IS THERE A NATIVITY GAP? NEW EVIDENCE ON THE ACADEMIC PERFORMANCE OF IMMIGRANT STUDENTS

Amy Ellen Schwartz
(corresponding author)
Professor of Public Policy, Education and Economics
Steinhardt School of Education and Wagner Graduate School
New York University
E-mail:
amy.schwartz@nyu.edu

Leanna Stiefel
Professor of Economics
Wagner Graduate School
New York University
E-mail:
leanna.stiefel@nyu.edu

Abstract

Public schools across the United States are educating an increasing number and diversity of immigrant students. Unfortunately, little is known about their performance relative to native-born students and the extent to which the "nativity gap" might be explained by school and demographic characteristics. This article takes a step toward filling that void using data from New York City where 17 percent of elementary and middle school students are immigrants. We explore disparities in performance between foreign-born and native-born students on reading and math tests in three ways—using levels (unadjusted scores), "value-added" scores (adjusted for prior performance), and an education production function. While unadjusted levels and value-added measures often indicate superior performance among immigrants, disparities are substantially explained by student and school characteristics. Further, while the nativity gap differs for students from different world regions, disparities are considerably diminished in fully specified models. We conclude with implications for urban schools in the United States.

1. INTRODUCTION

In 2000 immigrants exceeded 11 percent of the U.S. population, the highest level since 1930 and more than twice the twentieth-century low of 4.7 percent reached in 1970. In large cities, immigrants are particularly important—an astonishing 59.5 percent of the population of Miami was foreign-born in 2000, and a more "modest" 35.9 percent of New Yorkers (Singer 2004). As this wave of immigration adds ethnic and economic diversity to the adult population in the United States, the population of school children is changing as well. Public schools across the nation—and particularly urban public schools—educate an increasing number and diversity of immigrant students speaking a wide array of languages and hailing from a broad spectrum of countries and cultures around the world (Qin-Hilliard, Feinauer, and Quiroz 2001). At the same time, little is known about their performance relative to native-born students. Are there differences in the performance of immigrant and native-born students beyond what would be predicted by the differences in the sociodemographic and educational characteristics of these groups? What role do schools play? Are public schools failing our immigrant students?

There are at least four reasons to be concerned about the academic performance of immigrant students. The first stems from a concern about equity. While there may be little consensus on how best to address the needs of immigrant students, the notion that students' education should not depend upon their country of birth per se seems to have fairly broad appeal. To many, equity would require that two similar students differing only in their birth country should be treated equally by their schools. A second reason stems from a concern about the impact of immigrants on native-born students. Do immigrants serve to enhance or dilute the quality of the peer group for native-born students? A third, related concern is that immigrants may increase the pressure on schools already burdened by the challenges of new accountability measures, including, for example, those imposed by the federal No Child Left Behind Act of 2002. Whether (or to what extent) schools have the capacity to deal with new or different demands created by inflows of immigrant students is key to understanding the impact of immigration on education. Finally, one might be concerned about the impact immigrants may have on the economy if they do not succeed in American schools. Will an inadequate education cause them to become a drag on the economy upon entering the labor force? Given the large flows of immigrants into U.S. urban areas, the productivity of the U.S. labor force in the twenty-first century will be influenced by how well urban school districts succeed in teaching immigrants. Thus, understanding the success or failure of immigrant children is important, and the dearth of research—due, perhaps, to the scarcity of data on immigrant children—is problematic.

The New York City school system provides an excellent opportunity to study the performance of public school immigrant students, defined here as foreign-born. Of the 600,000-plus students in New York's public elementary and middle schools, almost 17 percent are immigrants; they originate in over 200 countries and speak over 160 languages and dialects. Moreover, we were able to obtain detailed administrative data on New York City public school children, including information on their country of birth.

