special education	1.389***	1.262***	1.263***	1.193***	1.190***	1.164***	1.162***	1.219***
		0.017	0.015	0.015	0.015	0.015	0.015	0.015	0.02
Bussing and Travel	*Attends non-neighborhood schoo*		1.980***	2.086***	2.138***	2.137***	2.106***	2.108***	2.079***
			0.02	0.021	0.022	0.022	0.021	0.021	0.027
	Bussing		0.298***	0.401***	0.429***	0.422***	0.424***	0.430***	0.341***
			0.007	0.01	0.016	0.016	0.016	0.016	0.017
	Involuntary bussing		3.322***	2.722***	2.704***	2.765***	2.842***	2.810***	3.515***
			0.149	0.126	0.143	0.147	0.151	0.15	0.292
	Restidential structural move		1.321***	1.158**	1.174**	1.158**	1.182**	1.187**	1.152
			0.073	0.065	0.066	0.065	0.067	0.067	0.083
School Types	*Magnet*			0.425***	0.390***	0.402***	0.421***	0.420***	0.533***
				0.021	0.022	0.023	0.024	0.024	0.036
	Charter - affilliated conversion			0.261***	0.274***	0.287***	0.313***	0.320***	0.211***
				0.059	0.062	0.065	0.071	0.073	0.076
	Charter - affilliated start-up			0.207***	0.202***	0.208***	0.227***	0.222***	0.246***
				0.032	0.031	0.032	0.035	0.034	0.041
	Charter - independent conversion			0.640***	0.640***	0.623***	0.633***	0.627***	0.589***
				0.023	0.023	0.023	0.023	0.023	0.027
	Charter - independent start-up			0.794***	0.925	0.953	1.034	1.014	0.897
				0.048	0.056	0.058	0.063	0.062	0.095
	Prevously overcrowded			1.517***	1.261***	1.283***	1.293***	1.293***	1.272***
				0.013	0.013	0.014	0.014	0.015	0.018
	Still overcrowded			1.377***	1.265***	1.264***	1.269***	1.270***	1.309***
				0.018	0.016	0.016	0.016	0.017	0.021
	New school			0.97	1.037	1.042	1.095**	1.075*	1.098**
				0.028	0.03	0.03	0.032	0.032	0.035
School Quality	*Class size*				0.983***	0.983***	0.974***	0.974***	0.979***
					0.001	0.001	0.001	0.001	0.001
	Enrollment at school				1.000***	1.000***	1.000***	1.000***	1.000***
					0	0	0	0	0
	Student teacher ratio				0.989***	0.985***	0.982***	0.987***	0.976***
					0.002	0.002	0.002	0.002	0.003
	Fully credentialed teachers (%)				1.103***	1.097***	1.078***	1.082***	1.042***
					0.007	0.007	0.007	0.007	0.009
	Teacher turnover lag (%)				1.042***	1.043***	1.044***	1.042***	1.055***
					0.004	0.004	0.004	0.004	0.006
oods	*% Hispanic*					0.950**	0.946***	0.938***	0.913***
						0.015	0.015	0.015	0.019
	% White					0.923***	0.917***	0.907***	0.879***
						0.016	0.016	0.016	0.019
	% Black					1.013**	1.011*	1.013**	1.009
						0.005	0.005	0.005	0.006

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Model 5 includes community attributes from the block-group data. Students in school located in neighborhoods with higher proportions of black residents show higher exit odds; while those in schools located in neighborhoods with higher proportions of Hispanic, white or Asian residents. Income has no discernable impact; although surprisingly, exit odds are lower in block-groups with greater residential stability.

Ecological factors appear to be at play as the mix of school institutions evolves over time. We see that the count of newly built schools, not surprisingly, is related to higher odds of exit. Model 7 includes ecological factors related to mix of schools variably proximal to students and families. Distance between the student's current school and the nearest school is associated with about 8% lower odds of exit per mile. While measuring distance in this way works well when considering distance to the nearest school. Distance to the nearest charter schools raises the odds of exit, but only by 1% per mile on average.

