The Effect of Grade Placement on English Language Learners' Academic Achievement

Dylan Conger

November 2012
Prepared for the annual meeting of the Association for Public Policy Analysis and Management

Abstract

Many English Language Learners (ELLs) migrate to the US at older ages and administrators must choose a grade in which to place these new entrants as soon as they register for school. In this study, I estimate the effect of grade placement on the academic performance of ELLs who enroll in the Miami-Dade County Public School system between the ages of 7 and 12 using a district policy that determines grade placement decisions for newcomers by their birthdate relative to September 1. The results suggest benefits to being placed in the lower of the two grades, particularly for students' achievement in mathematics.

KEYWORDS: English language learners; immigrants; grade placement.

I am grateful to the Foundation for Child Development, especially Ruby Takanishi and Don Hernandez, for their support and encouragement of this work. I also thank Sean Corcoran, Rajeev Darolia, Rachel Hess O'Brien, Scott Imberman, Jennifer Jennings, Anne Lamb, Patrick McEwan, Yas Nakib, Joe Robinson, and other participants at the Association for Public Policy Analysis and Management annual meeting, Association for Education Finance and Policy annual meeting and the University of Vermont research workshop for helpful comments. I am also grateful to the Miami-Dade County Public School System for maintaining such comprehensive records and for making them available to me for analysis. Megan Hatch and Lisa Randall are to be credited for research assistance.

The Effect of Grade Placement on English Language Learners' Academic Achievement

1 Introduction

The academic achievement gap between English Language Learners (ELLs) and fully English proficient students is one of the largest and most persistent gaps in US schools (August & Hakuta, 1997**)**. ELL students who migrate to the U.S. at older ages have a particularly difficult time learning English and reaching academic parity with their English proficient classmates (e.g., Conger, 2009; Hakuta, Butler, & Witt, 2000). Policymakers, educators, and researchers have worked hard to identify programs and policies that speed the English language acquisition and academic skills of ELL newcomers. A large, and important, body of experimentation and research focuses on the academic effects of the type and quality of English language instruction that ELL students receive in school (e.g., Francis, Lesaux, & August, 2006; Robinson, 2011; Slavin & Cheung, 2005; Slavin et al., 2011). In this study, I estimate the effect of a relatively under-examined policy decision regarding the educational experiences of ELL students who migrate to the US at older ages. When non-traditional age ELL entrants enroll in a school system, administrators must immediately choose a grade in which to place them and these grade-placement decisions may have lasting effects on the academic development of ELLs.

To my knowledge, there are no existing studies on the effect of grade placement decisions on newcomers to US schools. Identifying causal effects of grade placement is empirically challenging given the high probability of endogenous grade-level assignments. Students must be assigned to a grade as soon as they register for school, which provides teachers and administrators with very little time to assess students' academic skills. Yet, in some cases, administrators may obtain useful assessment information from the parents and/or from existing academic records. As such, an older ELL migrant who enrolls in the school system with limited prior formal schooling and whose parents speak very little English is unlikely to be placed in the higher of the two grade choices for her age under the assumption that she will quickly fall behind.

In this study, I take advantage of a Miami-Dade County Public Schools (M-DCPS) policy regarding registration, assessment, and placement of new entrants that produces quasi-random sorting into grades (M-DCPS, 2005). According to M-DCPS policy, school administrators are supposed to use newcomer students' date of birth relative to September 1 of the calendar year (the same cutoff used to determine kindergarten eligibility) to decide which of the two grades they should join. Consider two students who migrate to the district in June of their eighth year after birth: Student A has an August birthday and will turn 8 before September 1, while student B has an October birthday and will still be 7 on September 1. According to the district's policy, student A should be placed in the higher of the two grades (3^{nd} grade), while student B should be placed in the lower of the two grades (2^{nd} grade).

Any deviations from this default are to be determined by the school based upon consultation with the parents, the receipt of educational records documenting the students' prior school experiences, such as transcripts or other school records, and approval from district officials (M-DCPS, 2005). If parents report that the child has had no formal schooling, for instance, school personnel are required to screen the student for possible participation in the district's Project New Beginning Program, which is a program specifically for middle to high-school age (age 11 or older) newcomers with no exposure to school. While school personnel can be called into play, the district policy cautions personnel not to automatically resort to the lower grade placement as evidenced by the following excerpts from the district's ELL policy (M-DCPS, 2005):

> "Out of country students without educational records shall be placed according to the age of the student as of September 1 of the school year. Students registering at the middle or senior high school level should not be automatically placed in the lowest grade at that level." (p.2)

> "Any adjustment resulting in lowering grade placement must be thoroughly documented with home language assessment data, e.g., tests, class work, and submitted for district review by the Deputy Superintendent, Curriculum and Instruction or designee. Parents(s)/Guardian(s) must be informed prior to the grade level adjustment." (p.2)

> "Special care should be exercised to ensure that a student's limitation in ability to communicate in English is not a factor to be considered in determining grade placement." (p.3).

If every school and family complied with the policy of using the child's date of birth to determine grade placement, the sorting across the two grades would be random and the effect of enrolling in a higher or lower grade could be cleanly identified with a sharp regression discontinuity design. Children of essentially the same age (for instance, those with an August 31 birthday and those with a September 2 birthday) would be placed in different grades based only on their birthdates, which would causally link school performance differences to the grade in which they were placed. Yet even the policy allows for some deviation from using date of birth to determine grade placement and, as a result, non-compliance is to be expected. Students who arrive with very limited English proficiency, or whose parents report that they have had no prior schooling, are likely to be placed in the lower grade even though their birthdates would suggest placement in the upper grade. Similarly, relatively younger students who arrive with strong academic qualifications and/or whose parents insist on a high-level curriculum may be placed in the higher of the two grades even if their birthday falls after September 1.

Given the non-deterministic link between date of birth and grade placement, I use students' birthdates relative to the September 1 cutoff as an instrument for their grade placement in models of academic performance along the lines of a fuzzy or imperfect regression discontinuity design.

To support the identification, I first provide evidence that observable student characteristics (e.g., gender, age, language at home) are relatively balanced on either side of the September 1 cutoff. I then show a larger discontinuous change in the probability of grade assignment at the September 1 threshold, with students born just after September 1 having a 0.2 to 0.3 higher probability of placement in the lower grade for their age.

The results suggest that ELL newcomers who are placed in the lower grade for their age have higher math achievement scores than those who are placed in the higher grade. In addition, lower grade placement appears to increase the probability that students' will exit from ELL status in their second year after enrollment. Zero to modest positive effects are found for students' achievement on their first and second academic English reading exams.

The remainder of the paper is organized as follows. Section 2 describes the mechanisms through which lower grade placement might affect achievement. Section 3 describes the econometric framework, while Section 4 describes the data. Section 5 provides the empirical results and Section 6 provides a conclusion.

2 Mechanisms

The theoretical mechanisms that link lower grade placement to achievement are varied.
First, the rigor of the material (and, correspondingly, the rigor of the exams) covered in the two grades will naturally differ. For recently-arrived ELL students, all of whom have some limitations in English, there may be value to having a slightly lower-level curriculum. For some of these students, the curriculum in the lower grade may be a repeat of their prior year of schooling, equivalent to being retained in grade without the stigma of failure. The benefits of lower grade placement may show up in both reading and math, despite mathematics heavier

reliance on universal symbols and less dependence upon English proficiency. In fact, curricular differences between proximate grades in math may be larger (and more consequential) than those in reading given that math concepts tend to increase in greater complexity as students move from one grade to the next (Mathematics Learning Study Committee, 2001). Further, and related, the greater complexity of the mathematical concepts in the higher of the two grades may require a larger English vocabulary, which puts ELL students who enroll in the higher grade at a further disadvantage. Finally, if ELL students learn most of their math skills inside the classroom and less of it at home or elsewhere (relative to non-ELL students), then the math instruction across two grades may create larger differences for ELL newcomers than the reading instruction across two grades.