In this study, then, we examine and explore the disparity in performance between foreign-born and native-born students, which we term the "nativity gap," for two cohorts of fifth and eighth graders. We explore the nativity gap in performance on both reading and math tests in three ways—using level measures of performance (that is, comparing raw or unadjusted scores), using "value-added" measures of performance (adjusting for prior academic performance), and, ultimately, using an education production function (controlling for a range of student and school characteristics). We then explore the extent to which the coefficients of the production function differ between native and foreign-born students. Finally, we analyze differences between immigrants from different regions of origin.

To preview the results, we find that the difference in unadjusted test scores varies by grade. While fifth-grade immigrants perform better than the native-born, suggesting a positive nativity gap, in the eighth grade, immigrant and native-born students do about equally well. Value-added analyses, however, consistently indicate an immigrant advantage; immigrants gain more over a school year than native-born students do. Controlling for the full range of individual and school characteristics in a fully specified education production function framework, however, reduces the estimated nativity gap. In the end, the results from the fully specified model indicate that the immigrant advantage is positive but smaller in magnitude than the unadjusted test scores. At the same time, our regional analyses suggest that while the unadjusted disparities in test scores between regions can be substantively significant, the magnitudes of these disparities are diminished in the fully specified model.

The implication is that much of the difference between the native-born and the foreign-born and between immigrants from different world regions derives from differences in their underlying characteristics, such as poverty and language skills. There is virtually no evidence to suggest that immigrants are treated inequitably or discriminated against, nor is there evidence to indicate that immigrants form a low-performing peer group for the native-born. Further, the relative success of immigrants in their early education may allay concern over their entry into the labor market. To be clear, our analyses are limited to students entering the American educational system at a relatively young age—while still in elementary or middle school—and results for

high-school-age entrants may well be different. A study of the experience and education of later cohorts is a critical next step for researchers. And we examine disparities over a period of only one year. Over the longer run, the nativity gap may widen, shrink, or even reverse itself. This, too, is worthy of further study.

In the next section we discuss alternative explanations for a nativity gap, and in section 3 we review relevant literature on the size of the nativity gap. We present our model and methods in section 4, the data used in the empirical work in section 5. Results are discussed in section 6, and in section 7 we present conclusions.

2. WHY SHOULD NATIVITY MATTER?

Prior research on immigrant education has offered a variety of explanations for differences in performance between immigrant and native-born students in the United States. Some explanations explore the implications of differences between immigrants and native-born students, whether driven by selective migration, settlement patterns in the United States, or underlying differences between the United States and their home country. Other explanations look to differences in the experience of immigrants upon arrival in the United States.

To begin, immigrant students may differ, on average, from native-born students in their family and home circumstances in ways that influence academic performance. Differences in family income, wealth and/or education, for example, may well translate into differences in academic achievement, following the well-established link between these factors and student performance. Or there may be differences in family composition, such as number and ages of siblings or parental marital status and history. To the extent that family composition matters to achievement, differences in composition may drive differences between immigrant and native-born students. (See Kao [1999] and Glick and White [2003] for typical examples of quantitative studies that control for these kinds of factors.)

A second set of explanations focuses on differences in school readiness and prior academic experiences. While both immigrant and native-born students may learn a language other than English as a first language, limited English proficiency is undoubtedly more common among immigrants than among native-born students, and this difference may well lead to differences in academic performance, not only in literacy and language arts but also in other areas, such as mathematics, in which progress may be impeded by limited English skills. (See Gandara et al. [2003] and Bleakley and Chin [2004] for evidence of the relationship between English language proficiency and school or market outcomes.) Equally important, immigrants enter U.S. schools having had a wide range of prior academic experience in their home country; some

will be well prepared and others disadvantaged. For example, Russians and other Eastern Europeans emigrate from countries with highly developed comprehensive educational systems, including rigorous math education; and these students may be better prepared in some areas than their native-born peers. In other cases, immigrant students such as Mexicans or Dominicans hale from countries with less rigorous and comprehensive educational systems and are less well prepared than their native-born peers. Of course, selective migration may well mean that the preparation of immigrant students differs markedly from the typical experience in their birth country. That said, the important insight is that differences in prior academic experience means the nativity gap may be positive or negative, favoring immigrants or the native-born.