Finally, Model 8 reports the full model but only for the group of cases (student-spells) not contaminated by delayed entry into a period at risk (left censored). A case is identified as being characterized by delayed entry if the first observation of the case does not follow school movement of any kind, and the grade of the student at that time is greater than the minimum grade at their school. In these cases, we don't know the true time at risk at the first observation. Excluding these cases resulted in a very similar set of estimated coefficients to the models, which include them.

Identical estimation models were run for middle-school students. For brevity these results are not detailed here, but are available from the authors. The patterns were quite similar to the elementary student results with a few exceptions. Black students were still more likely to exit than Latino ones (again the reference group), but White middle-schoolers were 16% less likely to exit, and Asian as well as students of other ethnicities were less likely to leave. Students in special education are also slightly less likely to exit in the middle school models, the opposite of the results shown in the elementary school models.

Odds were a bit more sensitive to school quality indicators: middle-schoolers were about 5% more likely to exit for each increment in the student-teacher ratio, and students in middle schools with more fully credentialed teachers were less likely exit. The neighborhood covariates also showed patterns similar to the elementary school models with the exception that greater civic participation (voter turnout for school bonds) was associated with lower odds of student exit. Middle school students also appeared to be more sensitive to ecological factors. Odds of exit were about 16% greater per increment of distance to the nearest newly built school, and 11% greater for distance to the closest charter school.

*Estimating odds of exit by **secondary school pupils***. Results for the same estimation models, run for secondary students, appear in Table 6. We see that the odds of exit for Black students were 70% greater, compared with Latinos (reference group, Model 1); although this drops to about 50% greater as covariates are added. White and Asian students were about 20% less likely to exit with the effect declining to about 10% as covariates are added. After taking into account these ethnic effects, foreign-born students and those categorized as limited English proficient were more likely to move. Similar to findings for elementary school students, speaking English at home increased the odds of exit, as did Title I assistance.

Students in the gifted program were less likely to leave, but in contrast to the elementary school models, special education students are less likely to move.

Similar to elementary students, those secondary students who were involuntarily bussed out of overcrowded schools, along with others attending a non-neighborhood school, were more likely to exit at year's end. But again, we see that students who were involuntarily bussed were less likely to move (Model 2).

Students in overcrowded schools as well as those in overcrowded school that have seen enrollment relief show higher odds of exit, but in contrast to the elementary school models, students attending newly built schools showed much lower odds of exiting their schools (32% less), compared with students attending regular facilities (Model 3). Magnet school students displayed 60% lower odds of exit; although this effect disappears as covariates are added.

School quality indicators for secondary students show similar relationships to exit as we saw for elementary pupils. Counter-intuitively, higher class sizes and higher student-teacher ratios result in lowered odds of exit. On the other hand, the odds of exit were about 22% lower for each increment in the indicator of fully-credentialed teachers, and about 11% greater for each increment of teacher turnover.

Secondary students or their parents appear to be more responsive to shifts in the mix of available schools, relative to elementary students. For instance, we see in Model 6 that the odds of exit are 5% greater for each newly built school that opened in a given year, on average. And odds of exit ratchet-up 12% for each additional charter school that opened district wide. In addition, local ecological factors are significant with the odds of exit decreasing by about 25% for each mile between the student's current school and the next nearest school offering the students grade.