Second, same-age students who are placed in different grades will be slightly older (or younger) than their peers. Simply by virtue of having lived longer, older students will have had more exposure to information and formal schooling than younger students, which puts them at an advantage in the classroom. Older students are also relatively more mature and their behavior in the classroom may affect educators' evaluations of their performance and abilities (relative to their younger peers), which could in turn influence decisions about grades, discipline, special education referrals, and grade promotion (e.g., Bedard & Dhuey, 2006; Datar, 2006; Elder & Lubotsky, 2007). These teacher perceptions and decisions may also influence students' achievement scores if they boost students' self-esteem or increase learning opportunities. Being more mature might also have long-term effects on educational outcomes by determining the curricular tracks in which students are placed.

Finally, the testing conditions for students may vary by grade placement. For instance, students may be may be given more (or fewer) testing accommodations, such as more time on the exam or use of a dictionary, depending upon the grade in which they are placed.

This paper identifies the reduced-form effect on achievement of ELL students being placed in the lower of the two grade choices for their age. Given the various mechanisms outlined above, it is difficult to predict in advance how lower grade placement will influence student achievement, if at all. Nevertheless, the reduced-form effect of lower grade placement is relevant as it is a variable that can be easily manipulated by school administrators and school (or district) policies. I offer a preliminary investigation of mechanisms as well by exploring whether relative age and testing accommodations differs across ELL students who are placed in the lower and higher grades.

3 Model and Specification

Given the absence of prior research on this subject and to establish an empirical baseline, I begin the analysis with a regression of y_{ics}, an outcome (first and second reading and math test scores, grade promotion, exit from ELL status) for student *i* in cohort *c* and school *s*, as:

$$(1) \qquad y_{ics} = \alpha Lower_i + X_i\beta + \gamma_c + \delta_s + \varepsilon_{ics}$$

where $Lower_i$ takes a value of one if the student was placed in the lower of the two grade choices for her age; X_i are student-level covariates, including origin country/first language (grouped into Cuban origin-Spanish, Other origin-Spanish, Haitian-Creole, and other), gender, eligibility for subsidized meals (free or reduced-price), disability status, and whether the student scored at the entry (Novice) level on the English language assessment exam;[1] γ_c are cohort (age by year by semester of entry) fixed effects; δ_s are school of entry fixed effects; and ε_{ics} captures all other drivers of achievement, including variables that have been omitted from the model.

Though Equation (1) provides a useful benchmark, grade placement may be endogenous, rendering estimates of β_1 biased and inconsistent. To partially address the remaining biases, I estimate a second set of models that instrument for $Lower_i$ using the student's birthdate relative to the September 1 cutoff as explained in Section 1(Introduction). The first stage and reduced-form models follow:

(2) $$Lower_{ics} = f(Days_i) + \pi Cutoff_i + X_i\beta + \gamma_c + \delta_s + \varepsilon_{ics}$$

(3) $$y_{ics} = f(Days_i) + \theta Cutoff_i + X_i\beta + \gamma_c + \delta_s + \varepsilon_{ics}$$

where $f(Days_i)$ is a continuous function of the number of days between September 1 and the student's date of birth and $Cutoff_i$ =1 if the student's birthday falls on or after September 1. In this system, X_i γ_c, and δ_s are the same controls as those included in Equation (1).

The identification of treatment effects (in this case, being placed in the lower of the two grade choices) is drawn from observations near the discontinuity. I report estimates from three versions of Equations (1) and (2). First, I estimate a local linear specification with $f(Days_i)$ as a first order polynomial and a bandwidth of 9 days. I obtained this bandwidth by applying the

[1] According to district policy, new entrants are required to take the entry level exam as soon as possible. Thus, while the exam is administered after their enrollment in school, it is unlikely to be administered much later than their enrollment and should not be substantially influenced by the education they receive in their new school.

Imbens and Kalyanaraman (2010) optimal bandwidth-selection algorithm.[2] For the second and third estimations, I double (to 18 days) and triple (to 27 days) the bandwidth and add second and third order polynomials. For most of the analyses, I present and discuss in detail the results using the 18-day bandwidth, with results from the other bandwidths provided in the Appendix tables and summarized in the text.

Given the non-random compliance with the cutoff policy, the estimates from the discontinuity identify local average treatment effects; the average causal effect of lower grade placement on students who are induced into the lower grade by virtue of their birthdates. The estimates may not apply to students whose grade-level choices are uninfluenced by their age relative to the cutoff.

In all equations, models are estimated with OLS when the outcome is a continuous measure. For the dichotomous outcomes, probit models are estimated and the average of the marginal effects are reported. Standard errors are corrected for heteroskedasticity and clustering at the school of entry level.

4 Data

Data were provided by the M-DCPS on all students enrolled in the school system from 2003 through 2007. During these years, the district used the Miami-Dade County Oral Language Proficiency Scale-Revised (M-DCOLPS-R) to evaluate students' English listening and speaking

[2] The Imbens-Kalyanarman algorithm for bandwidth selection considers the size of the sample as well as the variation and functional form of the outcome variable near the discontinuity in generating an ideal bandwidth. Stata code can be found at http://www.economics.harvard.edu/faculty/imbens/software_imbens.

skills; students obtained values of Novice, Low Intermediate, High Intermediate, Advanced, and Non-ESOL. Students who received an evaluation below Non-ESOL were designated as ELL (not sufficiently English proficient) and retained for the analysis. The sample was further restricted to the nearly 14 thousand foreign-born entrants who were between the ages of 7 and 12 upon school entry.[3]

The primary outcome variables are the students' first observed math and reading test scores on Florida's Norm Referenced Test (NRT). In 2003 and 2004, the Florida NRT was the Stanford Achievement Test Series, 9th edition (SAT 9) and in later years the SAT 10, both of which are published by Harcourt Assessment, Inc. Students' scores on this vertically-scaled exam are converted to percentiles and indicate students' position relative to the nationally-normed reference group. Additional outcomes include students' second NRT math and reading scores, whether they are promoted to the next grade level, and whether they exit ELL status in the year following entry.

Importantly, the math and reading NRT scores indicate students' academic position relative to other students in the same grade across the nation who took the exam. Thus, for these achievement scores, the estimates obtained from the equations described above reflect the effect of lower grade placement on same-age ELL students' ranking relative to the other US students in the same grade. To further restrict the comparison to students in the Miami-Dade school system and to Florida-specific performance standards, I also estimate alternate models with students standardized scores on the math and reading Florida Comprehensive Achievement Tests

[3] The school system also records the date that the student entered the US and the correlation between age of US entry and M-DCPS enrollment is 95%, which indicates that M-DCPS is the first US school system encountered by the overwhelming majority of newcomers.

(FCAT).[4] For the grade promotion and ELL exit outcomes, the results indicate whether lower grade placement influences ELL students' probability of achieving these outcomes. To the extent that teachers and other in-class educators make grade promotion and ELL status decisions through a combination of academic scores and in comparison with other students, these outcomes may also reflect ELL students' position relative to their same-grade classmates.

Table 1 provides descriptive statistics on the 13,884 students by whether they were placed in the lower or higher grade for their age.[5] Students who are placed in the lower grade are more likely to be *in*eligible for a free school meal, male, disabled, and score higher than Novice on the entry English language exam. Several of these differences do not square with an expectation of lower grade placement being assigned to students who are traditionally low-achieving. For

[4] Florida's criterion-referenced statewide FCAT exam has been administered since the mid-1990s to evaluate students and schools against the state's curriculum and performance standards, known as the Sunshine State Standards. I standardize students' scale scores to a mean of zero and a standard deviation of one within grade, year, and subject using among Miami-Dade test-takers.