A third explanation offered for differences between immigrants and native-born students looks to attitudinal differences between these populations. To put it simply, some researchers have cited the positive attitude of immigrants toward education as well as the support and encouragement that immigrant parents provide their children as reasons that immigrant children may succeed particularly well in the United States (Waters 1999).

In a somewhat different vein, a fourth set of explanations looks to differences in school and classroom experiences between immigrants and native-born students. Residential location patterns may lead immigrants to attend different schools than native-born students; and whether driven by teacher location preferences, the idiosyncrasies of resource allocation formulas, the schooling preferences of parents, differences in political power, or discrimination per se, the implication is that immigrants' schools may have different resources and teachers. (Note, however, that Schwartz and Stiefel [2004] find few differences in resources between the schools attended by immigrant and native-born students in New York City elementary schools beyond those predicted by differences in student educational traits.) Differences in schools attended may mean that immigrants are exposed to different peers than native-born students, perhaps to more immigrants or more students with limited English proficiency. (See Ellen et al. [2002] for some evidence that immigrants are only slightly segregated in New York City schools.) Of course, there may be differences within schools and even within classrooms as well—due to ability grouping, differences in preferences, or language skills, say, or even driven by the teachers' and other school personnel's attitudes toward and expectations of immigrants. As before, whether these favor or harm immigrant students cannot be predicted theoretically but must be determined empirically.

Finally, differences may be driven by the legal status of immigrants and their parents. While foreign-born students may be citizens and children of U.S. citizens, they (and/or their parents) may be green card holders, temporary residents, or of uncertain legal status. While the impact of these legal

status differences may not be direct, they may indirectly influence performance through mobility, incomes, access to supplementary services, or other pathways.

Notice that all of these pathways suggest that the immigrant experience is unlikely to be singular. Instead, there will be considerable variation across immigrants. Indeed, sociological research suggests that the experience of immigrants and their assimilation over time can follow very different paths depending on their own characteristics and their reception in this country, among others factors.[1] As an example, some have argued that political refugees from Cuba (pre-1980) or Vietnam, for example, were welcomed and did well, while immigrants who came primarily in pursuit of low-skilled jobs, such as Mexicans and Haitians, did worse over time. (See Portes and MacLeod [1996].) This path has also been documented in ethnographic research and interacts with the race of the immigrant; black students have especially pronounced declining paths. (See Waters's 1999 study of Caribbean immigrants in Brooklyn, New York.) Further, evidence from the 2000 census indicates that there are substantial differences in the population of foreign-born New Yorkers across countries of origin. As an example, New York City residents born in Korea and Japan, the Philippines, the Indian subcontinent, and the former Soviet Union have college graduation rates and earnings that exceed those of native-born New Yorkers. In contrast, New Yorkers born in Mexico, the Dominican Republic, China, and Latin America have graduation rates and earnings that fall below that of native-born New Yorkers. (See Rosen, Wieler, and Periera [2005] for more on New York City immigrants.)

To summarize, there are many reasons that the academic performance of immigrant and native-born students may differ. Some involve differences in the students and/or their family and neighborhood context; some involve differences in schools; some vary with time and age while others are time-invariant. These explanations for differences may imply differences in the mean level of performance of immigrants, ceteris paribus, or in their responsiveness to school inputs, family background, and so on. As described below, we operationalize this notion in our empirical work by examining the extent to which disparities persist, even after controlling for differences in student

1. Sociologists identify three assimilation paths distinguished both by their trajectories toward or away from native-born performance and their application to first, second (native-born child with at least one foreign-born parent), and third (or native-born with native-born parents) generations. In straight-line assimilation, the first generation performs worse than the native-born, but subsequent generations do as well or better. In optimistic assimilation, the first generation performs better due to parental determination or optimism. Segmented assimilation describes the differences in paths that reflect the context in which the immigrant group is received. (For more information see Suarez-Orozco and Suarez-Orozco [1995] or Hirschman [2001].)

variables, and exploring whether the coefficients in the regression equations differ between the native and the foreign-born.