Table 6: Secondary school discrete time hazard estimates for non-strutural exit

	Independent Variables	Model 1 or/se	Model 2 or/se	Model 3 or/se	Model 4 or/se	Model 5 or/se	Model 6 or/se	Model 7 or/se	Model 8 or/se
Student Demographics and Program Participation	*Female*	0.928***	0.927***	0.936***	0.933***	0.933***	0.933***	0.932***	0.943***
		0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.014
	Black	1.703***	1.577***	1.658***	1.466***	1.499***	1.498***	1.483***	1.499***
		0.045	0.042	0.045	0.041	0.042	0.042	0.042	0.046
	White	0.825***	0.757***	0.819***	0.921**	0.925**	0.926*	0.920**	0.905**
		0.024	0.022	0.024	0.028	0.028	0.028	0.028	0.03
	Asian	0.802***	0.759***	0.805***	0.887***	0.883***	0.887***	0.877***	0.879***
		0.027	0.026	0.028	0.031	0.031	0.031	0.031	0.033
	Other	0.849***	0.824***	0.856***	0.933	0.924	0.928	0.909*	0.892*
		0.034	0.033	0.035	0.038	0.037	0.038	0.037	0.04
	Foreign Born	1.047*	1.027	1.02	1.022	1.021	1.025	1.023	1.045*
		0.02	0.019	0.019	0.019	0.019	0.019	0.019	0.021
	Speaks English at Home	0.999	1.001	1.052*	1.079***	1.081***	1.083***	1.085***	1.074**
		0.023	0.023	0.024	0.025	0.025	0.025	0.025	0.027
	Title I	1.264***	1.310***	1.214***	1.201***	1.183***	1.185***	1.203***	1.256***
		0.021	0.022	0.021	0.02	0.02	0.02	0.021	0.024
	Meal Assistance	1.050**	1.063***	1.024	0.993	0.986	0.98	0.978	0.98
		0.018	0.019	0.018	0.018	0.017	0.017	0.017	0.019
	Limited English Proficiency	1.148***	1.180***	1.159***	1.124***	1.125***	1.120***	1.115***	1.105***
		0.022	0.022	0.022	0.021	0.021	0.021	0.021	0.022
	GATE	0.745***	0.725***	0.723***	0.740***	0.745***	0.742***	0.750***	0.757***
		0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.019
	Special Education	0.879***	0.888***	0.875***	0.883***	0.878***	0.870***	0.867***	0.857***
		0.023	0.023	0.023	0.024	0.024	0.024	0.024	0.025
Bussing and Travel	*Attends Non-neighborhood School*		2.768***	3.276***	3.439***	3.352***	3.367***	3.420***	3.700***
			0.048	0.06	0.066	0.064	0.064	0.065	0.075
	Bussing		0.403***	0.503***	0.383***	0.380***	0.369***	0.397***	0.359***
			0.009	0.013	0.014	0.014	0.014	0.015	0.015
	Involuntary Bussing		2.685***	2.216***	3.078***	3.197***	3.268***	2.982***	3.197***
			0.112	0.095	0.162	0.172	0.177	0.162	0.186
	Restidential Structural Move		2.501***	2.333***	2.320***	2.372***	2.353***	2.375***	2.073***
			0.473	0.458	0.474	0.481	0.478	0.484	0.451
School Types	*Magnet*			0.403***	0.798***	0.830**	0.857*	0.951	1.045
				0.023	0.053	0.056	0.058	0.065	0.076
	Charter - Affilliated Conversion			0.463	0.324*	0.353*	0.364*	0.368*	0.233
				0.236	0.165	0.18	0.185	0.187	0.237
	Charter - Affilliated Start-Up			1	1	1	1	1	1
				.	.	.	.	.	.
	Charter - Independet Conversion			0.614***	0.708***	0.598***	0.589***	1.108	1.825*
				0.038	0.046	0.04	0.039	0.264	0.464
	Charter - Independent Sart-Up			0.917	0.85	0.967	0.967	1.089	1.141
				0.136	0.142	0.16	0.164	0.181	0.19
	Prevously Overcrowded			1.619***	1.352***	1.233***	1.234***	1.273***	1.275***
				0.032	0.035	0.034	0.034	0.036	0.038
	Still Overcrowded			1.372***	1.322***	1.290***	1.277***	1.282***	1.233***
				0.031	0.031	0.032	0.032	0.032	0.034
	New School			0.687***	0.707***	0.736***	0.728***	0.684***	0.699***
				0.029	0.031	0.033	0.033	0.032	0.034
School Quality	*Class Size*				0.998*	0.996**	0.995***	0.995***	0.993***
					0.001	0.001	0.001	0.001	0.001
	Enrollment at School				1.000***	1.000***	1.000***	1.000***	1.000***
					0	0	0	0	0
	Student Teacher Ratio				0.948***	0.942***	0.942***	0.951***	0.944***
					0.003	0.003	0.003	0.003	0.003
	Fully Credentialed Teachers (%)				0.766***	0.776***	0.763***	0.772***	0.746***
					0.01	0.01	0.01	0.01	0.01
	Teacher Turnover Lag (%)				1.119***	1.113***	1.117***	1.107***	1.094***
					0.008	0.008	0.007	0.008	0.009
Neighborhoods	*Percent Hispanic*					1.328***	1.259***	1.212***	1.180***
						0.044	0.042	0.04	0.042
	Percent White					1.290***	1.213***	1.163***	1.122**
						0.046	0.044	0.042	0.044
	Percent Black					1.051***	1.044***	1.036***	1.034***
						0.008	0.008	0.008	0.009
	Percent Asian/Pacific Islander					1.190***	1.159***	1.126***	1.123***
						0.023	0.022	0.022	0.023
	Meidan Household Income					1.000***	1.000***	1.000***	1.000***
						0	0	0	0
	Residential Instability					0.921*	0.912*	1.085*	1.043
						0.037	0.037	0.045	0.045
	Percent in Block Group Voting on School Bonds					1.092***	1.075***	1.074***	1.086***
						0.017	0.016	0.016	0.017
Ecological System	*Count of New Schools at Time*						1.051***	1.047***	1.035***
							0.006	0.006	0.006
	Enrollment in New Schools at Time						1.000***	1.000***	1.000***
							0	0	0
	Count of Charters at Time						1.122***	1.125***	1.116***
							0.009	0.009	0.01
	Enrollment in Charters at Time						1.000***	1.000***	1.000***
							0	0	0