[5] Approximately 85% to 90% of each age of entry group were placed in the relevant proximate grades. For instance, among the 9-year old entrants, 27% were placed in the 3rd grade and 61% were placed in the 4th grade. The remaining 11% of students were placed in 2nd, 5th, or 6th grades. To retain the sample size, I grouped students who were placed in a grade below the lower of the two major grade-level choices into the lower grade category (for instance, 9-year olds who entered 2nd were given a value of one for $Lower_i$) and I grouped students in grades above the higher of the two major grade-level choices into the higher grade category (a value of zero for $Lower_i$).

instance, students who are eligible for free meals live in homes where the family income is at or below 130 percent of the federal poverty level and, thus, these students typically underperform in school. If school administrators sought to make the transition less difficult for low-income newcomers, one would expect them to be disproportionately assigned to the lower of the two grades. For the same reasons, one would expect students with observably-low levels of English proficiency or in homes where neither parents speaks English to be disproportionately assigned to the lower of the two grades.

The explanation for some of these counterintuitive grade placement decisions can be found in the differences between the placement of students by their first language and, more specifically, origin country. Students placed in the lower grade are slightly more likely to come from homes where Haitian-Creole or another non-Spanish language is spoken (the largest language groups in the "other language" category include French (26%), followed by Portuguese (10%), Chinese (5%), and smaller shares of other languages). Among the Spanish at home students, there is a large difference between Cuban entrants and entrants from other Spanish-speaking territories (over 80% of whom migrate from Columbia, Venezuela, Honduras, Puerto Rico, the Dominican Republic, Nicaragua, Peru, and Mexico). The Cuban students are far less likely to enroll in the lower of the two grades. Since Cuban students are disproportionately low-income and more likely to receive a Novice score on the entry level language exam than students from the other major language groups,[6] their underrepresentation in the lower grade partially explains the

[6] For instance, 81% of Cuban entrants are eligible for the free lunch program, compared to only 62% of non-Cuban Spanish speakers (many of whom are from South American nations, such as Columbia and Venezuela) and 77% of Haitian-Creole speaking entrants. Further, 73% of Cuban

observed differences on these attributes. Given the administrative nature of the data, I am unable to determine why Cuban entrants are so much less likely to be placed in the lower grade; however, it is possible that their parents are more likely to advocate for the more rigorous schooling context than the parents of migrants from other countries. It is also possible that teachers and other administrators use students' Cuban-origin as a signal of academic skill. Cuba is known internationally for its relatively high achievement within the Latin American region, which may explain parent and educator decisions to place Cuban newcomers in the more challenging classroom environments (Carnoy, 2007).[7]

(Table 1)

The bottom of Table 1 provides the distribution on students' first NRT exam scores and the raw differences by grade placement. The mean math and reading NRT scores for *all* M-DCPS test-takers in the years (2003-2007) and age range (7-12) observed in this study were approximately 45.6 and 38.3, respectively (not shown in Table 1).[8] As a large metropolitan area with a sizable population of low-income, ELL, and minority students, the below national average scores for M-DCPS are to be expected. Also predictable, Table 1 shows that the ELL newcomers to the district score substantially lower on the two exams than the citywide average,

---

entrants receive the lowest score on the language exam in comparison to 64% of non-Cuban Spanish speakers and 56% of Haitian-Creole speaking students.

[7] The figures shown in Table 1 are very similar for the 9, 18, and 27 bandwidth samples and available upon request.

[8] For Miami-Dade test-takers, the median NRT score in 2007 ranged from 64% for 3rd graders to 67% for 8th graders on the math exam and from 56% for 3rd graders to 58% for 8th graders on the reading exam (http://fcat.fldoe.org/nrinfopg.asp).

33.3 in math and 20.2 in reading. Comparisons of ELL newcomers' scores across proximate grades also indicate that students in the lower grade earn higher scores on the order of approximately 6 percentile points on both exams. These unadjusted results suggest that being exposed to a lower-level curriculum and/or slightly older than one's peers may boost the achievement scores of ELL newcomers. Yet the differences in the upper portion of Table 1 suggest non-random sorting into grades, which could explain the raw differences. The next section reports results from regression-adjusted estimates and the discontinuity estimates.

5 Results

5.1 Instrument and Specification Tests

An underlying assumption of the discontinuity estimator is that individuals cannot manipulate the assignment variable to determine whether they fall on one side or the other of the discontinuity. While this might be a concern in studies where a grade-point average or an aptitude score is used to determine treatment eligibility (e.g., merit-based aid), it is unlikely to matter in this inquiry where birthdate is the assignment variable. That is, except through timing of cesarean sections, parents cannot manipulate the exact birth date of their children. In this study's context, one additional (though unlikely) possibility is that of selective emigration among parents that differs according to their children's birthdates. Figures 1-2 and Table 2 provide evidence that minimizes these concerns.

Following McCrary (2008), Figure 1 is a histogram of day of birth relative to September 1 (using a wide bandwidth of 50 days) with no clear signs of clustering or density around the September 1 cutoff. Table 2 provides the estimates and standard errors on the September 1 cutoff variable in regressions of each variable shown in the row on the cutoff variable along with varying polynomial orders of the number days between students' birthday for the three different bandwidths. As shown, none of the estimates are large or statistically significant. Figure 2 provides a graphical representation of these relationships using the 18-day bandwidth: the lines in the graphs show the fitted values from a parametric model with a discontinuity at zero and a quadratic function of *Days* on either side of the discontinuity. The markers in the figures are local averages: the proportion of students placed in the lower grade in non-overlapping intervals that are two days wide. Similar to Table 2, Figure 2 suggests that, at least on observable student covariates, the conditional expectations are relatively smooth at the discontinuity. Though some of the estimated probabilities at the discontinuity are non-trivial (for instance, an increase of 8 to 9 percentage-points in the probability of being male), there are no clear theoretical explanations for these relationships and all of them are statistically insignificant at conventional levels.

(Figure 1)

(Table 2)

(Figure 2)

A second key assumption of the design is that the M-DCPS policy regarding the September 1 cutoff actually creates a discontinuity in the relationship between birthdate and the probability of being placed in the lower grade. Figure 3 provides a pictorial representation of the strength of the instrument, with the lines and markers calculated using the same procedures as those described for Figure 2. As shown, the relationship between days and lower grade placement is non-linear and appears to jump slightly at the cutoff by around 20 percentage-points.

(Figure 3)

To test for the magnitude and significance of the relationship observed in Figure 3 and to adjust for covariates, Table 3 provides the first stage estimates using the different bandwidths and their corresponding specifications [results from Equation (2) above]. As shown, the estimated increase in the probability of being placed in the lower grade ranges from 0.21 to 0.33 depending upon the bandwidth, specification, and whether covariates are included. All estimates suggest a positive and statistically significant increase in the probability of lower grade placement at the cutoff, with compliance rates around 60 percent.

(Table 3)

5.2 Estimated Effects

Table 4 provides OLS, reduced-form, and 2SLS estimates using all three bandwidths (and their corresponding specifications) for students' first math (Panel A) and reading (Panel B) NRT scores. The OLS estimates suggest statistically significant improvements in reading and math scores associated with lower grade placement of approximately 7 to 10 percentile-points depending upon the bandwidth. The reduced form estimates are considerably smaller and statistically insignificant for reading achievement. For math, the reduced form estimates are of similar magnitude to the OLS estimates, though statistically insignificant in most specifications. Correspondingly, the 2SLS estimates are much larger than the OLS estimates for math and somewhat smaller and statistically insignificant for reading.