To be more specific, we include measures of student prior academic performance, poverty, race, gender, age, time in system, language ability, and learning disabilities, and control for school characteristics using school fixed effects. We are not, however, able to include measures of family context, such as parental education, number of parents or others in household, or attitudes toward school, which have been found to be important in much previous research, suggesting that even our fullest specifications are incomplete, and, to the extent that the omitted factors vary with nativity, some nativity gap should emerge. Further, these limitations in the data mean that we are not able to disentangle the specific importance of each of these explanations. Instead, this work takes a step toward that goal, laying the foundation for further work on this subject.

3. LITERATURE REVIEW

In sharp contrast to the large volume of research examining the gap in performance between racial/ethnic groups in the United States, there is scant quantitative research examining disparities between immigrants and native-born students to complement the rich qualitative, ethnographic studies of immigrants from specific regions or countries, a small number of which are cited above. Thus, in addition to looking at the literature on immigrants per se, our work has also been informed by the far larger research literature that has examined the gap in performance between racial/ethnic groups using the type of data that are available for this study.

As shown in Table 1, there are seven recent studies of immigrant student academic performance that use individual-level data to examine the performance of immigrant students at the K–12 level.[2] All use samples of adequate to large size (ranging from 1,225 to 207,609 individual students). They mostly focus on the late elementary and early high school grades (fourth to eighth); only two (4, 6) use students as old as tenth and twelfth graders. All but two studies (4, 5) analyze the determinants of scores themselves rather than added value in scores (or how those scores change over time). Additionally, all control in some way for race/ethnicity, socioeconomic status, and language background, while some add more variables on schools or, in the case of one (5), include district or school fixed effects.

The findings are mixed. Among those examining scores in levels, first-generation (foreign-born) students often outperform native-born students

2. These seven studies are all we have located that use individual data and focus specifically on the differences between immigrants and native-born K–12 students.

Table 1 Summary of Relevant Quantitative Research on Immigrant Performance

Authors/Date	Data	Grades	Measures	Controls	Findings
1. Portes and MacLeod (1996)	Children of Immigrants; Miami, Ft. Lauderdale, San Diego, 1996 5,266 students	8, 9	Math, reading Stanford 9 Ach Levels No z-scores	Socioeconomic, Race, Educational, School composition	Second-generation Mexican and Haitians outperform other immigrants; second-generation Vietnamese do better in math; pre-1980 Cubans do better; post-1980 Cubans do no differently.
2. Kao (1999)	NELS-88,[a] 1988 24,599 original sample	8	GPA Math and reading Levels No z-scores	Socioeconomic, Race, Psychological, Language, Education progress and experience	Generally, by race, first- and second-generation immigrants do better than same race native-born and as well as or better than white native-born.
3. Kao and Tienda (1995)	NELS-88, 1988 24,599 original sample	8	Math Levels No z-scores	Socioeconomic, Race, Language	Both first- and second-generation immigrants outperform native-born. Within race/ethnic groups, only first-generation immigrants uniformly outperform native-born.
4. Glick and White (2003)	HSB[b] 1980, 1990 13,152 students NELS-88, 1990, 1992 16,376 students	10, 12	Dropout rates Math and reading Levels and changes z-scores	Socioeconomic, Race, Language	In levels, 1980s immigrants perform worse than native-born (0 to–.56 sd); in 1990s, they perform better (0 to 0.31 sd). In changes, immigrants about on par with native-born. Dropout rates same for immigrants and native-born.