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Estimating Migration to Particular Types of Schools

Our second set of research questions ask whether similar predictors contribute to entry into particular types of schools, following exit from the student's prior school. Table 7 reports the results of a competing risks analysis via discrete-time multinomial logistic regression for entry into a regular, charter, or magnet school, reported for elementary and then secondary students.[11] Table 7 details the results of these models showing the relative risk ratios and associated standard errors. Relative risk ratios show the increase in odds for entry into a particular type of school, relative to staying in the current school for a unit change in the independent variable.

Table 7: Competing risks estimates for non-structural exit by type

		Elementary School				Secondary School			
	Independent Variables	Regular School rrr/se	Charter rrr/se	Magnet rrr/se	New school rrr/se	Regular School rrr/se	Charter rrr/se	Magnet rrr/se	New school rrr/se
Student Demographics and Program Participation	Female	0.966***	1.02	0.918**	1.048	0.923***	0.762*	1.337*	0.898
		0.008	0.047	0.028	0.039	0.015	0.087	0.162	0.054
	Black	1.346***	1.477***	2.524***	0.861	1.553***	2.741***	3.972***	0.554***
		0.021	0.13	0.137	0.09	0.047	0.619	1.006	0.093
	White	1.011	0.799	2.836***	0.437***	0.972	2.128***	1.791*	0.232***
		0.02	0.103	0.168	0.077	0.032	0.451	0.456	0.07
	Asian	0.883***	0.779	5.758***	0.404***	0.936	2.011**	2.866***	0.132***
		0.023	0.12	0.313	0.06	0.036	0.435	0.644	0.054
	Other	1.033	0.706	3.342***	0.507***	0.931	0.925	0.83	0.497*
		0.026	0.133	0.212	0.086	0.042	0.372	0.35	0.145
	Foreign born	1.333***	1.129	1.205***	1.224***	1.059**	1.721***	1.011	1.013
		0.017	0.087	0.064	0.073	0.023	0.252	0.182	0.08
	Speaks English at home	1.173***	1.247**	1.046	0.904	1.172***	0.808	0.75	1.019
		0.016	0.101	0.049	0.065	0.03	0.153	0.165	0.129
	Title I student	1.096***	1	1.140*	0.683*	1.145***	0.971	0.686**	1.503***
		0.025	0.126	0.074	0.106	0.022	0.135	0.092	0.127
	Meal assistance	1.102***	0.888	0.956	0.753***	0.968	0.831	1.510*	1.321**
		0.012	0.054	0.037	0.037	0.019	0.113	0.245	0.133
	Limited English proficiency	0.996	1.073	0.464***	1.215***	1.109***	0.73	0.522**	1.385***
		0.012	0.071	0.021	0.063	0.026	0.152	0.119	0.103
	GATE	0.928**	0.867	1.855***	0.603**	0.763***	0.791	1.106	0.729**
		0.022	0.113	0.111	0.099	0.02	0.131	0.189	0.086
	Special education	1.241***	0.629***	0.421***	0.971	0.841***	0.822	0.421*	1.295*
		0.017	0.065	0.035	0.074	0.027	0.188	0.152	0.139
Bussing and Travel	Attends non-neighborhood school	2.108***	2.218***	1.625***	4.733***	2.261***	2.080***	1.353	6.549***