(Table 4)

To summarize, though the reduced-form estimates are somewhat imprecise, the results from Table 4 indicate that the OLS estimates may be downwardly biased for math, but not for reading (in fact, the OLS estimates could be slightly upwardly biased for reading). This suggests that students who enroll in the lower grade may enroll with relatively lower math skills and equal or slightly higher English reading skills (relative to the national norm) than those who enroll in the higher of the two grades. Indeed, Table 1 reveals that students who score higher on the basic English language proficiency exam are *more* likely to be placed in the lower of the two grades. Though students' scores on this exam are held constant in the OLS model, it is certainly possible that measurement error or the broad classifications on the exam fail to detect and control for meaningful differences in English reading ability. Assuming that the IV estimates are less biased by the omission of such characteristics, the results also suggest positive effects of lower grade placement on students' math achievement and zero to modest effects on their English reading achievement.[9]

Table 5 examines differences in the effects of grade placement for students according to their score on the entry level English language exam, whether they are from Cuba or another Spanish speaking country, and their gender. The results from the 18 day bandwidth are presented in the main of the paper, with estimates from the 9 and 27 day bandwidths provided in Appendix Table 1. The first stage estimates vary in magnitude, suggesting variation in compliance across the

---

[9] When the NRT scores are replaced with standardized FCAT scores, the sample sizes are reduced (because fewer students have scores on these exams), and the grade-placement differences are somewhat larger. Using the 18-day bandwidth, for instance, the OLS-estimates suggest that students in the lower grade earn 0.30 standard deviation higher FCAT math scores and 0.36 standard deviation higher FCAT reading scores than those in the upper grades, with standard errors of 0.10 and 0.09 respectively. The corresponding reduced-form estimates are 0.26 standard deviations in math and 0.19 standard deviations in reading, with standard errors of 0.22 for both estimates. Though none of the reduced-form estimates in the FCAT models reach statistical significance, all of the point estimates are positive and quite large in most specifications.

subgroups. For instance, there appears to be somewhat lower rates of compliance among Cuban-born Spanish speakers and among females than among Spanish-speakers from other countries and among males.

(Table 5)

The magnitudes of the OLS-estimated effects of lower grade placement on math and reading exams are similar across the subgroups, ranging from a low of 6 to a high of nearly 11 percentile-points.[10] The reduced-form point estimates for math are similar, and in some cases larger, than the OLS estimates for each of the subgroups. In reading, however, the reduced-form estimates are substantially smaller than the OLS estimates and statistically indistinguishable from zero for all subgroups. Given the imprecision of most of the reduced-form results, I do not present the 2SLS estimates for the subgroups; they can be roughly calculated as two to five times the size of the reduced-form results. Among Non-Cuban Spanish speaking students, for example, where the first stage estimates are strong and the reduced form estimates are large, the results indicate clear advantages in math for students who enroll in the lower grade. The results from the alternative bandwidths shown in Appendix Table 1 differ slightly from those presented in Table 5. All specifications indicate positive and large OLS estimates in reading and math and reduced-form estimates in math, yet more of the estimates are statistically insignificant than those from the 18-day bandwidth. The reduced-form estimates in reading are modest and statistically insignificant in all specifications.

Table 6 examines the results for outcomes in the second year following students' enrollment in M-DCPS, again using the 18 day bandwidth (see Appendix Table 2 for the results from the alternate bandwidths). The first outcome in the table is whether the student remained enrolled in M-DCPS in the second year following entry. Column (2) of Table 6 indicates that 71 percent of the students in the sample remained in the school system in the second year. Column (3) presents the average of the marginal effects from a probit regression of M-DCPS enrollment on lower grade placement with covariates; the results from these models suggest no effect of lower grade placement. The reduced-form estimates also indicate no difference in the second year enrollment of students who are placed in the lower grade based upon their birthdates.

The remaining outcomes in Table 6 are observed among the 1,087 students who did remain enrolled in the school system; given the absence of a differential effect of lower grade placement on students' probability of remaining in the school system, the estimates for the remaining outcomes are unlikely to be biased by selection into the second year. Both the OLS and reduced-form estimates suggest positive effects of lower grade placement on math outcomes that persist into the second year after enrollment. In addition to being positive and statistically significant, the second year math effects are of similar magnitude to the first year math effects, which indicates at least no fade out in the lower grade advantage. While the OLS estimates suggest positive effects on reading in the second year, once again, the estimates from the reduced-from model are somewhat smaller and less precise. Both estimators indicate no effect of lower grade placement on whether students are promoted to the next grade. And while the point estimates on whether students exit ELL status in year 2 are positive in both the OLS and the reduced-form models, they are statistically insignificant in the latter model. The results using the alternate bandwidths, shown in Appendix Table 2, are similar except that the estimates from the second year math model in the 9-day discontinuity sample fail to reach statistical significance, while the estimate from the ELL exit model in the 27-day discontinuity sample do reach significance at the 10% level.

(Table 6)

In sum, the results from Table 6 suggest positive estimated effects of lower grade placement that extend into the second year after placement, particularly in math achievement. To the extent that exit from ELL status reflects meaningful improvements in English language proficiency, the results also indicate positive effects of lower grade placement on basic understanding of English. Interestingly, while the estimated effect of lower grade placement on academic English reading proficiency (as indicated by the reading NRT exam) are statistically insignificant in year 2, the point estimates are larger than the estimates for year 1 (true for all bandwidths). These results suggest that lower grade placement may not have immediate effects on students' academic English proficiency, but that their basic oral proficiency develops faster than those who are placed in the higher grade, and that these achievements may translate to higher levels of English proficiency in later years. Given the imprecision and modest point estimates from all of the reading models, this interpretation is much more speculative than definitive.

5.3 Possible Mechanisms

So far, the results indicate some advantages to being placed in the lower grade, particularly for math achievement. In Section 2, I describe the following three mechanisms that could explain the link between lower grade placement and higher achievement: 1) lower-level curriculum and test; 2) advantages associated with being slightly older than one's classmates; and 3) the possibility of more testing accommodations. There is no need to provide evidence of the first mechanism as lower grades will naturally cover less difficult concepts and material than the higher grades. In Table 7, I explore the validity of the second two mechanisms. Table 7 provides the means and estimated effect of lower grade placement on students' age relative to the mean age of their classmates and whether they received testing accommodations on the reading and math exams. Again, the results from the 18-day bandwidth are provided in Table 7, with comparable estimates from the alternate bandwidths provided in Appendix Table 3. Focusing first on the descriptives in Column (1), the first cell indicates that new entrants are slightly older than their classmates by approximately three to four months.[11] In addition, just under half of the new ELL entrants receive some form of testing accommodations on the reading and math exam. Moving to the OLS/Probit results in Column (2), the results for relative age reveal that students who are placed in the lower grade are roughly 10 to 12 months older than their classmates on average. This large gap suggests that administrators heavily lean towards placing new entrants in the lower grade irrespective of their birthdates, a preference that likely explains why the average ELL newcomer is slightly older than her classroom peers. The reduced-form estimates in Column (3) confirm a 3-month relative age advantage among the students whose birthdate determines their placement in the lower grade. Further, the results suggest that students in the lower grade are more likely to receive testing accommodations in both reading and math. The estimates obtained using the two alternate bandwidths are largely the same as those shown in Table 7 except that more of them are statistically insignificant (see Appendix Table 3).

(Table 7)

6 Conclusions

In this paper, I examine the effect of grade placement on the academic performance of non-traditional age (ages 7 to 12) ELL entrants to the Miami-Dade County public school system.

[11] Relative age is calculated as the age of student *i* in months divided by the mean age of student *i*'s classmates (minus student *i*). Thus, a relative gap of 0.03 translates to almost 3 months for a 7-year old and almost 4 months for a 12-year old.

OLS and probit models with controls for student-level covariates and school fixed effects indicate that students who are placed in the lower of the two grade choices for their age earn higher reading and math achievement scores in the first and second years following school entry and exit ELL status more quickly than their peers who enroll in the higher grade. The positive estimates from these models hold for students from several subgroups.