Table 1 Continued

5. Berg and Kain (2003)	Texas School Micro Panel, 1999 207,609 students	6	Math Changes No z-scores	Socioeconomic, Race, School composition or fixed effects	All immigrants perform better than native-born. Hispanic immigrants perform better than Hispanic native-born, but Asians do about the same.
6. Demie (2001)	Three samples of London students 1998 2340, 2267, 1225 students	Primary and secondary	Average of scores on English, math, and science national exams Levels No z-scores	Poverty, Ethnicity, English skills	Indian, Vietnamese, and Chinese students perform better than English/Scottish/Welsh, African; Caribbean and Portuguese perform worse.
7. Schnepf (2004)	Four international surveys, ten countries TIMSS, PIRLS, PISA[c] 1995 to 2001 Samples from 1,314 to 8,115 students	4, 8, and 15-year olds	Math and reading test scores Levels No z-scores	Socioeconomic, Home language, Immigrant segregation at school	In six countries, immigrants and native-born perform no differently; in three countries (France, Netherlands, and Germany), immigrants perform worse.

Notes: [a]National Educational Longitudinal Study, 1988, National Center for Education Statistics, U.S. Department of Education. [b]High School and Beyond, National Center for Education Statistics, U.S. Department of Education. [c]Trends in International Mathematics and Science Study, International Study Center at Boston College, http://timss.bc.edu/timss1999.html; Progress in International Reading Literacy Study, International Study Center at Boston College, http://timss.bc.edu/pirls2001.html; OECD Programme for International Student Assessment, Paris, France, http://www.pisa.oecd.org/.

(1, 2, 3), although distinguishing students by country of origin (1, 6, 7) yields mixed results—immigrants from only some regions or countries show superior performance. The authors attribute these mixed results to reception of immigrants in their destination country—welcomed due to political asylum versus tolerated in order to fill low-skilled jobs, for example (the latter perform less well). In some studies, race plays a critical role: black students, in particular, are more likely to show no difference from native-born black students, at least in the second generation. The two studies that take a value-added perspective by controlling for previous test scores (4, 5) show either no difference in performance between foreign-born and native-born or superior performance of foreign-born for only one race (Hispanic, 5).

In summary, the evidence across studies on the whether immigrants perform better or worse than native-born students mostly finds superior performance by immigrants in the first generation. Analyses distinguishing the origin country or region of the world yield mixed results and thus a more nuanced version of immigrant performance. Few studies use value-added measures of performance (changes in scores), but when they do, the positive effect of immigrant status is often eliminated. Taken together, these studies complement the large body of qualitative research, but their data sets are typically limited in size and in the range of origin countries and regions represented, often only a small number. Further, the treatment of previous academic performance is typically limited.

While the quantitative research on the nativity gap is small, the large literature on the racial gap in test scores provides valuable insights and a useful perspective. In recent years, a significant body of work has examined the extent to which differences in socioeconomic background and school characteristics explain the magnitudes and trajectories of gaps in performance between racial/ethnic groups in the United States; studies in this area typically focus on the black-white test score gap. As an example, Hedges and Nowell (1998, 1999), using data from six large nationally representative surveys conducted between 1965 and 1992, find that the .7 to 1.0 standard deviation black-white twelfth-grade test score gap is reduced by less than half when adjustments are made for socioeconomic factors. Cook and Evans (2000), using National Assessment of Educational Progress (NAEP) data on thirteen-year-olds between 1970 and 1988, explore the reduction in the black-white test score gap (i.e., the difference in the percentage correct dropped from 17.0 to 9.6 in reading and 17.6 to 11.6 in math) due to family and school factors.[3] They find that 25 percent of these changes can be attributed to shifts in family and school characteristics,

3. To give a sense of magnitudes, the average percentage correct for whites was 63.7 in reading in 1988.

while 75 percent can be attributed to reductions within schools. Finally, in a more recent paper, using the kindergarten through first grade cohort from the Early Childhood Longitudinal Study (ECLS), Fryer and Levitt (2004) find that the black-white test score gap disappears for children entering kindergarten when socioeconomic status and several other background factors are controlled.[4] Between the beginning of kindergarten and the end of first grade, however, the adjusted gap increases to 0.2 standard deviations. Moreover, in an extension using additional years of ECLS, Fryer and Levitt (2005) find that the black-white gap increases by 0.1 standard deviations each year between the beginning of kindergarten and the end of third grade.

