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Do Immigrants Differ from Migrants?

Disentangling the Impact of Mobility on High School Completion and Performance

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Abstract

While previous evidence finds that foreign-born students perform better than native-born students in their elementary and middle school years, policymakers and practitioners continue to raise concerns about educational outcomes of immigrants who come to the United States in their high school years. Are late entering students able to graduate from high school in a timely manner or do they fall behind? How does their success compare to late entering native-born students – that is, migrant students? How does mobility shape performance and does nativity matter? We use data on a large cohort of New York City public high school students to estimate a standard education production function model and to examine how the performance of immigrant students differs between students who emigrate during high school, middle school or elementary school. We then compare these level of entry disparities to the level of entry disparities experienced by native-born students. Contrary to prior studies, our difference-in-difference estimates suggest that, *ceteris paribus*, immigrant students do quite well compared to mobile native-born students and high school entrants even better than earlier entering immigrants. Migration appears to be a bigger issue than immigration *per se*.

Introduction

As immigrant students continue to enter U.S. schools in large numbers, policymakers, parents and school leaders are concerned about their levels of academic performance and educational attainment. Immigrant students' educational performance indicates how well U.S. schools are serving newcomer children and informs larger issues such as whether immigrants will enhance or impede U. S. ability to compete in global labor markets and whether immigrants' future earnings will support or burden welfare, health care and retirement systems.

Advocates for immigrant services as well as researchers document an array of challenges faced by immigrant students and their parents that could impair student achievement, including limited English proficiency (LEP), differences in the curriculum or rigor of education between countries of origin and the U.S., and communication barriers between students, parents and U.S. educators (e.g. Gershberg, Danenberg, and Sanchez 2004; Ruiz-de-Velasco, Fix, and Clewell 2002). In previous work on New York City children in public elementary and middle schools, however, we found that young immigrants on average outperform native-born students throughout the elementary and middle school grades. While some immigrants have lower raw test scores than the average native-born, the disparity largely reflects differences in the demographic and educational (e.g. LEP) characteristics of the immigrant groups (Schwartz and Stiefel 2006). Comparing observationally-equivalent students suggests that immigrants from almost all regions of the world perform better than their native-born peers on elementary and middle school reading and math tests[1].

Yet success in the primary grades may not be sustained through high school. As important, a significant number of students emigrate during the high school years and there is

[1] While this contradicts the claims of some advocates and some previous research (particularly studies that include few control variables), the finding is consistent with a few notable studies such as Kao and Tienda (1995).

growing research indicating that these youths do not fare well (e.g. Chiswick and DebBurman 2004; Ruiz-de-Velasco et al. 2002). While empirical evidence is relatively thin, a variety of economic, developmental, and educational factors could lead to lower educational attainment and achievement of teenage entrants to the U.S. Prior human capital may matter more in high school than in elementary or middle school, and foreign-born students who enter as teenagers may have accumulated poor quality, limited quantity, or non-transferable education in their source country. The developmental characteristics of immigrant teens may affect negatively their ability to learn a new language and new customs. Or, there may be less flexibility in the curricula of high schools compared to lower schools that limits the transferability of prior knowledge. Of course, it is also possible that foreign-born students - or some group of them - will have accumulated superior academic training prior to emigrating.

Moreover, there is a growing recognition that school mobility can harm the achievement of all students no matter what their nativity status. In large districts, in particular, this may be due to differences in the kinds of schools and programs that new entrants can attend. For example, entry into magnet or specialized schools may be limited to students who apply early or some schools may already be overcrowded and unable to accept new students. Some of the disadvantages faced by later-entering foreign-born students might, therefore, be shared by native-born students moving into the district. Mobility itself, rather than mobility associated with moving to a new country, could account for differences in educational performance of new immigrants compared to native-born students who are not mobile. Thus, understanding the performance of immigrants in school requires comparing them to similarly mobile native-born students, a comparison that has not been made in prior research.

This paper aims to estimate the impact of time of entry into the school system on high school academic performance and to disentangle the specific contribution of immigration as distinct from migration/mobility. Using data on a cohort of over 60 thousand New York City

public school students, we estimate whether – and to what extent – the timing of entry into U.S. schools affects immigrant students' high school performance by comparing high school entrants to middle and elementary school entrants. At the same time, we estimate whether – and to what extent – the timing of entry into New York City public schools affects the performance of native-born students.[2] To be more specific, we estimate the difference between the high school performance of students who enter in high school and those who enter in lower grades, both for the foreign-born students and for the native-born students. From these, we construct difference-in-difference estimates of the impact of high school entry on immigrant performance, relative to the performance of native-born students.

In short, we add to existing literature by studying high school outcomes by time of entry, distinguishing the effects of mobility for immigrant and native-born students and isolating the extent to which the high school performance of immigrants reflects the impact of immigration per se, rather than mobility or migration, on performance. We make a number of additional contributions to the literature. First, we control for a range of differences between students that may confound previous research and, second, we estimate value-added models of high school graduation that include measures of prior academic performance. Third, we control for differences between foreign-born entrants in prior human capital, co-ethnic communities, and culture by including 13 region-of-origin fixed effects. Finally, we introduce a set of high school fixed effects, which control for any differences in the quality of schools attended by immigrant and native-born students. In summary, we exploit the large size and diversity of New York City's high school students to understand whether and why nativity and level of entry matters to high school performance.

The rest of this paper is organized as follows. In section two, we review prior literature with a focus on why migration might matter to academic performance. In section three, we

[2] For the vast majority of foreign-born students, entry into New York City schools marks their entry into U.S. schools.

develop our empirical strategy, in section four describe our data and in section five present results. A series of robustness tests are described in section six and conclusions are presented in section seven.

Why Should (Im)migration Matter to Academic Performance?

Prior research examining the relationship between academic outcomes and mobility – both within and between countries – often draws upon human capital theory, which regards investment in schooling as an individual decision undertaken when expected returns (usually measured as earnings) exceed expected costs, both direct and opportunity (Chiswick 1978; Chiswick and DebBurman 2004; Duleep and Regets 1999). While human capital models can be applied to a wide range of educational decisions, they are often focused on explaining years of schooling and educational attainment (e.g., explaining drop out decisions of high school students). Typically, differences in attainment are attributed to differences in labor market returns to education and to differences in the direct and indirect or opportunity costs of schooling.

Interestingly, human capital theory yields competing predictions about immigrant investments in schooling. On the one hand, if immigrants have lower destination-specific or "transferable" skills (e.g., English proficiency and familiarity with U.S. culture and labor market structures), they may face lower wages in the labor market than native-born students, *ceteris paribus,* and as a result have less incentive to forego school for full time work. Put differently, lower destination specific skills among immigrants will mean a lower opportunity cost of schooling and greater attainment for immigrants. In contrast, immigrants with fewer transferable skills may need to exert more effort to acquire more schooling precisely because of this limited set of skills, and thus the costs of further schooling (which may be psychic) may be higher than for native-born students. Which of these forces dominates is, in the end, an empirical question

and the limited prior empirical work on this topic suggests that the latter effect dominates. That is, immigrants who enter the U.S. at older ages are found to invest in fewer years of schooling than younger immigrants, which is consistent with the notion that the high costs of schooling are more important than low opportunity costs, at least for immigrants entering in high school. Similarly, immigrants from less developed countries where English is not the official language obtain fewer years of schooling than immigrants from more developed regions, again suggesting the domination of the latter effect (Chiswick and DebBurman 2004).