Conventional wisdom would predict a negative bias on the lower grade estimate given that administrators are likely to place the most academically-challenged newcomers in the lower of the two grade choices. Yet the observed attributes of students in the two grades do not always point in this direction. For instance, Cuban immigrants to the district appear to disproportionately enroll in the higher grade, despite their relatively high rates of poverty and relatively low levels of basic English proficiency. To reduce the bias associated with this non-random sorting into grades, I estimate the effect of lower grade placement using the variation in grade assignment that is determined by students' birthdates. M-DCPS recommends that school administrators' use students' birthdates relative to September 1 to determine the appropriate grade level for newcomers to the school system. The estimates from the discontinuity in grade placement created by the birthdate policy suggest that the OLS/Probit estimates may be downwardly biased for math. The 2SLS effects on student's first math exam range from 24 to 28 percentile-points, depending upon the bandwidth chosen for the discontinuity regression. The 2SLS estimated-effect of lower grade placement on students' first reading exam reaches a statistically insignificant maximum of 6 percentile-points; however, lower grade placement appears to be associated with a higher probability of exit from ELL status. Though quite often imprecise, the results are largely robust to the bandwidth and specification chosen. The positive effects of lower grade placement also appear to sustain into the second year after school enrollment.

These findings are consistent with the hypothesis that new ELL students benefit from being placed in a grade with a lower level curriculum. A cursory exploration of the mechanisms underlying the link between lower grade placement and higher achievement also point to the possibility that students in the lower grade may benefit from being slightly older for their grade either because they are relatively more mature than their classmates or because they have been exposed to more prior schooling. Finally, ELLs who enroll in the lower grade receive more testing accommodations (e.g., permission to use a dictionary, extra time) on both exams. Given that I am unable to isolate the exact source of the positive lower grade placement effects, I am reluctant to point to one specific mechanism. Instead, the benefits likely lie in a combination of lower-level curriculum, relative age, and testing accommodations.

What explains the potentially larger effects on math than on reading? As explained above, curriculum experts have shown that the complexity and conceptual difficulty of math curriculum tends to increase by larger amounts than that of reading curriculum as students' age to the next grade (Mathematics Learning Study Committee, 2001). In addition, for many new students (and many students in the general population), mathematics learning occurs almost exclusively in school. Exposure to English and English language acquisition, in contrast, occurs both inside and outside of school. For ELL students, the language learning outside of school may be particularly high. Thus, the grade in which ELL students are placed may have less impact on their relative English language proficiency if students who are placed in the higher grade are able to supplement their learning of English at home and in the community.

Possibly due to the small samples required to identify local treatment effects, many of the estimated effects of lower grade placement from the regression discontinuity models are statistically indistinguishable from zero. Thus, it remains possible that lower grade placement does not lead to gains in ELL newcomers' performance in this large school system. However, the empirical results reveal no signs of harm to students' performance when they enroll in the lower grade. Given the absence of negative consequences, combined with suggestive evidence of positive consequences, the findings of this study would seem to suggest that the district should abandon the birthdate policy and encourage schools to assign new ELL entrants to the lower grade. In the meantime, further research is needed on the sources of the lower grade advantage as well as the generalizability of the advantage to students who are not induced into the lower grade by virtue of their date of birth and to students who migrate to other districts in the US.

References

August, D., & Hakuta, K. (Eds.) (1997). *Improving schooling for language-minority children: A research agenda*. Washington, DC: National Academies Press.

Bedard, K. and E. Dhuey. (2006). "The persistence of early maturity: International evidence of long-Run age effects." *Quarterly Journal of Economics*, 121, 1437-1472.

Carnoy, M. (2007). *Cuba's academic advantage: Why students in Cuba do better in school*. Stanford, CA: Stanford University Press.

Conger, D. (2009). "Testing, time limits, and English learners: Does age of entry affect how quickly students can learn English?" *Social Science Research 38*, 383-396.

Datar, A. (2006). "Does delaying kindergarten entrance give children a head start?" *Economics of Education Review* 25, 43-62.

Elder, T. and D. H. Lubotsky. (2009). "Kindergarten entrance age and children's achievement." *The Journal of Human Resources 44*, 641-683.

Francis, D.J., Lesaux, N., & August, D. (2006). "Language of instruction. in Developing Literacy in Second-Language Learners." Pp.365-413 in Diane August and Timothy Shanahan, eds., *Report of the National Literacy Panel on Language-Minority Children and Youth*, Mahwah, NJ: Lawrence Erlbaum Associates.

Hakuta, K., Y.G. Butler, D.Witt. (2000). "How long does it take English learners to attain proficiency?" University of California Linguistic Minority Research Institute, Santa Barbara, CA.

Mathematics Learning Study Committee. (2001). *Adding it up: Helping children learn Mathematics*. J. Kilpatrick, J. Swafford, & B. Findell (Eds.). National Research Council. Washington, DC: National Academies Press.

M-DCPS (Miami-Dade County Public Schools). (2005). Miami-Dade County Public Schools District LEP Plan 2004-2005. (and ELL Plan for 2008-09)

Imbens, G.W., and K. Kalyanaraman. (2010). "Optimal Bandwidth Choice for the Regression Discontinuity Estimator." CEMMAP Working Paper CWP05/10.

Imbens, G.W., and T. Lemieux, (2008). "Regression discontinuity designs: A Guide to Practice." *Journal of Econometrics* 142, 615-635.

McCrary, J. (2008). "Manipulation of the running variable in the regression discontinuity design: A density test." *Journal of Econometrics*, 142, 698-714.

Robinson, J.P. (2011). "Evaluating criteria for English learner reclassification: A causal-effects approach using a binding-score regression discontinuity design with instrumental variables." *Educational Evaluation and Policy Analysis* 33, 267-292.

Slavin, R.E., & Cheung, A. (2005). “A synthesis of research on language of reading instruction for English language learners.” *Review of Educational Research* 75(2): 247-284.

Slavin, R.E., N. Madden, M. Calderón, A. Chamberlain, and M. Hennessy. (2011). "Reading and language outcomes of a multiyear randomized evaluation of transitional bilingual education." *Educational Evaluation and Policy Analysis* 33, 47-58.

Figure 1: Distribution of Number of Days between Students' Birthdate and September 1