		0.023	0.133	0.065	0.196	0.051	0.37	0.258	0.522
	Bussing	0.388***	0.673	0.561***	1.593**	0.467***	1.544	0.546*	0.284***
		0.017	0.142	0.066	0.262	0.021	0.35	0.159	0.047
	Involuntary bussing	2.655***	2.527**	1.561	1.04	3.132***	0.415	6.061***	13.401***
		0.158	0.727	0.375	0.297	0.188	0.224	2.656	2.905
	Restidential structural move	1.325***	2.047**	1.172	0.531*	2.429***	10.933***	14.222**	0.799
		0.08	0.508	0.293	0.159	0.558	7.509	11.5	0.843
School Types	Magnet	0.450***	0.68	0.238***	0.067***	0.867	0.153**	1.177	0.280***
		0.028	0.21	0.043	0.029	0.065	0.1	0.719	0.088
	Charter - affilliated conversion	0.322***	1.47	0.000***	0.000***	0.340*	0.000***	0.000***	0.000***
		0.08	0.88	0	0	0.173	0	0	0
	Charter - affilliated start-up	0.186***	0.291	0.818	0.161*	1	1	1	1
		0.034	0.208	0.276	0.116	.	.	.	.
	Charter - independent conversion	0.712***	1.516**	0.604*	0.380***	1.561	4.093***	0.000***	0.648
		0.028	0.226	0.126	0.084	0.463	1.252	0	0.608
	Charter - independent start-up	0.826**	4.544***	0.957	0.136**	0.976	0.000***	17.011**	0.034***
		0.056	0.752	0.198	0.105	0.172	0	17.3	0.028
	Prevously overcrowded	1.053***	1.064	1.128*	1.781***	0.922*	1.212	0.735	1.286
		0.014	0.078	0.063	0.097	0.032	0.346	0.205	0.186
	Still overcrowded	1.218***	1.450***	1.370***	1.590***	1.359***	1.475	0.539*	0.533***
		0.018	0.109	0.08	0.11	0.035	0.327	0.13	0.083
	New school	1.01	1.548**	0.731	1.889***	0.823***	0.267*	2.365*	0.083***
		0.032	0.25	0.139	0.224	0.046	0.154	0.926	0.022
School Quality	Class size	0.973***	0.975***	0.946***	0.988*	0.989***	0.993	0.994	1.011***
		0.001	0.006	0.004	0.005	0.002	0.008	0.012	0.003
	Enrollment at school	1.000***	1.000***	1.000***	1.001***	1.000***	1.000*	1.000*	1
		0	0	0	0	0	0	0	0
	Student teacher ratio	0.984***	1.011	1.038***	1.076***	0.973***	1.072**	0.890***	1.044**
		0.003	0.014	0.009	0.014	0.004	0.025	0.03	0.014
	Fully credentialed teachers (%)	1.078***	1.085*	1.090**	1.677***	0.847***	0.682***	0.915	0.476***
		0.008	0.041	0.03	0.074	0.012	0.075	0.12	0.039
	Teacher turnover lag (%)	1.042***	1.046	1.080***	1.292***	1.106***	1.064	1.096	1.234***
		0.005	0.028	0.018	0.025	0.008	0.038	0.086	0.058
hborhoods	% Hispanic	1.033	0.866	0.591***	1.258**	1.241***	1.228	1.327	1.263
		0.018	0.106	0.035	0.109	0.045	0.387	0.361	0.24
	% White	0.982	1.003	0.542***	1.175	1.205***	1.867	1.34	1.143
		0.019	0.138	0.032	0.113	0.048	0.653	0.404	0.237
	% Black	1.014**	1.021	0.929***	1.189***	1.046***	0.89	1.042	1.021
		0.005	0.032	0.015	0.031	0.009	0.088	0.08	0.044
	% Asian/Pacific Islander	1.006	0.884	0.722***	1.268***	1.006	1.282	1.096	0.898
		0.01	0.063	0.023	0.064	0.022	0.243	0.181	0.105