Alternatively, differences in educational attainment may also be driven by differences in the educational ambitions of the peers with whom students identify, their own cultural norms, the treatment they receive from the U.S. government, and/or the cohesiveness of and labor market opportunities provided by their local co-ethnic communities (e.g. Alba and Nee 2003; Borjas 1992; 1995; Portes and Rumbaut 1996; 2001). Thus, educational attainment is likely to differ across countries of origin, ethnicities, and/or cultures. Existing empirical work often documents such differences (e.g. Gonzalez 2003; Hirschman 2001), although it should be noted that country or region of origin often serves as a proxy in empirical work for many of these unobserved contextual and cultural influences on young immigrant assimilation patterns.

In a somewhat different vein, age of entry may be important because immigration often marks the onset of learning a second language, which may be developmentally more difficult for older children. One review of linguistics research suggests that while older children acquire second language proficiency more quickly than younger children because they are more advanced in their native-language development, the children who learned the second language at a younger age are eventually more proficient than those who learned at an older age (Collier 1987). Thus, age of entry may shape academic performance because of developmental differences in the ability to gain complete proficiency in English and these differences may persist.

Of course, differences in achievement, both among immigrants and between immigrants

and the native-born, may be a reflection of differences in the quality of schools attended. Schools in the United States are notoriously segregated along racial lines, with disturbing implications for the quality of schools attended by different race groups (see Iatarola and Stiefel 2003; Kain and Singleton 1996; and Ellen, O'Regan, Schwartz and Stiefel 2002). It is plausible that similar kinds of segregation obtain for immigrant students, with similar results. While there is limited existing work on this, our prior work on New York City elementary and middle school students suggests few differences between the quality measures of schools attended by foreign- and native-born students (Schwartz and Stiefel 2004). Studies of secondary school students in California and the nation, however, suggest that LEP and Hispanic students attend lower quality high schools than other students (Gershberg et al. 2004; Ruiz-de-Velasco et al. 2002). Whether there are differences in the quality of high schools attended – due to differences in programs, opportunity, residential location, or say, driven by the difficulty of navigating school choice – and whether these differences have particular salience for high school immigrants is an open question that we examine in this paper.

Finally, there is a growing concern that mobility (including switching schools without concomitant residential moves) is, in and of itself, harmful to academic performance. While some previous research supports the claim that mobility is harmful to student test scores (Hanushek, Rivkin, and Kain 2004; U.S. GAO 1994), other studies have found no effect of school transfers (Alexander, Entwisle, and Dauber 1996; Heinlin and Shinn 2000). Recent evidence suggests that mobility during high school may increase the likelihood of dropout, however. Using data from the first two waves of the National Longitudinal Study of Adolescent Health, South, Haynie, and Bose (2007) find that adolescent students who change schools and residences are twice as likely to drop out of high school compared to their non-mobile counterparts (6.0% versus 3.2% with no controls) and that differences in peer networks are a contributing factor

Taken together, the previous literature suggests that while late entrance to a school

system may mean lower high school performance for both foreign-born and native-born students, the effect may be stronger for immigrants due both to differences in their socio-economic status and to the difficulties of gaining English language skills as teenagers. Thus, controlling for these attributes, foreign-born who enter late may not fare differently than those who enter early or than native-born who are also migrants.

Turning to empirical estimates, we know of only six studies that examine the effect of age of entry on the academic performance and educational attainment of foreign-born students in the U.S. The methodology and findings from each study are provided in Table 1. Even though the studies use different data sets, measures of educational performance, age of entry cutoffs, and covariates, they tell a fairly consistent story: among youth who emigrate before the age of 19, educational achievement and attainment decreases with age at immigration. A notable exception is Glick and White (2003), who use two national longitudinal surveys of 10th graders to examine performance on standardized exams in the 10th and the 12th grades as well as high school graduation rates. Controlling for student and family characteristics, Glick and White find that, among immigrants, more recent entrants perform less well on 10th grade exams than earlier entrants, but there is no difference between these groups in 12th grade exams or high school dropout rates.

Chiswick and DebBurman (2004) examine the effect of age of entry among both youth and adult immigrants, and the findings shed some light on the difference between the effect of age of entry versus length of residency. Using Current Population Survey data on 1990 households, the authors find that teenage entrants (ages 13 to 19) obtain the least amount of schooling, while those who emigrate at younger and older ages obtain more years of schooling. Importantly, they conclude that age of immigration may influence schooling independently of the number of years since immigration.

We are left with unanswered questions about the effects on academic performance of

mobility by its source (immigration versus domestic mobility) and about the effects of level of entry (elementary, middle, or high school) into the school system. We turn to our empirical work, where we address both questions.

Empirical Strategy

1. Empirical Strategy

At the core of our empirical work is a regression model that links student performance to a set of variables characterizing age of entry and nativity. We create three indicator variables that distinguish between students who entered in elementary school (ES), middle school (MS), or high school (HS) years. Another indicator variable (FB) identifies foreign-born students, who we define as students born in a country other than United States.[3] We then include these variables in a traditional education production function model – interacted, as necessary -- to estimate the key differences between these groups and, critically, to construct difference-in-difference estimates of the effects of immigration and level of entry on high school outcomes.

To be concrete, we begin with the following simplified equation:

(1) $Y_i = \alpha_0 + \alpha_1 FB_i + \alpha_2 FB_i*MS_i + \alpha_3 FB_i*HS_i + \alpha_4 NB_i*MS_i + \alpha_5 NB_i*HS_i + \varepsilon_i$

where Y_i represents one of five different high school outcomes for student *i,* "FB" indicates whether the student is foreign-born, "NB" whether she is native-born, "MS" whether she entered in middle school, and "HS" whether she entered in high school. Notice that this specification includes no control variables and so coefficients capture the mean performance (Y) for the relevant group. More specifically, α_0 captures the mean performance of native-born students who enter in elementary school (NB/ES), and who serve as the reference group. Adding α_0 to α_1 yields the mean performance of the foreign-born elementary school entrants (FB/ES) and α_1 measures

[3] Students reporting a country of birth other than the United States or its territories is considered foreign-born.

the mean disparity between foreign-born elementary school entrants and native-born elementary school entrants. This specification allows us to estimate a number of differences between key groups and also a set of difference-in-difference estimates.

To make these clear, Table 2 shows the estimated parameters, their relationship to the key constructs of interest and the calculations of the difference and difference-in-difference estimators. We begin by exploring the differences between entry cohorts within the nativity groups. The first column shows how to calculate the performance of foreign-born students by their entry cohort. Row 1 provides the calculation for the mean performance of high school entrants ($\alpha_0 + \alpha_1 + \alpha_3$), row 2 provides the calculation for middle school entrants ($\alpha_0 + \alpha_1 + \alpha_2$), and row 3 provides the calculation for elementary school entrants ($\alpha_0 + \alpha_1$). Subtracting any two rows provides the three age of entry differences among the foreign-born. For instance, the difference between the high school and middle school entrants is the difference between the first two rows ($\alpha_3 - \alpha_2$), shown in row 4. In a fully specified model, this difference is an estimate of the impact of high school entry on performance for foreign-born students, relative to middle school entrants. Rows 5 and 6 show how to calculate the differences between the other level of entry groups. Similar calculations can be made for the native-born students and are shown in column (2).