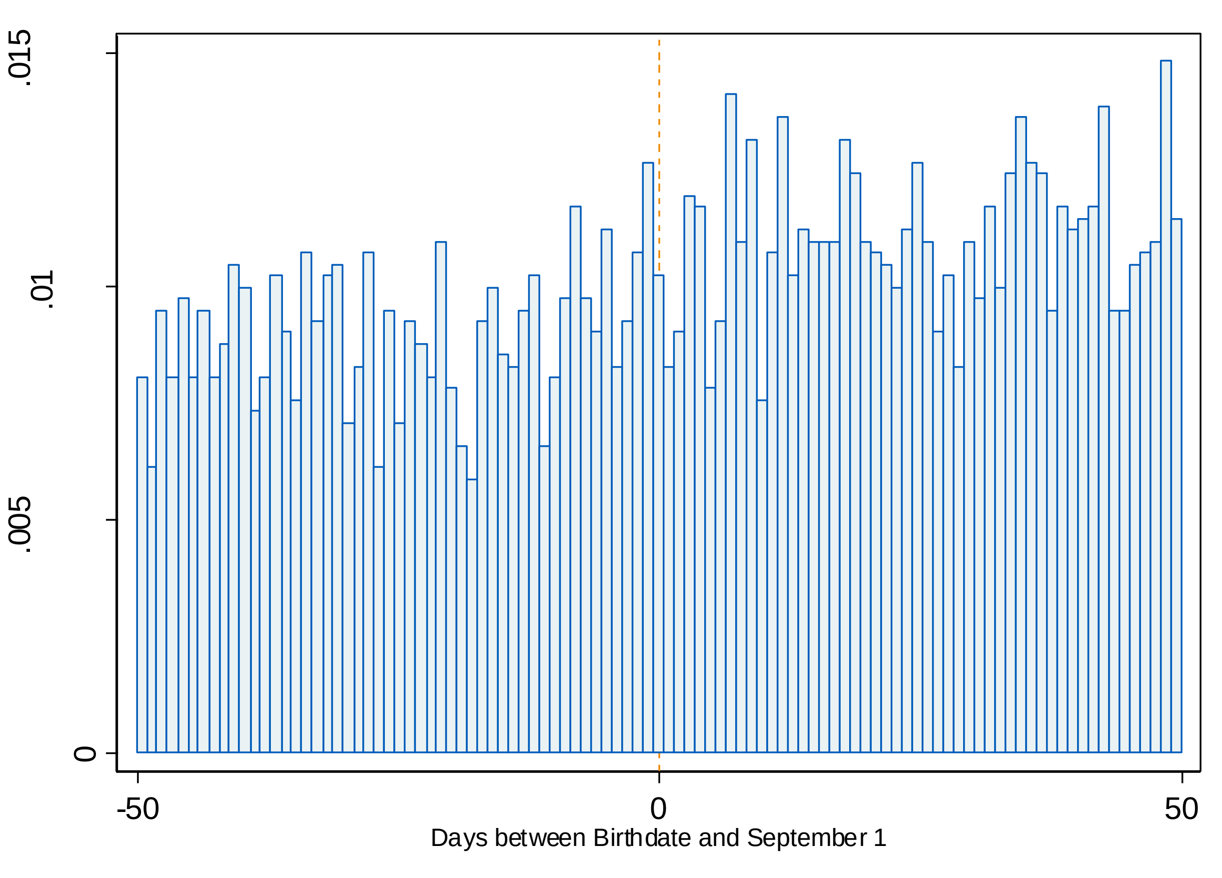
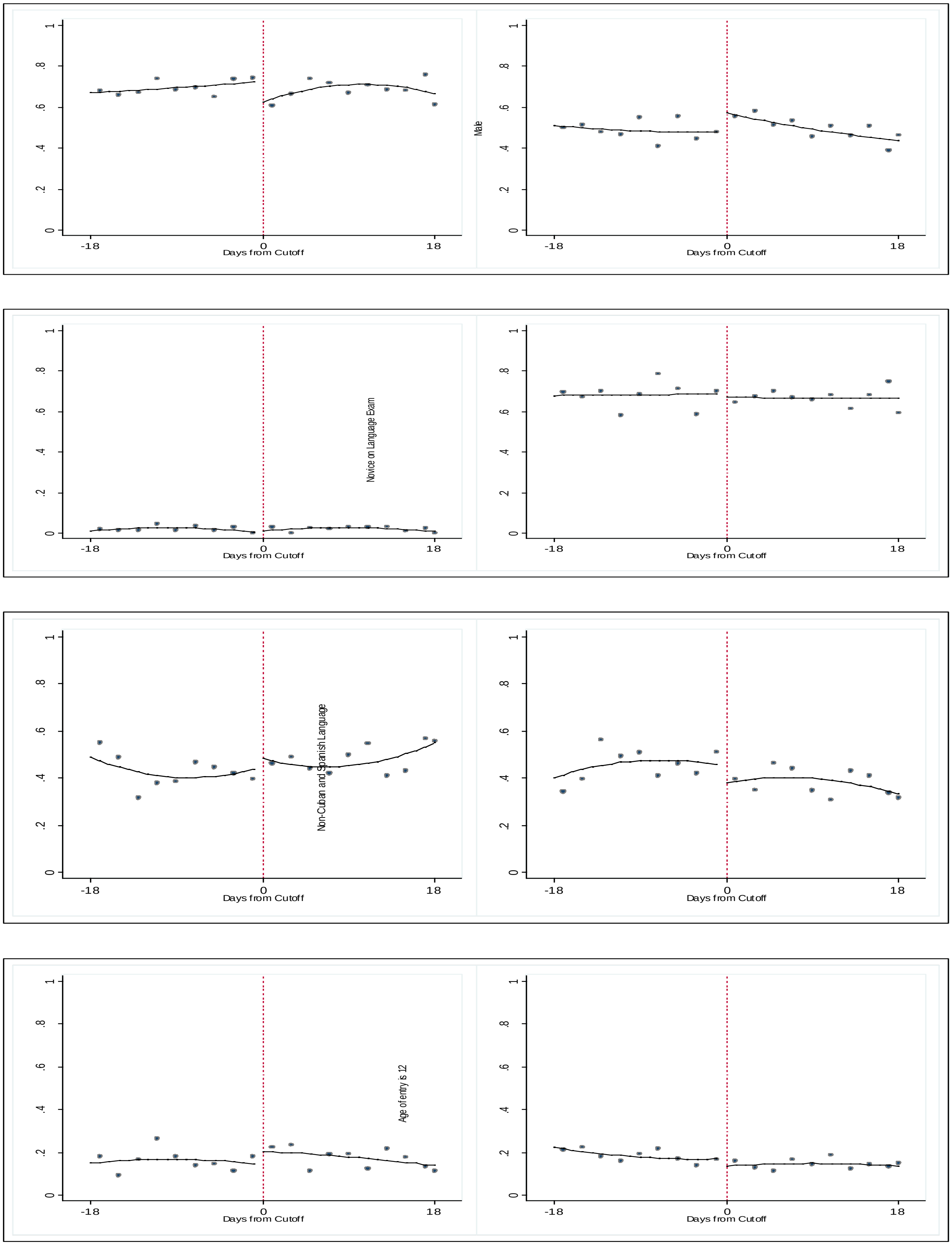
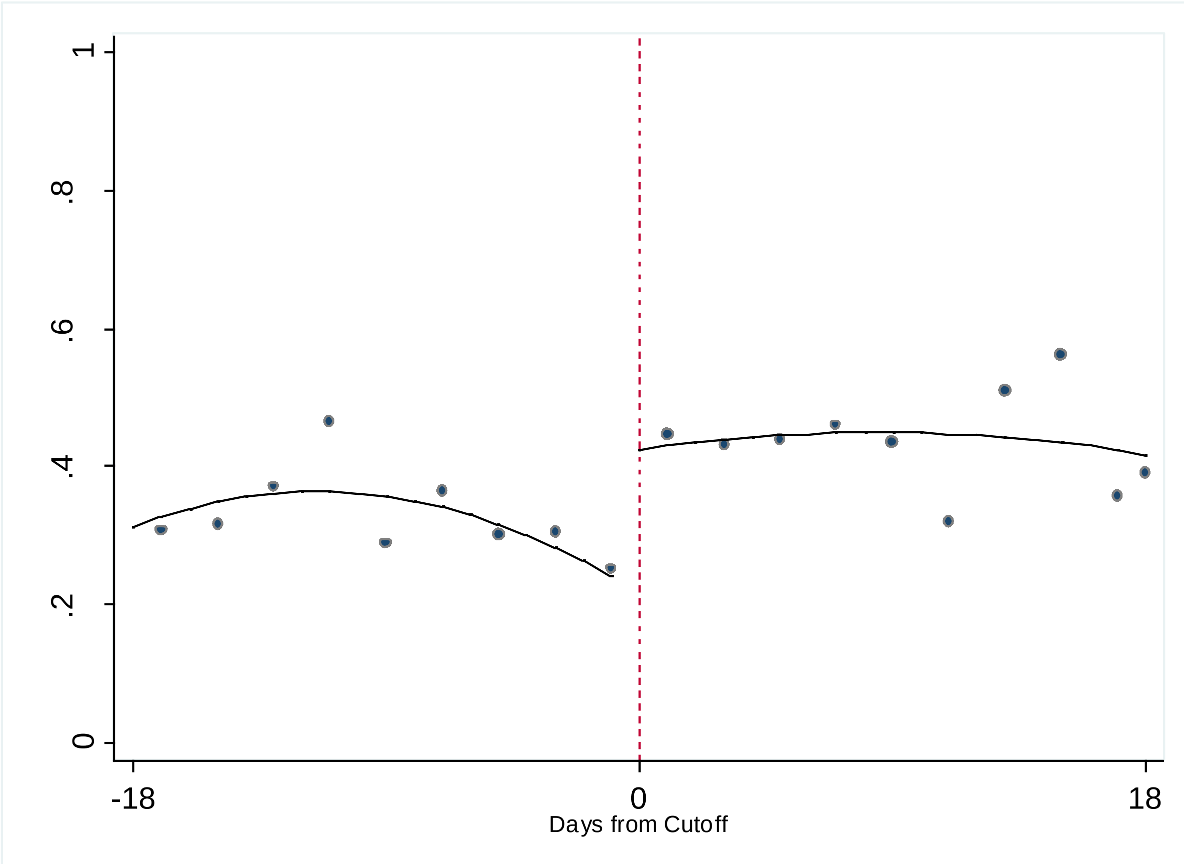


Figure 2: Graphical Discontinuities on Covariates



Notes: Lines represent local linear regressions using a rectangle kernel and a bandwidth of 18 days. Dots represent the average per bins of 2 days wide.