These studies of racial test score gaps are similar in spirit to the ones on the nativity gap in that they attempt to explain the disparity in performance by compositional differences in student socioeconomic or educational characteristics or by differences in schools. They differ in that they generally find that large gaps persist even though controls for student and school differences are systematically used. Our study builds on these two literatures, applying the tools developed to explore the race gap to study the nativity gap. We begin with an analysis of raw scores for orientation. We then turn to value-added analyses, since ascertaining how student and school resources affect the flow of achievement is most relevant for education policy. Thus our study contributes to the literature by exploring value-added models of academic performance, analyzing the extent to which models vary between immigrants and native-born students by examining the interaction between immigrant status and other individual characteristics and by exploring the performance of students from twelve world regions, spanning the globe.

4. MODEL AND METHODS

We estimate three sets of regression models. The first set estimates the nativity gap between foreign-born and native-born students; the second explores differences in the coefficients of the production function between foreign and native-born students; and the third examines differences in the nativity gap across immigrants from different world regions. All equations are estimated using ordinary least squares with robust standard errors corrected for within-school clustering.[5]

The centerpiece of our empirical work is a regression model relating student performance on standardized tests to student background traits, such as race, gender, and age; education characteristics, such as language abilities,

4. Reardon (2003), using the same ECLS data set, finds similar results.
5. Alternative specifications estimated using instrumental variables to control for the potential endogeneity of school resources yielded similar results and are available from the authors.

learning disabilities, time of arrival into the school system, and prior test score as a proxy for all prior education performance; and school fixed effects to capture school differences in resources or peers or any other school specific variables. Finally, we include a dummy variable that captures differences in performance between the foreign-born and the native-born, whether due to unmeasured characteristics such as parents' education and attitudes, within school differences in treatment by teachers or others, or the context of reception, etc., as described above. To be specific, the resulting education production function model is:

$$\begin{aligned} \text{Test}_{ijt} = {} & \beta_0 + \beta_1 \text{Foreign}_i + \beta_2 \text{Test}_{i,j,t-1} + \beta_3 \mathit{Sociodem}_{ijt} \\ & + \beta_4 \mathit{Education}_{ijt} + \beta_5 \mathit{Cohort}_{ijt} + \beta_6 \mathit{School}_j + \epsilon_{ijt} \end{aligned} \quad (1)$$

where i, j, and t index student, school, and year, respectively; italics represent vectors; Test is the student's normalized score on a citywide math or reading test (and its lagged value $\text{Test}_{i,j,t-1}$); Foreign is an indicator that takes a value of one if the student is born in a country outside the United States; *Sociodem* is a vector of variables capturing the student's poverty status (measured by eligibility for free or reduced price lunch), gender, age, and race; *Education* is a vector of variables capturing the student's educational characteristics, including English language abilities and participation in part-time special education programs; *Cohort* represents a set of dummy variables indicating the year of admission to the New York City public schools (with "Admission Cohort 1993" indicating first admission five or more years ago); and *School* is a set of school fixed effects.[6]

Our education variables include an unusually rich specification of variables relating to experience with and proficiency in the English language. One dummy variable indicates whether a language other than English is the primary language spoken at home. A second variable captures whether the student was given the Language Assessment Battery (LAB), a test for English language proficiency (Took LAB). A third variable is the score the student earned on the LAB, if taken, and a final variable indicates whether the student scored at or below the fortieth percentile, the cutoff score determining eligibility for services to address limited English proficiency (LEP). Taken together, these provide a more nuanced view of the relationship between performance and language than the more usual specifications in the literature, which include only a LEP indicator. Thus, the coefficient on home language, for example, captures the

6. For more on education production functions see Hanushek (1986), or more recently McEwan (2003) or Todd and Wolpin (2003) for a good presentation of the theory of education production functions.

difference in performance between children from English-speaking homes and non-English-speaking homes, *controlling for the child's measured English proficiency*. Some caution is warranted, however, in interpreting these coefficients because of the correlation between language skills and unobserved background and family characteristics.