We turn next to examining the differences between the foreign-born and the native-born within their entry cohorts. As shown in Column (3), we can calculate the "nativity gaps" in performance within entry level by subtracting the coefficients in Column (2) from those in Column (1). Thus, the disparity in performance between foreign-born and native-born high school entrants is found as $\alpha_1 + \alpha_3 - \alpha_5$. Similarly, for middle school entrants, the difference is $\alpha_1 + \alpha_2 - \alpha_4$. For elementary entrants, the difference is simply α_1.

Finally, we find the difference-in-difference estimates of the impact of level of entry on the relative performance of immigrants in the bottom right quadrant of Table 2. Subtracting the

difference between the foreign- and native-born middle school entrants from the difference between foreign- and native-born high school entrants yields $[(\alpha_3 - \alpha_2) - (\alpha_5 - \alpha_4)]$, an estimate of the differential impact of middle versus high school entry. A similar difference-in-difference estimate between high school and elementary school entrants is $\alpha_3 - \alpha_5$. These calculations can be viewed as estimates of the specific impact of high school entry on the performance of foreign-born students. The difference-in-difference approach distinguishes whether age of entry differences among foreign-born are due to immigration to the country or mobility to a new school system. In addition, we estimate whether mobility at the high school level has a unique effect by comparing mobile groups at middle school and then at elementary school. If immigration in the teenage years is uniquely disadvantageous, then we should find negative difference-in-difference estimates for immigrant high school entry, perhaps with larger absolute values for comparisons with the earliest entrants (elementary school level). That said, the parsimonious model includes no other control variables so that some of the measured disparities may reflect differences in the characteristics of students, families and schools.

As described earlier, our core model includes a range of student demographic and educational characteristics and school characteristics in a fairly traditional education production style model:

(2) $Y_{ij} = \alpha_0 + \alpha_1 FB_i + \alpha_2 FB_i*MS_i + \alpha_3 FB_i*HS_i + \alpha_4 NB_i*MS_i + \alpha_5 NB_i*HS_i + \mathbf{ST}_i\beta + S_j + \varepsilon_{ij}$

where outcome Y is for student *i* in school *j*. **ST** is a vector of student demographic and language variables, including race/ethnicity, gender, whether the student is overage for grade, whether the student is LEP, and whether a language other than English is most frequently spoken at home. S_j is a set of high school fixed effects that controls for unobserved characteristics, including, for example, differences in location or admission policy. Importantly, using the school effects means that the coefficients are identified only by the within school variation in the variables and not the between schools variation, which may be limiting. Thus, we estimate the model both with and

without the school effects. Finally, we replace the foreign-born indicator with a set of fixed effects distinguishing 13 regions of origin to control for unobserved factors that vary across students from different regions of the world. (See Appendix 1 for countries by region.) Such factors might include the level of development, quality of schooling, or the official language students may have experienced in their home country as well as the cultural norms and contextual influences of their families and co-ethnic communities in New York City. Note this means that it is possible to estimate region-specific "differences" and difference-in-difference estimates. We return to this point in section six where we perform a series of robustness checks.

Our third specification models only the probability of graduation and includes 10th grade test scores as a regressor to create a value-added model as follows:

(3) $Graduation_{ij} = \alpha_0 + \alpha_1 FB_i + \alpha_2 FB_i*MS_i + \alpha_3 FB_i*HS_i + \alpha_4 NB_i*MS_i + \alpha_5 NB_i*HS_i + \mathbf{ST}_i\beta + S_j + \alpha_6 10thgradetest_i + \varepsilon_{ij}$

This full model allows us to begin to distinguish the effect of level of entry from length of residency. If we observe level of entry effects on changes from 10th grade test score to completion (a two-year time span), we can more confidently conclude that level of entry influences performance independently of time in the school system since time in system between 10th grade and four-year graduation is held constant. We also estimate this model with a set of fixed effects distinguishing 13 regions of origin.

Data

With administrative data provided by the New York City Department of Education, we assembled a cohort of students projected to graduate from the New York City public schools in the spring of 2002 had they been on normal academic progression from the 9th grade. The sample of 61,338 students includes all 9th graders in 1998-99, incoming 10th graders in 1999-2000,

incoming 11th graders in 2000-01, and incoming 12th graders in 2001-02.

For each high school student, the data include detailed demographic and academic records, such as race, language spoken at home, gender, English proficiency level, performance on 10th grade reading and math exams, SAT scores, and whether graduated from high school. In addition, the data identify each student's birthplace (country of origin for foreign-born), the date (and correspondingly age) that the student first entered the New York City public school system, and the grade the student was assigned upon entry. Using the grade at first entry, we group students into elementary school entrants (fifth grade or earlier), middle school entrants (sixth through eighth grades), and high school entrants (grade nine or later).

Almost 34 percent of the students are foreign-born and almost 70 percent entered during their elementary school years (see Table 3). Consistent with our earlier work on younger students, native-born and foreign-born have different background characteristics: foreign-born are far more likely to be Asian, LEP, overage for their grade, and living in homes where English is not the primary language spoken. Despite having lower rates of English proficiency, the foreign-born perform relatively well in high school. They are more likely to take the SAT and the city's math and reading "Regents" exams and to perform better on the math exam than native-born students. They also have higher four-year graduation rates than native-born by approximately six percentage points.

Turning to the entry characteristics, our analyses reveal that foreign-born disproportionately enter NYC's public schools during high school and middle school. While roughly 82% of the native-born students entered in elementary school, only approximately 43% of immigrants did so. Conversely, foreign-born students are much more likely than native-born to enter in high school, 40% and 15% respectively. The large samples of both native-born (more than 40,000 students) and foreign-born (more than 20,000) mean that there are large enough samples within each of these entry cohorts to allow us to examine the differences between them.

As shown in Table 4, there are indeed differences in the characteristics of students in the different nativity/level of entry groups. Among the foreign-born, high school entrants are more likely to be LEP and slightly more likely to be Asian and white than earlier entrants. In contrast, native-born high school entrants have lower rates of LEP than earlier entrants. Most importantly, the table reveals substantial differences in student outcomes by nativity status and level of entry. Among the foreign-born, there is a negative relationship between level of entry and student performance with students who enter in the earlier levels more likely to take exams, to score well on the exams, and to graduate on time than those who enter later. The pattern is similar among native-born, except that native-born high school entrants score higher on the SAT than those who enter during middle school.

Results

Graduation Rates

Table 5 presents the coefficient estimates from a set of four year-high school graduation models. To begin, column 1 presents the results of estimating the parsimonious model in equation (1) for the high school graduation outcome. To assist in interpreting the results from column 1 of Table 5, Table 6 shows the calculations for these "raw" graduation rates for each entry level/nativity group, the differences between them and the resulting difference-in-difference estimates of mobility. We find that, among the foreign-born, only 45% of the high school entrants graduate in four years, which is roughly 6 percentage points lower than the graduation rate of middle school entrants and 13 percentage points lower than elementary school entrants. These findings are consistent with the claims that foreign-born high school entrants fare particularly poorly relative to earlier entrants.

That said, foreign-born students graduate at higher rates than the native-born at each level

of entry. Among high school entrants, foreign-born students graduate at a 6 percentage point higher rate than the native-born; among middle school entrants, at a 3.8 percentage point higher rate; and among the elementary school entrants, at an 11.2 percentage point higher rate. Put differently, at all three entry levels, the nativity gap favors the foreign-born. In addition, native-born high school entrants graduate at lower rates than those who enter at earlier levels (though the difference between native-born elementary and middle school entrants is not statistically different from zero).