Figure 3: Graphical Discontinuity on Lower Grade Placement



Notes: Lines represent local linear regressions using a rectangle kernel and a bandwidth of 18 days. Dots represent the average per bins of 2 days wide.

Table 1. Characteristics of Students by Grade Placement

	All	Lower Grade	Higher Grade	Difference
	(1)	(2)	(3)	(4) = (2)-(3)
Number of students	13884	4742	9142	
Proportion of all	1.00	0.34	0.66	
Background Characteristics:				
Free lunch eligible	0.69	0.65	0.72	-0.06***
Male	0.51	0.53	0.50	0.03***
Disabled	0.02	0.03	0.01	0.02***
Cuban and Spanish language	0.44	0.25	0.54	-0.28***
Non-Cuban and Spanish language	0.41	0.56	0.33	0.23***
Haitian-Creole language	0.09	0.11	0.07	0.03***
Other language	0.07	0.08	0.06	0.03***
Novice on Language Exam	0.66	0.63	0.68	-0.06***
Age 7 upon entry	0.17	0.17	0.17	-0.00
Age 8 upon entry	0.17	0.17	0.17	0.00
Age 9 upon entry	0.16	0.16	0.16	-0.01
Age 10 upon entry	0.16	0.17	0.16	0.01
Age 11 upon entry	0.17	0.16	0.17	0.00
Age 12 upon entry	0.17	0.17	0.17	0.00
Exam score:				
NRT Math Score	33.32	37.01	31.40	5.61***
	(26.72)	(28.66)	(25.45)	
NRT Reading Score	20.18	24.26	18.05	6.21***
	(21.39)	(24.21)	(19.45)	

Notes: i) Sample includes all foreign-born ELL students who enrolled in the Miami-Dade County Public School System between the ages of 7 and 12 in school years 2003 through 2007. ii) One-quarter of students in the "other language" category are French-speaking, followed by 10% Portuguese, 5% Chinese, and smaller shares of other language groups. iii) * p< 0.10; ** p<0.05; *** p<0.01.

Table 2. Instrument Independence

Dependent variable	(1)	(2)	(3)
Free lunch eligible	-0.06	-0.06	-0.06
	(0.07)	(0.07)	(0.08)
Male	0.08	0.06	0.09
	(0.07)	(0.08)	(0.09)
Disabled	0.02	0.02	0.02
	(0.02)	(0.02)	(0.02)
Cuban and Spanish language	0.08	0.09	0.08
	(0.07)	(0.08)	(0.09)
Non-Cuban and Spanish language	-0.09	-0.09	-0.10
	(0.07)	(0.08)	(0.09)
Haitian-Creole language	0.01	0.02	0.03
	(0.04)	(0.05)	(0.05)
Novice on Language Exam	0.04	-0.01	0.02
	(0.07)	(0.07)	(0.08)
Age 7 upon entry	0.01	0.01	0.00
	(0.05)	(0.05)	(0.06)
Age 8 upon entry	0.06	0.08	0.09
	(0.05)	(0.06)	(0.07)
Age 9 upon entry	-0.05	-0.07	-0.07
	(0.05)	(0.05)	(0.06)
Age 10 upon entry	0.00	-0.01	0.01
	(0.06)	(0.06)	(0.06)
Age 11 upon entry	-0.03	-0.02	-0.03
	(0.05)	(0.06)	(0.06)
Age 12 upon entry	0.01	0.01	0.00
	(0.05)	(0.06)	(0.06)
Number of students	816	1537	2245
Bandwidth	9	18	27
Polynomial degree	1	2	3

Notes: i) Table provides estimates and standard errors on the September 1 cutoff variable from regressions of each variable shown in the row on the cutoff variable and polynomial orders on days for the 9, 18, and 27 day bandwidths. ii) Models estimated with probit and marginal effects are reported. iii) Standard errors are corrected for clustering at school of entry. ii) * p <.10; ** p<0.05; *** p<0.01.

Table 3. Birthdate Effects on Lower Grade Placement (First Stage Estimates)

	(1)	(2)	(3)	(4)	(5)	(6)
September 1 cutoff	0.22***	0.30***	0.24***	0.33***	0.21***	0.22***
	(0.06)	(0.08)	(0.07)	(0.08)	(0.08)	(0.08)
Number of students	816	816	1537	1537	2245	2245
Bandwidth	9	9	18	18	27	27
Polynomial degree	1	1	2	2	3	3
Controls	No	Yes	No	Yes	No	Yes

Notes: i) Control variables include eligibility for free or reduced-price lunch, gender, first language and country of origin, entry language score, disability, age by year by semester of entry fixed effects, and school fixed effects. ii) Standard errors are corrected for clustering at school of entry and reported in parentheses. iii) * p <.10; ** p<0.05; *** p<0.01.

Table 4. Lower Grade Placement Effects on First Reading and Math Scores

	(1)	(2)	(3)
Panel A: Math			
OLS	9.93***	8.46***	6.56***
	(3.49)	(2.04)	(1.60)
Reduced-form (RF)	7.15	8.96*	6.30
	(4.75)	(4.78)	(4.78)
2SLS	23.91*	27.12**	28.30
	(13.48)	(12.94)	(20.40)
Panel B: Reading			
OLS	10.59***	7.68***	6.41***
	(2.71)	(1.53)	(1.12)
Reduced-form (RF)	1.47	2.17	0.75
	(3.44)	(3.33)	(3.39)
2SLS	4.93	6.56	3.38
	(9.26)	(8.82)	(13.90)
Number of students	816	1537	2245
Bandwidth	9	18	27
Polynomial degree	1	2	3

Notes: i) Control variables include eligibility for free or reduced-price lunch, gender, first language and country of origin, entry language score, disability, age by year by semester of entry fixed effects, and school fixed effects. ii) Standard errors are corrected for clustering at school of entry and reported in parentheses. iii) * p <.10; ** p<0.05; *** p<0.01.

Table 5. Lower Grade Placement Effects on First Reading and Math Scores by Subgroup, 18 Day Bandwidth

	N	FS	Math OLS	Reading OLS	Math RF	Reading RF
	(1)	(2)	(3)	(4)	(5)	(6)
All	1537	0.33***	8.46***	7.68***	8.96*	2.17
		(0.08)	(2.04)	(1.53)	(4.78)	(3.33)
Novice Entry score	1036	0.31***	8.24***	7.21***	9.40*	1.98
		(0.09)	(2.18)	(1.67)	(5.42)	(3.56)
Higher than Novice	501	0.24	6.35	7.65*	4.01	-2.94
		(0.23)	(5.30)	(4.62)	(13.14)	(12.08)
Cuban, Spanish	696	0.21*	9.83***	7.83***	7.45	-2.98
		(0.12)	(3.41)	(2.84)	(8.40)	(5.61)
Non-Cuban, Spanish	638	0.47***	10.77***	9.27***	16.59*	6.03
		(0.14)	(3.19)	(2.63)	(8.49)	(6.76)
Female	782	0.23*	8.32**	7.96***	10.30	0.78
		(0.13)	(3.27)	(2.48)	(7.82)	(6.35)
Male	755	0.49***	6.12*	5.95**	11.29	1.23
		(0.14)	(3.39)	(2.57)	(7.77)	(5.52)

Notes: i) OLS results from Equation (1), first stage (FS) results from Equation (2), and reduced-form (RF) results from Equation (3). ii) Regressions control for eligibility for free or reduced-price lunch, gender, first language and country of origin, entry language score, disability, age by year by semester of entry fixed effects, and school fixed effects. iii) Standard errors are corrected for clustering at school of entry and reported in parentheses. iv) * p <.10; ** p<0.05; *** p<0.01.