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Competing risks for elementary student exit. Looking at columns 1-4, we see that Black elementary students displayed 34% higher odds of exiting their prior school and entering a regular school, 47% higher for exiting to a charter, and the odds of entering a magnet school were 2.5 times greater (each compared with Latinos, still the reference group). The odds that Whites entered a magnet school were 2.7 times higher, and 56% lower for entering a newly built school. The odds of entering a charter school were 23% greater for English speakers,

while odds for Title I students and those eligible for meal assistance were more likely to enter a regular school and less likely to enter a newly built school.

GATE participants showed exit odds that were 76% greater for entering a magnet school, but 39% less for entering a newly built school. This latter finding holds important implications for how analysts might estimate achievement effects of new schools. Students receiving special education services were much less likely to enter a charter or magnet school (odds 37% and 57% lower, respectively). Here too, future analyses must take into account differential selection patterns before estimating achievement effects for kids attending differing types of schools.

Students exiting one charter school were much more likely to enter another charter school, suggesting segmentation in the kinds of schools that parents consider, once they have made one exit decision. We also see that the odds of entering a newly built school are 84% greater if the student was previously enrolled in a newly built school. This may help to explain the higher exit rate we earlier observed for elementary students attending newly built schools. Some churning appears to occur while students settle into new schools, or parents into neighborhoods.

The ecological predictors also appear to play a role in determining student destinations. The count of charter operating district-wide appears to modestly suppress the odds of entering a newly built school (11% less). Students who live farther from the school nearest to their prior school were more likely to enter a charter or magnet school (odds of 72% and 38% greater, respectively). And when a newly built school is nearer, the odds of entering a newly built school are, not surprisingly, 30% greater.

Secondary students enter differing schools. These patterns (columns 5-8) are similar to those observed for elementary students, with several notable exceptions. Black secondary students show odds that are 2.8 times greater for entering a charter school, again compared with Latinos, and 3.8 times greater for entering a magnet school. Black pupils show odds that are 46% less for entering a newly built school. The odds that White secondary students enter a charter school are 2.2 times greater, and 76% lower for entering a newly built school. Asian secondary students show odds that are 1.9 times greater for entering a charter school, and 2.8 times higher for entering a magnet school.

Perhaps related, the odds that foreign-born students enter a charter are 1.7 times greater than native-born Latinos (essentially, the reference group). And the odds of entering a magnet school are 47% lower for students with limited English, and 1.4 times greater for entering newly built school. GATE participants show odds that are 27% lower for entering a newly built school. Again, we see the mix of students entering newly opened schools differs greatly from the average LAUSD student.

Students earlier enrolled in overcrowded schools show much higher odds of entering a charter school: 1.3 greater if the student attended a previously overcrowded school that's seen some enrollment relief, and 1.5 greater odds if still overcrowded during the period.

We again see that the growth of charter schools undercut demand for newly built schools, with odds of entering the latter dropping 28%. The student's proximity to the nearest charter

school further dampened demand for entering a newly built schools (odds 7% less), and slightly boosted the odds of entering a charter school.

DISCUSSION

These findings reveal how pupil and family background – along with the type of school attended – help to predict the likelihood of student exit and mobility. We also discovered how certain kinds of students are more likely to enter particular types of schools, dynamics in play as LAUSD seeks to diversify its colorful array of school organizations, new and old.

For *elementary school* pupils we saw – with all factors entered into the statistical model – that Blacks were 40% more likely to exit their school, compared with the Latino reference group, and we later observed that many migrated to charters during the 2002-2008 period. White and Asian students were more likely to move, as were foreign-born pupils. So, nativity and ethnic membership, and perhaps corresponding areas of residence, all play into the likelihood of moving from one school to another.