Pulling these unadjusted mean differences together, the difference-in-difference estimates show that there is no difference between native-born and foreign-born in the effect of entering during high school relative to middle school. (Although the foreign-born difference is 2.2 percentage-points higher, this difference is not statistically significant.) Yet the penalty of middle or high school entry relative to elementary school entry is greater for the foreign-born than the native-born. That said, the harmful effects of high school entry relative to middle school entry can be attributed simply to migration and not immigration per se.

Controlling for other differences in students has a significant impact on the estimated differences between these groups. As shown in column two of Table 5, we first note that our estimated coefficients on socioeconomic and educational characteristics are similar to those estimated in other studies. Black and Hispanic students graduate at noticeably lower rates, *ceteris paribus*, than other students (18.1 percentage points and 22.9 percentage points lower respectively), students who are overage (often who were retained) and LEP at lower rates (27.5 percentage points and 16.0 percentage points respectively), and females and those who do not have English spoken at home at higher rates (9.7 percentage points and 4.8 percentage points respectively). Although the magnitude of these coefficients changes slightly when high school and region effects are added in columns 3 and 4, the signs are robust to alternative specifications.

In contrast, the age of entry/nativity difference estimates change significantly from those

in column 1 as we add controls for student characteristics and high school fixed effects (see Table 7 for the difference estimates from column 2 of Table 5). To be specific, among the foreign-born, the advantage of entering during elementary school is eliminated and an advantage of entering during high school emerges (with high school entrants graduating at a higher rate than middle school entrants by a marginally significant 2.5 percentage points). Among the native-born, high school entrants still fare worse than middle school entrants but not elementary school entrants. The nativity gap within entry groups still favors foreign-born, though the nativity difference is no longer significant at the middle school entry level. Finally, our difference-in-difference estimates now point to a positive or neutral impact of high school entrance on the graduation probabilities for foreign-born students, relative to native-born students.

Controlling for differences in schools increases the positive effect of high school entry for foreign-born students and significantly reduces any level of entry effects for native-born students. As shown in Table 5, column 3, and Table 8, all results favor the foreign-born and suggest that the foreign-born do better when they enter in high school than the native-born and than when they enter at any other level. For example, compared to elementary school entrants, the foreign-born high school entrants graduate at a 2.6 percentage point higher rate than similar native-born high school entrants. Thus, late immigration serves to increase the probability of graduation.

Finally, as shown in column 4 in Table 5, substituting the 13 region-of-origin effects for the single foreign-born indicator yields quite similar results. (Appendix Table 2 shows the number of foreign-born students by entry level and region of origin.) The region effects are jointly significant ($F = 9.97$) and the coefficients on the entry-level/nativity variables are little changed. This means that while there may be variation in the graduation rates by region, our level of entry results are not driven by unobserved differences in region-specific characteristics of students who enter at different ages.

Test Taking, Test Scores and Value-added Graduation Rates

We now turn to the results of our analyses of test taking and test scores. Table 9 shows estimated parameters for models explaining the taking of the HS English test and the scores earned, among those students who took the test, and for a model explaining the taking of the HS Math test and the score earned, among those who took the test.[4] For each, we show a model that adjusts for student characteristics and includes school fixed effects, a second specification that also includes region fixed effects, and a third specification that includes age and age squared (the results are explained in section 6 below). Table 10 shows the results of our value-added models of graduation outcomes and Table 11 provides a summary of the estimated difference and difference-in-difference results from the fully specified models in Tables 9 and 10 (with school fixed effects but without region fixed effects and without age and age squared).

Overall, the results reveal that there are significant differences between the foreign-born and native-born students in their test taking, and that the inclusion of the region effects has little impact on the signs and magnitudes of most of the estimated coefficients. Again, we find that the estimated coefficients on many the covariates are similar to those found elsewhere. (Of particular interest, however, are the coefficients on LEP, which suggest that while LEP students are more likely to take the reading and math tests in high school, their performance is lower than otherwise similar students and, critically, they are less likely to graduate from high school *even controlling for their performance.)* This suggest that the disadvantage faced by LEP students may extend beyond the impacts on test scores per se and/or that LEP captures otherwise unobserved individual or family characteristics that influence graduation outcomes.

Turning to our key variables, we find that among the foreign-born, high school entrants are more likely to take the English exam, less likely to take the Math exam and, among those who

[4] Took HS English and Took HS Math are estimated as linear probability models. Similar models estimated using a maximum likelihood estimator yielded similar results.

take the exam, their performance exceeds that of middle school entrants. Thus there may be some selection process at work. They are, however, less likely to take the tests than the foreign-born elementary school entrants, although the high school entrants do continue to earn higher scores.

Somewhat different patterns emerge for the native-born students. Among the native-born, high school entrants are less likely to take either the English or Math exams than their peers entering in middle school or elementary schools but, while their English performance is superior, they fall short of the earlier entrants in Math. The value-added graduation models suggest that, as for the foreign-born, native-born high school entrants are more likely to graduate, *conditional on their prior test taking and performance.* Thus, it seems that taking these standardized tests in reading and math represents overcoming a critical hurdle, after which late-entry does not harm graduation outcomes for either group.

Turning next to the differences between the foreign and native-born, we find that at all levels of entry, the foreign-born perform better the native-born on all outcomes. That is, the foreign-born are more likely to take the key standardized tests, to earn high scores and, conditional on these, to graduate at higher rates. Finally, the difference-in-difference estimates in Table 11 show virtually no evidence that high school entry is particularly harmful for immigrant students. Instead, the difference between foreign and native-born high school entrants relative to middle school entrants is positive or neutral indicating high school immigrants are more or as likely to take the standardized tests, earn high scores and graduate, conditional on those scores. Results are similar for the comparison to elementary school entrants with one notable exception for math scores.

Robustness Tests

There are a number of reasons why one might question our conclusions that immigrants entering NYC public schools at the high school level perform no worse and often better compared to mobile native-born students who enter in high school or to foreign-born students who enter at other school levels, or even in difference-in-difference comparisons. We address four of these reasons here.

First, grouping students by level of entry may average out effects of specific ages at which students have particular problems completing their high school education. For example, entry at age 15 or 16 (approximately ninth grade) may advantage entering students because they begin with a cohort new to high school and have four years in which to remedy any problems with gaps in their education. Entering at an older age, however, may require catching up that cannot be done quickly enough to graduate "on time." To examine the effect of age as well as level of entry, we estimate our basic equation with student controls and high school fixed effects, but add separate quadratics in age-of-entry for native-born and for foreign-born students. These results are shown in Table 12, column 1. Age exhibits a concave relationship with graduation rate, where the curve is somewhat attenuated for the foreign-born. In combination with less negative coefficients on foreign-born high school than native-born high school entry variables, these age coefficients illustrate that foreign-born continue to outperform native-born students, no matter what age they enter high school. In fact, the advantage increases with age of entry, controlling for level of entry.

Second, controlling for region of origin may be too gross a classification to capture unobserved variation in the populations of students from different countries – their social networks, languages spoken, community characteristics, etc. Perhaps the introduction of country-of-origin effects would control better for specific characteristics that distinguish between

immigrant groups and would change the effects of entering NYC public schools at different levels of schooling. In column 2, Table 12 we estimate a model with student controls and high school fixed effects, but substitute 177 country effects for 13 region effects. This analysis suggests there is almost no difference in the coefficients on the entry variables and that using regions or even simply a dummy for foreign-born rather than country effects does not bias our coefficients on level of entry.