Notice that the three testing variables offer a particularly interesting interpretation: the coefficient on Took LAB indicates the difference between students who do and do not take the LAB; the LAB score coefficient indicates the way in which performance on the standardized test varies with English language proficiency; and the coefficient on LEP (LAB less than 40) indicates how much performance is higher (or lower) for students who are LEP-eligible, compared to otherwise similar students. To put it differently, Took LAB indicates whether there is a discontinuity in the relationship between performance in reading and the LAB score at the point of LEP eligibility. Thus, it provides a regression discontinuity estimate of the impact of LEP eligibility on performance.[7]

Finally, the inclusion of the admission cohort variables is unusual but important in this context for three reasons: (1) there may be unobserved differences in cohorts, for example, due to differences in U.S. immigration policies or international conditions;[8] (2) performance may be influenced by the amount of time a student has had to acclimate or adjust to new conditions; and (3) performance may be shaped by the grade of entry.[9] Since these factors may also be important for native-born children, we include them as a control variable for all students.[10]

Before estimating equation (1), we present results of a parsimonious test score regression including only the foreign-born dummy as a regressor. Here, β_1 measures the mean difference in performance between foreign-born and native-born students. Our seond specification introduces two controls for prior performance: a dummy variable indicating whether a lagged test score was available and the lagged test score (which takes a value of zero if there is no prior test score). In this model, β_1 captures the disparity between immigrant and native-born students in the value added to their scores between years.

7. See Jacob (2004) for more on regression discontinuity designs and an application to special educational programs or Matsudaira (2004) for an analysis of bilingual education and ESL programs.
8. For example, U.S. immigration policy may be focused on refugees from particular countries (e.g., Vietnamese or Haitians) or on family unification.
9. As an example, a student entering in second grade is virtually certain to be a "new kid" among peers, most of whom entered at a common articulation grade, typically kindergarten.
10. Of course the native-born prior educational experiences were most likely obtained in U.S. schools, while the foreign-born may have prior education elsewhere in the United States or in their birth country or other locations. These dummies capture the impacts of any differences in cohorts unmeasured by other model variables.

Notice that this specification is nonstandard. While many studies use samples limited to students with prior test score data, this seems inappropriate here because recent immigrants would be disproportionately represented among those excluded on this basis.[11] Our final specification follows equation (1), adding student characteristics and school fixed effects to the independent variables.

Our second set of analyses considers whether the production function differs for foreign-born and native-born students. Do the coefficients suggest differences in the impact of language proficiency, say, or poverty? To do so, we estimate equation (1) with a complete set of interactions between the regressors and the foreign-born dummy:

$$\begin{aligned}\text{Test}_{ijt} = {} & \beta_0 + \beta_1 \text{Foreign}_i + \beta_2 \text{Test}_{i,j,t-1} + \beta_3 \textit{Sociodem}_{ijt} \\ & + \beta_4 \textit{Education}_{ijt} + \beta_5 \textit{Cohort}_{ijt} + \beta_6 \textit{School}_j \\ & + \gamma_2 \text{Test}_{i,j,t-1}\text{Foreign}_i + \gamma_3 \textit{Sociodem}_{ijt}\text{Foreign}_i \\ & + \gamma_4 \textit{Education}_{ijt}\text{Foreign}_i + \gamma_5 \textit{Cohort}_{ijt}\text{Foreign}_i \\ & + \gamma_6 \textit{School}_j\text{Foreign}_i + \epsilon_{ijt} \qquad (2)\end{aligned}$$

Here, then, the γ's capture the differences between the two groups.