Parents' earlier propensity to work the L.A. education market also contributes to additional moves downstream. Students attending a school outside their catchment area and/or participated in voluntary bussing efforts were more likely to exit that school and head for another, compared with students more rooted in their catchment area.

Apparent student and family loyalty to charter and magnet schools is reflected in these organizations' strength in slowing down student mobility. The odds of student exit were about 75% lower for students attending conversion charters, but no different for (our limited sample) of start-up charters. Pupil-exit propensities were half as small for those attending magnets, compared with peers in regular LAUSD elementary schools. Families fled still overcrowded schools during the 2002-2008 period, about one-third more likely to exit, compared with students in other schools, and schools displaying greater teacher exit (turnover) also showed higher rates of student exit.

We also discovered that the neighborhood ecology within which parents are making decisions further contributes to likelihood of student exit. For example, exit propensities were lower in communities where the next closest school or nearest newly built school was located farther from the school in which the child was currently enrolled. At the same time, as the count of charters increased district wide, the likelihood of student mobility rose – evidence that education markets do boost mobility, at least in the short run for elementary pupils.

Turning to *secondary school* students, these patterns were quite similar, although the annual rate of exit was lower, compared with exit rates for elementary students. A few differences did emerge for secondary pupils. White and Asian students, for instance, were less likely to exit, compared with Latino students. GATE and special education students were considerably less likely to move schools.

As with elementary students, secondary pupils originally attending a school outside their catchment area, or involved in voluntary bussing, were much more likely to exercise choice a second time and move to another school. Results for charter schools were mixed. But attending a newly built secondary school reduced the odds of exit by 30%, one piece of good news, given LAUSD's sizeable investment in new facilities.

We saw that school quality helps to predict student exit – especially a much lower mobility rates for students attending schools with a higher share of teachers who are fully credentialed. Like elementary schools, when teacher turnover is higher, students exit at a higher rate as well. And we observed similar ecological effects – when school options are geographical located farther away, students are less likely to exit their current school.

Finally, the sorting of certain types of kids into certain types of schools – after exiting one's prior school – is eye opening. We mentioned the steady drift of Black pupils into charters. White and GATE students rarely exited to enter a newly constructed school, but readily headed for a magnet school.

We also saw how once parents and students enter one charter school they are more likely to head for another charter. This further suggests segmentation of which pupils engage which pieces of L.A.'s education market. Latino students are more likely to remain in their catchment areas and work the market less, compared with Asian, Black, and White families. The one important exception is that Latinos benefitted from comparatively high rates of entry to newly built schools, spurred by greater proximity to newly opened campuses. At the same time, the rapid growth of charters softened family demand for newly built schools.

In summary, the diversification of LAUSD school types is affecting student or family engagement – especially with charter and magnet schools. The opening of new high schools slowed student mobility over the 2002-2008 period. At the same time, the ethnicity and nativity of families – corresponding to household income and where they reside in L.A. – conditioned the extent to which differing kinds of schools slowed or hurried the movement of students from one school to the next.

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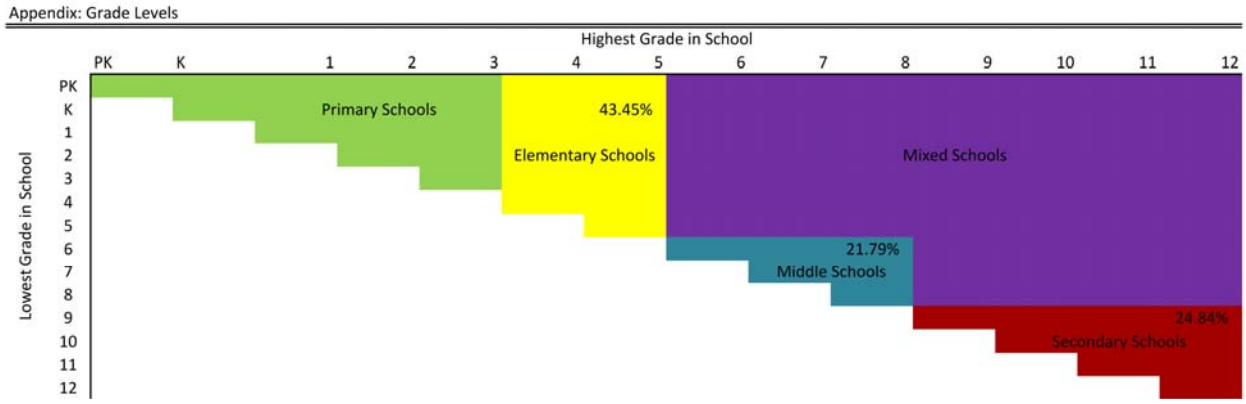
Appendix 1. Various grade structures for LAUSD schools