Third, reverting back to the models with region effects, perhaps the impact of level of entry differs by region. For example, students from some regions may have particular difficulty if they enter late, perhaps due to non-transferable prior education or to the need to learn a new alphabet along with a new language etc. In column 3 of Table 12, we interact each region with each of the three levels of entry, keeping the native-born elementary entry level as the omitted category (and thus represented by the constant). Note that in comparison to the estimates in column 4 of Table 5 (region effects not interacted), the native-born coefficients, including the constant that represents native-born elementary school entry, do not change in magnitude or significance. Thus the new results in Table 12 can be compared to the foreign-born coefficients of 0.060 for elementary level entry (column 3, Table 5), -0.005 and not significant for middle school entry (column 4, Table 5) and 0.029 for high school entry (again column 4, Table 5).

For several regions, entering at the elementary level appears to be even more advantageous than for the foreign-born on average. Students from Russia, Africa, the Dominican Republic, the Caribbean and Guyana fall into these regions. Students from West Asia and from Mexico do less well than the average foreign-born when they enter early, with Mexicans falling to the level of the native-born. At the middle school entry level, East Asian and South American immigrant students outperform the average immigrant while West Asian and Guyanan students perform less well. And, at the high school level, entrants from four regions do particularly well –

East and West Europeans, Africans and the Caribbean Islanders. Exact explanations for these heterogeneous effects is beyond the scope of this paper, but given that Dominicans are one of the poorest group of immigrants, perhaps the positive results on early entry are indicative of the time it takes to overcome this disadvantage. The results for high school may reflect the similarity in language and education systems between the US, Europe and the Caribbean Islands.

Finally, one might wonder whether the results for the particular 2002 cohort that we use for our sample are unique. To investigate this question, we re-estimated all equations using the 2001 cohort of students. Because the results are substantially the same, with a few differences in significance of coefficients or of signs for ones that are not significant, we do not show them.

Discussion and Conclusion

While previous evidence has pointed to superior performance by foreign-born students in their elementary and middle school years, growing concern has centered around the education and life chance of immigrants who come to the United States in their high school years and pointed to a significant gap in the research literature. This paper takes a step toward filling the gap. We use data on a cohort of New York City public high school students to examine how the performance of immigrant students differs between students who enter in high school, middle school or elementary school, adjusting for the conventional student characteristics that may shape outcomes. We then compare these disparities to the disparities experienced by the native- born population in order to remove any differences in performance due merely to differences in mobility. Thus, we derive estimates of the "cost" in performance due to their entry in high school that has been purged of a range of possible confounding factors. Our difference-in-difference estimates suggests that, *ceteris paribus,* immigrant students do quite well and high school entrants even better than earlier entering immigrants. If anything, mobility of native-born students

reduces performance more than mobility of foreign-born students.

Why do these results obtain? One possibility is that selection is strong at the high school level, due both to selective migration (perhaps lower ability teenagers are less likely to emigrate) and to selective school attendance. While students must attend school through age 16 in New York State, older students with poorer high school prospects may well eschew high school altogether, creating a higher performing cohort. Of course, the key to our research design is that this must be a stronger force among the foreign-born than among the native-born in-migrants from other cities and states and whether it is, or is not, is worthy of further study. Another explanation may be that in contrast to our expectations, high school programs or cultures may be better suited to integrating and assisting immigrant students than middle schools and the suggestion that the middle school years are the most problematic years for immigrants, is consistent with growing concerns about middle school education overall.

An important direction for future work will be to examine the extent to which these nativity gaps vary across schools and to identify the programs or features of schools that contribute to success. Can we find evidence that newcomer programs are particularly effective? If so, it may argue for an expanded role for newcomer programs in middle schools. Do large, comprehensive high schools serve immigrants better (or worse) then smaller themed schools? Answering these questions is a critical next step in our research.

Equally important, future research should examine the reasons for variation in these impacts across students from different regions. While introducing region fixed effects has little impact on our key measures, indicating that the unobserved region-specific differences in culture or language are not biasing our estimates, there are some differences by level of entry for some regions. Understanding the way in which the country of origin may shape outcomes is important and worthy of additional investigation.

Table 1: Prior Studies on Immigrant Educational Attainment and Achievement w/ Age of Entry

Authors (Date)	Data	Dependent Variable	Age of entry categories	Adjusted age of entry findings
Cortes (2006)	CILS: 8th and 9th grade immigrant children (first and second generation) in Miami and San Diego, 1992	Abbreviated Stanford Achievement Tests in reading and math	Before age 5 Ages 5 to 8 After age 9*	Age of entry is negatively correlated with performance on achievement tests.
Perriera, Harris, and Lee (2006)	AddHealth: 18-26 year olds in 2001-2002.	High school completion	Before age 6 After age 6	Age of entry is negatively correlated with high school completion.
Chiswick and DebBurman (2004)	CPS: 25-65 year-olds in 1995	Total years of schooling	Continuous measure and intervals: 0 to 4, 5 to 12, 13 to 19, 20 to 24, 25 to 29, 30 to 34, 35 to 44, 45 to 64.	Age of entry is nonlinearly correlated with years of schooling: Immigrants who enter between 13 and 19 years obtain the least amount of schooling but those who enter at later ages obtain more.
Gonzalez (2003)	PUMS: 25-53 year-olds in 1980 and 1990	Total years of schooling	Continuous measure and intervals: 1 to 5, 6 to 8, 9 to 11, 12 to 14, 15 to 18.	Age of entry is negatively correlated with years of schooling.
Glick and White (2003)	HSB: 10th graders in 1980 NELS: 10th graders in 1990	Achievement tests and high school dropout	Before age 11 After age 10*	None of the age of entry differences is statistically significant once covariates were included.
Hirschman (2001)	PUMS: 15-17 year olds in 1990	Enrollment in school	Before age 9 After age 8	Age of entry is negatively correlated with enrollment in school.

CILS= Children of Immigrants Longitudinal Study; AddHealth= National Longitudinal Study of Adolescent Health; CPS= Current Population Survey; PUMS= 5% sample of the Public Use Microdata Sample of the U.S. Census; HSB= High School and Beyond Study; NELS= National Educational Longitudinal Study.* Age of entry are approximate since study did not specify.