Table 6. Lower Grade Placement Effects on Second Year Outcomes, 18 Day Bandwidth

Dependent Variable	N (1)	Mean [Std. Dev] (2)	OLS/ Probit (3)	RF (4)
Enrolled in M-DCPS	1537	0.71	0.0002	0.001
			(0.0156)	(0.006)
Second year math score	1087	44.76	7.89***	12.44*
		[28.88]	(2.54)	(6.66)
Second year reading score	1087	33.36	7.82***	6.16
		[27.40]	(2.46)	(5.64)
Promoted to next grade	1087	0.97	-0.02	0.03
			(0.02)	(0.02)
Exit ELL status	1087	0.22	0.07**	0.04
			(0.03)	(0.07)

Notes: i) OLS/Probit results from Equation (1), reduced-form (RF) results from Equation (3). ii) Regresions control for eligibility for free or reduced-price lunch, gender, first language and country of origin, entry language score, disability, age by year by semester of entry fixed effects, and school fixed effects. iii) Standard errors are corrected for clustering at school of entry and reported in parentheses. iv) * p <.10; ** p<0.05; *** p<0.01.

Table 7. Possible Mechanisms, 18 Day Bandwidth

Dependent variable	Mean [Std. Dev] (1)	OLS/ Probit (2)	RF (3)
Relative age (in months)	1.03	0.10***	0.03***
	[0.07]	(0.00)	(0.01)
Testing accomodations: Math	0.45	-0.01	0.02**
		(0.02)	(0.01)
Testing accomodations: Reading	0.46	0.02	0.03***
		(0.02)	(0.01)

Notes: i) OLS/Probit results from Equation (1), reduced-form (RF) results from Equation (3). ii) Regresions control for eligibility for free or reduced-price lunch, gender, first language and country of origin, entry language score, disability, age by year by semester of entry fixed effects, and school fixed effects. iii) Standard errors are corrected for clustering at school of entry and reported in parentheses. iv) * p <.10; ** p<0.05; *** p<0.01.

Appendix Table 1. Lower Grade Placement Effects on First Reading and Math Scores by Subgroup, Alternate Bandwidths

	9 Day Bandwidth						27 Day Bandwidth					
	N	FS	Math OLS	Reading OLS	Math RF	Reading RF	N	FS	Math OLS	Reading OLS	Math RF	Reading RF
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
All	816	0.299**	9.93***	10.59***	7.15	1.47	2245	0.222***	6.56***	6.41***	6.3	0.75
		(0.075)	(3.49)	(2.71)	(4.75)	(3.44)		(0.077)	(1.60)	(1.12)	(4.78)	(3.39)
Novice Entry score	557	0.240***	8.91**	10.18***	6.83	1.64	1502	0.192*	6.31***	6.19***	8.64*	1.04
		(0.089)	(4.07)	(3.42)	(5.68)	(4.39)		(0.097)	(1.73)	(1.39)	(5.22)	(3.75)
Higher than Novice	259	0.259	17.14	7.34	2.75	-11.4	743	0.084	6.04	5.81**	5.37	-1.39
		(0.376)	(14.53)	(11.44)	(18.98)	(23.96)		(0.188)	(3.68)	(2.85)	(11.22)	(8.85)
Cuban, Spanish	361	0.254**	7.13	7.91	9.09	-3.69	1027	0.218**	6.80***	5.27***	5.49	-4.93
		(0.123)	(5.02)	(5.33)	(9.54)	(6.88)		(0.104)	(2.37)	(1.76)	(7.96)	(5.70)
Non-Cuban, Spanish	348	0.408**	12.67*	12.05	11.3	-1.15	917	0.291*	10.14***	8.25***	12.2	6.04
		(0.192)	(7.65)	(7.67)	(10.69)	(9.37)		(0.149)	(2.45)	(2.11)	(8.21)	(5.82)
Female	406	0.099	4.38	8.38	11.43	3.17	1131	0.215*	6.07**	6.92***	4.32	1.54
		(0.148)	(7.88)	(5.83)	(9.93)	(8.21)		(0.118)	(2.39)	(1.78)	(6.83)	(5.60)
Male	410	0.403**	9.42	10.90**	4.47	-6.05	1114	0.326**	5.66**	5.64***	7.37	-4.53
		(0.165)	(6.51)	(5.08)	(10.71)	(6.87)		(0.135)	(2.29)	(1.69)	(8.13)	(5.59)

Notes: i) OLS results from Equation (1), first stage (FS) results from Equation (2), and reduced-form (RF) results from Equation (3). ii) Regressions control for eligibility for free or reduced-price lunch, gender, first language and country of origin, entry language score, disability, age by year by semester of entry fixed effects, and school fixed effects. iii) Standard errors are corrected for clustering at school of entry and reported in parentheses. iv) * p <.10; ** p<0.05; *** p<0.01.

Appendix Table 2. Lower Grade Placement Effects on Second Year Outcomes, Alternate Bandwidths

	9 Day Bandwidth				27 Day Bandwidth			
	N	Mean [Std. Dev]	OLS/ Probit	RF	N	Mean [Std. Dev]	OLS/ Probit	RF
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Enrolled in M-DCPS	816	0.72	--	--	2245	0.70	-0.003	-0.01
							(0.019)	(0.01)
Second year math score	584	45.03	9.94**	9.71	1577	44.67	6.90***	12.14*
		[28.56]	(4.55)	(7.26)		[28.93]	(1.94)	(6.41)
Second year reading score	584	33.14	10.89**	5.05	1577	32.97	6.99***	5.78
		[27.32]	(4.29)	(6.51)		[27.58]	(1.92)	(5.72)
Promoted to next grade	584	0.97	--	--	1577	0.96	-0.01	0.03
							(0.01)	(0.06)
Exit ELL status	584	0.22	0.06**	0.05	1577	0.22	0.06***	0.03*
			(0.03)	(0.06)			(0.02)	(0.02)

Notes: i) OLS/Probit results from Equation (1), reduced-form (RF) results from Equation (3). ii) '--' indicates that the estimates could not be obtained given the small sample and large number of fixed effects. iii) Regresions control for eligibility for free or reduced-price lunch, gender, first language and country of origin, entry language score, disability, age by year by semester of entry fixed effects, and school fixed effects. iv) Standard errors are corrected for clustering at school of entry and reported in parentheses. iv) * p <.10; ** p<0.05; *** p<0.01.

Appendix Table 3. Possible Mechanisms, Alternate Bandwidths

	9 Day Bandwidth			27 Day Bandwidth		
	Mean [Std. Dev]	OLS/ Probit	RF	Mean [Std. Dev]	OLS/Pro bit	RF
Dependent variable	(1)	(2)	(3)	(4)	(5)	(6)
Relative age (in months)	1.03	0.10***	0.03**	1.03	0.10***	0.03***
	[0.07]	(0.01)	(0.01)	[0.07]	(0.00)	(0.01)
Testing accomodations: Math	0.44	0.01	0.03**	0.45	-0.01	0.01
		(0.03)	(0.01)		(0.02)	(0.03)
Testing accomodations: Reading	0.46	0.04	0.03	0.47	0.02	0.01
		(0.03)	(0.022)		(0.02)	(0.02)

Notes: i) OLS/Probit results from Equation (1), reduced-form (RF) results from Equation (3). ii) Regresions control for eligibility for free or reduced-price lunch, gender, first language and country of origin, entry language score, disability, age by year by semester of entry fixed effects, and school fixed effects. iii) Standard errors are corrected for clustering at school of entry and reported in parentheses. iv) * p <.10; ** p<0.05; *** p<0.01.