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Endnotes

[1] Catholic high schools initially drew attention in this regard, at first appearing to be stronger in terms of engagement and higher graduation rates, compared with conventional public schools (Coleman, Hoffer, and Kilgore 1982; Rumberger and Thomas 2000). Similarly, the Gates Foundation effort to build more intimate and demanding small schools aimed to incorporate effective mechanisms within a particular organizational type (Smerdon and Means 2006), a theory of action heard among charter school advocates as well (Lubienski and Weitzel 2010). And certain types of schools may attract similarly committed parents, whose children exercise positive peer effects on others, further boosting engagement and achievement, in turn reducing rates of student exit (Ream and Stanton-Salazar 2007).

[2] Defining our time-at-risk as the time between structural moves, and resetting the spell counter after each structural move not only differentiates our data by school level, it also helps in minimizing bias linked to left censoring. When we first observe a student in the data set, we don't know whether they have moved schools in the past, and thus don't know how long they have been at risk of moving, except for students observed in kindergarten. Since we define the analytical unit as a student-school-period, the left censoring of the case is limited to the time between initial observation and the first move, leaving data after the first move free to be used without reservation.

[3] In addition, we have defined hazard time as the number of semesters a student attends a particular school before exit (non-structural or structural), creating two levels of hazard time. The highest level measures semesters between *structural* exit while the lowest level measures semesters between *nonstructural* exit within this higher level. For instance, if a student in a K-5 elementary school exits at grade 3 to another school with the same grade range, and then matriculates at grade 5, that student will have experienced two spells: one exit event at grade 3 and the other, at grade 5, is right censored. When that student begins middle school at grade 6, the spell counter is reset. We argue that these structural moves (matriculation) represent important milestones separating distinct eras, not only in how the institution organizes time and grade levels, but also in terms of the student's social relationships. By limiting our analysis to students at elementary, middle and secondary schools and running separate models for each, we eliminate the possibility that students could structurally move within the context of one model, thus having two first spells, as defined above.

[4] In some cases, especially in newly built schools or newly opened charter schools, students may appear to reach the highest grade in their school, but the next grade is added in the subsequent year. For this reason a school's highest grade is considered the highest grade in that school looking forward one year. In addition, a case may be right censored if a student leaves their school and does not appear in the data in the subsequent period.

[5] Because this teacher turnover variable is differenced, we might have lost the first year of data for any new school, as well as the 2002-03 school year for all schools. To utilize all data points we interpolated the current year's teacher turnover in these instances.

[6] This procedure utilizes geocoded data to weight block-group values by the share of a voting precinct that is made up of overlapping, though multiple, block groups.

[7] The LAUSD Board of Education approved a master plan for school construction in 2000 which ranked 130 schools by the severity of overcrowded conditions. Two indicators were employed to

rank schools: the number of classroom seats short, relative to the number of age-eligible children residing in the catchment area, and the number of years that the school operated multiple enrollment tracks (Board of Education 2000). Eighty of the 140 schools experienced enrollment relief through 2008 as new schools opened-up, while the 30 remaining schools had not.

[8] These nearness measures were calculated by taking the distance between a student's current school and the nearest new or charter school We recoded instances in which a student had no alternative school in that time period for their grade with the largest distance observed for any student. Extremely small distances were recoded to 0.01 mile.

[9] As stated previously, our data includes only a sub-set of the universe of charter schools in LAUSD. In particular, our data is missing information from independent start-up charters meaning these results should be interpreted with caution.

[11] Again, results for middle-schools students are available from the authors.