Table 2: Illustration of Construction of Difference and Difference-in-Difference Estimators

	Foreign-born FB (1)	Native-born NB (2)	Difference FB-NB (3)
High school entry HS (1)	$\alpha_0 + \alpha_1 + \alpha_3$	$\alpha_0 + \alpha_5$	$\alpha_1 + \alpha_3 - \alpha_5$
Middle school entry MS (2)	$\alpha_0 + \alpha_1 + \alpha_2$	$\alpha_0 + \alpha_4$	$\alpha_1 + \alpha_2 - \alpha_4$
Elementary school entry ES (3)	$\alpha_0 + \alpha_1$	α_0	α_1
			Diff-in-Diff
Difference HS - MS (4)	$\alpha_3 - \alpha_2$	$\alpha_5 - \alpha_4$	$(\alpha_3 - \alpha_2) - (\alpha_5 - \alpha_4)$
Difference MS - ES (5)	α_2	α_4	$\alpha_2 - \alpha_4$
Difference HS - ES (6)	α_3	α_5	$\alpha_3 - \alpha_5$

Table 3. Descriptives of 2002 High School Cohort in NYC- Overall and By Nativity

Variable	All Students	Foreign	Native
	Mean	Mean	Mean
Student Characteristics			
Native-Born	0.662	0.000	1.000
Foreign-Born	0.338	1.000	0.000
LEP	0.079	0.209	0.013
English Spoken at Home	0.543	0.285	0.675
Female	0.512	0.500	0.518
Asian	0.140	0.275	0.071
Black	0.358	0.255	0.411
Hispanic	0.332	0.312	0.343
White	0.167	0.156	0.172
Overage for grade in 2002	0.292	0.416	0.229
Student Outcomes			
Took Regent or RCT, English	0.711	0.748	0.692
Regents English Score[a]	69.127	67.867	69.826
Took Regent or RCT, Math	0.745	0.777	0.729
Regents Sequential I Math Score[b]	66.132	68.541	64.842
Took SAT	0.261	0.314	0.233
SAT Score[c]	919.695	908.047	927.689
Graduated from HS in 4 Years	0.474	0.513	0.454
Still Enrolled after 4 Years	0.289	0.286	0.290
Entry Characteristics			
Entered in Elementary School	0.689	0.429	0.822
Entered in Middle School	0.073	0.171	0.023
Entered in High School	0.237	0.400	0.154
Entered High School in 99	0.169	0.246	0.130
Entered High School in 00	0.046	0.109	0.014
Entered High School in 01	0.017	0.035	0.007
Entered High School in 02	0.005	0.010	0.003
Age Entered NYC Schools	8.624	11.560	7.128
N	61,338	20,707	40,631

Notes: a.) Data is only available for students who took the various tests. Of the 43,188 students who took the Regents English exam, 15,400 are foreign-born and 27,788 are native-born, b.) 41,380 students took the Regents Math exam and of those, 14,437 are foreign-born and 26,943 are native-born, c.) 15,988 students took the SATs and 6,507 of them are foreign-born and 9,481 are native-born

Table 4. Descriptives of 2002 High School Cohort in NYC- By Nativity and Entry Level

Variable	Foreign Students			Native Students		
	Elem. Entry	Middle School Entry	High School Entry	Elem. Entry	Middle School Entry	High School Entry
Student Characteristics						
Native-Born	0.000	0.000	0.000	1.000	1.000	1.000
Foreign-Born	1.000	1.000	1.000	0.000	0.000	0.000
LEP	0.073	0.265	0.331	0.010	0.056	0.026
English Spoken at Home	0.292	0.289	0.276	0.662	0.742	0.735
Female	0.505	0.499	0.495	0.521	0.503	0.502
Asian	0.247	0.272	0.307	0.075	0.057	0.051
Black	0.221	0.269	0.285	0.406	0.516	0.418
Hispanic	0.355	0.292	0.275	0.345	0.270	0.340
White	0.176	0.164	0.131	0.171	0.151	0.186
Overage for grade in 2002	0.245	0.349	0.628	0.194	0.275	0.411
Student Outcomes						
Took Regent or RCT, English	0.802	0.753	0.688	0.711	0.715	0.585
Regents English Score[a]	70.812	66.187	64.960	69.812	68.299	70.212
Took Regent or RCT, Math	0.841	0.793	0.702	0.753	0.743	0.602
Regents Sequential I Math Score[b]	70.289	67.155	66.747	65.100	65.011	62.900
Took SAT	0.354	0.326	0.267	0.242	0.243	0.184
SAT Score[c]	951.608	875.750	863.046	929.995	903.160	916.445
Graduated from HS in 4 Years	0.579	0.507	0.447	0.467	0.469	0.387
Still Enrolled after 4 Years	0.258	0.309	0.306	0.296	0.324	0.254
Entry Characteristics						
Age Entered NYC Schools	7.510	12.438	15.525	5.539	12.226	14.817
N	8,883	3,533	8,291	3,3405	951	6,275

Notes: a.) Data is only available for students who took the various tests. Of the 15,400 foreign-born students who took the Regents English exam, 7,094 entered in elementary school, 2,652 entered in middle school and 5,654 entered in high school. There were 27,788 native-born students who took the Regents English exam and 23,567 entered in elementary school, 680 entered in middle school and 3,541 entered in high school, b.) There were 14,437 foreign-born who took the Regents Sequential I Math exam and 7,016 of them entered in elementary school, 2,574 entered in middle school, and 4,847 entered in high school. There were 26,943 native-born took the Regents Sequential I Math exam and 23,156 entered in elementary school, 647 in middle school and 3,140 in high school, c.) Of the 6,507 foreign-born students who took the SATs, 3,141 entered in elementary school, 1,153 entered in middle school and 2,213 entered in high school. There were 9,481 native-born who took the SATs and 8,094 entered in elementary school, 231 in middle school and 1,156 in high school.

Table 5. Regressions of Graduation from NYC High Schools for 2002 Cohort

	(1)	(2)	(3)	(4)
Native*Middle School Entry	0.002	0.041***	0.011	0.013
	(0.016)	(0.015)	(0.013)	(0.013)
Native*High School Entry	-0.080***	-0.011	0.012*	0.012*
	(0.013)	(0.010)	(0.006)	(0.006)
Foreign Born	0.112***	0.087***	0.060***	--
	(0.014)	(0.010)	(0.007)	--
Foreign*Middle School Entry	-0.072***	-0.018	0.002	-0.005
	(0.015)	(0.011)	(0.009)	(0.009)
Foreign*High School Entry	-0.132***	0.007	0.038***	0.029***
	(0.019)	(0.013)	(0.011)	(0.010)
Asian		0.010	0.016*	0.043***
		(0.023)	(0.009)	(0.011)
Black		-0.181***	-0.055***	-0.060***
		(0.030)	(0.011)	(0.011)
Hispanic		-0.229***	-0.091***	-0.089***
		(0.026)	(0.011)	(0.011)
Over Age for Grade		-0.275***	-0.140***	-0.140***
		(0.010)	(0.012)	(0.012)
Female		0.097***	0.074***	0.074***
		(0.008)	(0.005)	(0.005)
LEP		-0.160***	-0.137***	-0.128***
		(0.017)	(0.016)	(0.015)
Non-English Spoken at Home		0.048***	0.019***	0.020***
		(0.013)	(0.005)	(0.006)
Constant	0.467***	0.606***	0.501***	0.499***
	(0.029)	(0.039)	(0.009)	(0.009)
Observations	61338	61338	61338	61338
R-squared	0.01	0.13	0.36	0.36
HS FE (n = 286)	No	No	Yes	Yes
Region FE (n = 13)	No	No	No	Yes

Robust standard errors, adjusted for within-school clustering, in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 6: Graduation Outcomes Results, Parsimonious Models (See Table 5, Col. (1))

	Foreign-born FB (1)	Native-born NB (2)	Difference FB-NB (3)
High school entry HS (1)	0.447***	0.387***	.060***
Middle school entry MS (2)	0.507 ***	0.469***	.038*
Elem. school entry ES (3)	0.579***	0.467***	.112***
			Diff-in-Diff
Difference HS - MS (4)	-.060***	-.082***	.022
Difference MS - ES (5)	-.072	.002	-.074***
Difference HS - ES (6)	-.132***	-.080***	-.052***

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

Table 7: Graduation Outcomes Results, Student Controls (See Table 5, Col. (2))

	Foreign-born FB (1)	Native-born NB (2)	Difference FB-NB (3)
High school entry HS (1)	0.700***	0.595***	0.105***
Middle school entry MS (2)	0.675***	0.647***	0.028
Elem school entry ES (3)	0.693***	0.606***	.087***
			Diff-in-Diff
Difference HS - MS (4)	0.025*	-0.052***	0.077***
Difference MS - ES (5)	-.018	0.041***	-.059***
Difference HS - ES (6)	0.007	-0.011	0.018

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

Table 8: Graduation Outcomes Results, School Fixed Effects Specification (Table 5, Col. (3))

	Foreign-born FB (1)	Native-born NB (2)	Difference FB-NB (3)
High school entry HS (1)	0.599***	0.513***	0.086***
Middle school entry MS (2)	0.563***	0.512 ***	0.051***
Elementary school entry ES (3)	0.561***	0.501***	0.060***
			Diff-in-Diff
Difference HS - MS (4)	0.036***	0.001	0.035*
Difference MS - ES (5)	0.002	0.011	-0.009
Difference HS - ES (6)	0.038***	0.012*	0.026**

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

Table 9. Regressions of High School Test-Taking & Test Scores for NYC 2002 HS Cohort

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Took HS English Test		English Test Score		Took HS Math Test		Math Test Score	
Native*MS Entry	.005	.007	-.017	-.016	-.006	-.005	.063**	.062**
	(.011)	(.011)	(.033)	(.033)	(.012)	(.012)	(.032)	(.032)
Native*HS Entry	-.033***	-.032***	.068***	.069***	-.098***	-.097***	-.025	-.028
	(.008)	(.008)	(.018)	(.018)	(.009)	(.009)	(.017)	(.017)
Foreign	.056***	--	.067***	--	.057***	--	.117***	--
	(.006)	--	(.011)	--	(.007)	--	(.012)	--
Foreign*MS Entry	-.031***	-.039***	-.075***	-.082***	-.028***	-.033***	.057**	.058***
	(.008)	(.008)	(.021)	(.021)	(.009)	(.008)	(.022)	(.022)
Foreign*HS Entry	-.014	-.022**	.066***	.059**	-.090***	-.095***	.215***	.218***
	(.010)	(.009)	(.024)	(.023)	(.011)	(.011)	(.027)	(.026)
Asian	.008	.025***	-.052**	.009	.019**	.032***	.184***	.151***
	(.008)	(.008)	(.026)	(.027)	(.008)	(.009)	(.027)	(.026)
Black	.003	-.004	-.290***	-.277***	-.030***	-.037***	-.275***	-.269***
	(.008)	(.008)	(.028)	(.028)	(.010)	(.010)	(.029)	(.028)
Hispanic	-.038***	-.038***	-.243***	-.215***	-.068***	-.070***	-.281***	-.253***
	(.007)	(.007)	(.023)	(.025)	(.010)	(.011)	(.023)	(.024)
Over Age for Grade	-.180***	-.181***	-.361***	-.361***	-.168***	-.169***	-.312***	-.315***
	(.010)	(.010)	(.015)	(.015)	(.007)	(.007)	(.015)	(.015)
Female	.042***	.042***	.182***	.182***	.029***	.028***	.038***	.037***
	(.004)	(.004)	(.011)	(.011)	(.005)	(.005)	(.010)	(.010)
LEP	.090***	.104***	-.771***	-.759***	.035**	.041**	-.367***	-.400***
	(.013)	(.013)	(.033)	(.032)	(.017)	(.017)	(.030)	(.028)
Non-English at Home	-.003	.005	-.028*	-.042***	.012**	.017***	.035**	.010
	(.004)	(.005)	(.014)	(.015)	(.005)	(.005)	(.015)	(.016)
Age Admitted								
Age Admitted^2								
Foreign*Age Admitted								
Foreign*Age Admitted^2								
Constant	.728***	.728***	.201***	.186***	.736***	.737***	.133***	.135***
	(.007)	(.007)	(.021)	(.021)	(.008)	(.009)	(.020)	(.020)
Observations	61338	61338	43188	43188	61338	61338	41380	41380
R-squared	0.40	0.41	0.35	0.36	0.32	0.33	0.35	0.36
HS FE (N=286)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region FE (N=13)	No	Yes	No	Yes	No	Yes	No	Yes

Robust standard errors, adjusted for within-school clustering, in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 10. Graduation Models – Value Added Specifications

	(1)	(2)
Native*MS Entry	0.011	0.012
	(0.013)	(0.013)
Native*HS Entry	0.036***	0.037***
	(0.007)	(0.007)
Foreign	0.013***	--
	(0.005)	--
Foreign*MS Entry	0.036***	0.032***
	(0.008)	(0.008)
Foreign*HS Entry	0.065***	0.059***
	(0.009)	(0.010)
Asian	-0.009	0.000
	(0.007)	(0.008)
Black	-0.003	-0.008
	(0.008)	(0.008)
Hispanic	-0.023***	-0.030***
	(0.007)	(0.007)
Over Age for Grade	0.005	0.006
	(0.006)	(0.006)
Female	0.039***	0.039***
	(0.004)	(0.004)
LEP	-0.085***	-0.081***
	(0.010)	(0.010)
Non-English at Home	0.019***	0.022***
	(0.005)	(0.005)
English Test Z-Score	0.127***	0.127***
	(0.004)	(0.004)
Took English Test	0.435***	0.432***
	(0.021)	(0.021)
Math Test Z-Score	0.127***	0.129***
	(0.006)	(0.006)
Took Math Test	0.237***	0.238***
	(0.017)	(0.017)
Constant	-0.025	-0.020
	(0.026)	(0.026)
Observations	47491	47491
R-squared	0.47	0.47
HS FE (N=286)	Yes	Yes
Region FE (N=13)	No	Yes

Robust standard errors, adjusted for within-school clustering, in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 11: Summary Table of difference and difference-in-difference estimates, fully adjusted model, includes school fixed effects

	Took Eng	Eng	Took Math	Math	Value-Add.
Foreign-born					
High – Middle	.017*	.141***	-.062***	.158***	.029***
Middle – Elem	-.031***	-.075***	-.028***	.057***	.036***
High – Elem	-.014	.066	-.090***	.215***	.065***
Native-born					
High – Middle	-.038***	.085***	-.092***	-.088***	.025*
Middle – Elem	.005	-.017	-.006	.063***	.011
High – Elem	-.033***	.068***	-.098***	-.025	.036***
High School					
FB – NB	.075***	.065***	.065	.357***	.042***
Middle School					
FB-NB	.02	.009	.035***	.111***	.038***
Elementary School					
FB-NB	.056***	.067***	.057***	.117***	.013***
Diff in Diff					
FB-NB,HS-MS	.055***	.056	.03*	.246***	.004
FB-NB,HS-ES	.019***	-.002	.008*	.24	.029*
FB-NB,MS-ES	-.036	-.058	-.022	-.006***	.025***

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

Table 12. Robustness Tests on Graduation Rates from New York City High Schools for 2002 Cohort (Age, Country Effects, Regions by Entry Level)

	(1)	(2)	(3)	(4)	(5)
Native*MS Entry (NBMS)	0.011	-0.047**	0.013	0.012	0.013
	(0.013)	(0.019)	(0.013)	(0.013)	(0.013)
Native*HS Entry (NBHS)	0.012*	-0.100***	0.012*	0.012*	0.012*
	(0.006)	(0.024)	(0.006)	(0.006)	(0.006)
Foreign Born	0.060***	0.040	--	--	--
	(0.007)	(0.037)	--	--	--
Foreign*MS Entry (FBMS)	0.002	-0.051***	-0.005	-0.007	--
	(0.009)	(0.014)	(0.009)	(0.008)	--
Foreign*HS Entry (FBHS)	0.038***	-0.076***	0.029***	0.028***	--
	(0.011)	(0.023)	(0.010)	(0.010)	--
Asian	0.016*	0.016*	0.043***	0.047***	0.044***
	(0.009)	(0.009)	(0.011)	(0.011)	(0.011)
Black	-0.055***	-0.055***	-0.060***	-0.060***	-0.060***
	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)
Hispanic	-0.091***	-0.089***	-0.089***	-0.087***	-0.088***
	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)
Over Age for Grade	-0.140***	-0.156***	-0.140***	-0.139***	-0.140***
	(0.012)	(0.012)	(0.012)	(0.011)	(0.012)
Female	0.074***	0.074***	0.074***	0.074***	0.074***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
LEP	-0.137***	-0.139***	-0.128***	-0.126***	-0.126***
	(0.016)	(0.016)	(0.015)	(0.015)	(0.015)
Non-English at Home	0.019***	0.017***	0.020***	0.018***	0.019***
	(0.005)	(0.005)	(0.006)	(0.006)	(0.006)
Age Admit		-0.015**			
		(0.007)			
Age Admit^2		0.001***			
		(0.000)			
Foreign* Age Admit		0.011***			
		(0.003)			
Foreign* Age Admit^2		-0.001*			
		(0.000)			
FBMS*Russia					-0.004
					(0.019)
FBMS*East. Europe					-0.052
					(0.049)
FBMS*West. Europe					0.082
					(0.059)
FBMS*China					-0.030
					(0.026)
FBMS*East Asian					0.103**
					(0.042)
FBMS*South Asian					0.014
					(0.028)
FBMS*West Asian					-0.161***
					(0.051)
FBMS*Africa					0.049
					(0.068)
FBMS*Dom. Rep.					-0.035

					(0.023)
FBMS*Caribbean					0.008
					(0.021)
FBMS*Guyana					-0.074*
					(0.040)
FBMS*Latin/South Am.					0.048*
					(0.026)
FBMS*Mexico					-0.040
					(0.049)
FBHS*Russia					-0.032
					(0.022)
FBHS*East. Europe					0.088***
					(0.030)
FBHS*West. Europe					0.087*
					(0.050)
FBHS*China					0.033
					(0.039)
FBHS*East Asian					0.011
					(0.034)
FBHS*South Asian					-0.019
					(0.027)
FBHS*West Asian					-0.006
					(0.036)
FBHS*Africa					0.068*
					(0.041)
FBHS*Dom. Rep.					0.022
					(0.020)
FBHS*Caribbean					0.075***
					(0.025)
FBHS*Guyana					-0.018
					(0.026)
FBHS*Latin/South Am.					0.017
					(0.019)
FBHS*Mexico					0.002
					(0.041)
Russia					0.087***
					(0.014)
East. Europe					0.062**
					(0.028)
West. Europe					-0.019
					(0.032)
China					0.012
					(0.017)
East Asian					-0.009
					(0.030)
South Asian					0.043**
					(0.019)
West Asian					0.048*
					(0.028)
Africa					0.154***
					(0.035)
Dom. Rep.					0.072***

					(0.011)
Caribbean					0.071***
					(0.014)
Guyana					0.075***
					(0.019)
Latin/South Am.					0.064***
					(0.012)
Mexico					-0.046**
					(0.021)
Constant	0.501***	0.541***	0.499***	0.499***	0.500***
	(0.009)	(0.025)	(0.009)	(0.009)	(0.009)
Observations	61338	61338	61338	61338	61338
R-squared	0.36	0.36	0.36	0.36	0.36
HS FE (n=286)	Yes	Yes	Yes	Yes	Yes
Region FE (n=13)	No	No	Yes	No	Yes
Country FE (n=177)	No	No	No	Yes	No

Appendix Table 1. Countries in Region Groups

Region 1 = Russia: Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Russia, Tajikistan, Turkmenistan, Ukraine, Uzbekistan

Region 2 = East Europe: Albania, Bosnia & Herzegovina, Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Macedonia, Poland, Romania, Slovak Republic, Slovenia, Yugoslavia

Region 3 = West Europe: Australia, Austria, Belgium, Bermuda, Canada, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Malta, Monaco, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom

Region 4 = China: China, Hong Kong, Taiwan

Region 5 = East Asia: Bhutan, Brunei Darussalam, Burma (Myanmar), Cambodia, Fiji, French Polynesia, Indonesia, Japan, North Korea, South Korea, Laos, Macao, Malaysia, Maldives, Marshall Island, Micronesia, Mongolia, Nepal, Papua New Guinea, Philippines, Samoa, Singapore, Solomon Islands, Sri Lanka, Thailand, Vanuatu, Vietnam

Region 6 = South Asia: Bangladesh, India, Pakistan

Region 7 = West Asia: Afghanistan, Algeria, Bahrain, Cyprus, Egypt, Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Libya, Morocco, Oman, Qatar, Saudi Arabia, Syria, Tunisia, Turkey, United Arab Emirates, Yemen

Region 8 = Africa: Angola, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Cape Verde, Central African Republic, Chad, Comoros, Congo, Djibouti, Equatorial Guinea, Ethiopia, Gabon, Gambia, Ghana, Guinea-Bissau, Guinea, Ivory Coast, Kenya, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mauritius, Mozambique, Namibia, Niger, Nigeria, Rwanda, Sao Tome & Principe, Senegal, Seychelles, Sierra Leone, Somalia, Republic of South Africa, Sudan, Swaziland, Tanzania, Togo, Tonga, Uganda, Zaire, Zambia, Zimbabwe

Region 9 = Dominican Republic: Dominican Republic

Region 10 = Caribbean: Antigua & Barbuda, Bahamas, Barbados, British Virgin Islands, British West Indies, Cuba, Dominica, French Antilles, French West Indies, Grenada, Guadeloupe, Haiti, Jamaica, Nether Antilles, St. Kitts & Nevis, St. Lucia, St. Vincent & Grenada, Trinidad & Tobago

Region 11 = Guyana: French Guiana, Guyana, Surinam

Region 12 = Latin America: Argentina, Belize, Bolivia, Brazil, Chile, Colombia, Costa Rica, Ecuador, El Salvador, Guatemala, Honduras, Nicaragua, Panama, Paraguay, Peru, Uruguay, Venezuela

Region 13 = Mexico

Appendix Table 2. Counts of Obs. by Foreign Regions & Entry Level in NYC Schools

	Elem Entry	MS Entry	HS Entry	Total
Russia	982	331	430	1743
East Europe	285	150	427	862
West Europe	312	57	235	604
China	729	359	1085	2173
East Asia	489	146	451	1086
South Asia	602	316	774	1692
West Asia	176	76	206	458
Africa	114	102	380	596
Dom. Rep.	1610	542	960	3112
Caribbean	1579	767	1833	4179
Guyana	530	217	265	1012
Lat/South Am.	1131	387	1099	2617
Mexico	341	83	145	569

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