Our third set of analyses investigates differences in the performance of immigrants from different world regions, replacing the single foreign-born dummy in equation (1) with a series of region dummies (Region) indicating the student's birth region.[12]

$$\begin{aligned}\text{Test}_{ijt} = {} & \beta_0 + \beta_1 \textit{Region}_i + \beta_2 \text{Test}_{i,j,t-1} + \beta_3 \textit{Sociodem}_{ijt} \\ & + \beta_4 \textit{Education}_{ijt} + \beta_5 \textit{Cohort}_{ijt} + \beta_6 \textit{School}_j + \epsilon_{ijt} \qquad (3)\end{aligned}$$

We follow the same procedure as outlined earlier: first, estimating a parsimonious model, resulting in mean differences in performance across regions; second, controlling for prior performance, yielding estimates of the differences

11. We include only students with a current-year test scores. In the 1997–98 fifth grade, we exclude roughly 2 percent of the native-born and one quarter of the foreign-born, virtually all of whom have a home language other than English, roughly 80 percent are LEP and recent immigrants, pointing to the importance of controlling for language proficiency and recentness of immigration, as we have done. The excluded foreign-born may well be higher performing—they are better-off, younger, and more likely to be Asian and white than the excluded native-born. These variables are included in our regressions. Alternatively, the potential selection bias could have been addressed by a Heckman-style selection correction, if we were able to identify variables that predict participation but not the test score, which we were unable to do. Finally, estimating a specification with the interaction of the missing flag and foreign-born yielded insignificant coefficients.

12. The appendix provides countries by region. Schwartz, Stiefel, and Conger (2002) have more on regional classifications.

in value added; and, finally, including a full set of student factors and school fixed effects.

5. EMPIRICAL PRELIMINARIES: DATA SOURCES, DEFINITIONS, AND STYLIZED FACTS

We use individual-level data on fifth and eighth graders in New York City public schools in 1997–98 and 2000–1 for whom standardized reading or math exam data were available, excluding students in full-time special education, lacking exam data, or having a missing or unknown birthplace.[13]

Student performance is measured citywide in reading (CTB/McGraw-Hill Test of Basic Skills or New York State English Language Assessment) and mathematics (California Achievement Test [CAT] or New York State Math Assessment). To facilitate the comparison of test scores across grades and years, we convert them to z-scores.[14]

As shown in Table 2, samples are large, ranging from 57,152 to 72,509, and immigrants often outperform the native-born—consistently in the fifth grade and never lower in the eighth grade. The value-added analyses are even more consistent: in all cases, immigrants earn higher scores, roughly on the order of one-tenth of a standard deviation and ranging from a low of .037 to a high of .148 standard deviations. While these differences are modest, if continued over many grades, substantial gaps would accumulate, favoring immigrants.

Notice, however, that there are many differences between the native- and the foreign-born students. As shown in Table 3, approximately 14 percent of the roughly 65,000 fifth graders and one-fifth of the nearly 57,500 eighth graders in our 1997–98 samples are foreign-born.[15] Immigrants are more likely to be poor. They are disproportionately Asian and are less likely to be black or Hispanic; however, there is little difference in the percentage of whites. Not surprisingly, immigrants are far more likely to come from homes in which the language spoken is other than English; more likely to take the LAB; more likely to score lower on the LAB if they take it; and more likely to score below the LEP cutoff point. As a result, while nearly all native-born students have taken reading and math tests in the previous academic year (roughly 95 percent), a smaller percentage of the foreign-born have taken these standardized tests

13. Data were generously provided by the New York City Department of Education.
14. To calculate z-scores, one subtracts the mean for the grade and year and divides by the standard deviation. Using z-scores facilitates comparisons across tests and years; equations are estimated separately.
15. Any student reporting a country of birth other than the United States or its territories is considered foreign-born. Thus, some (exceedingly small) number of students termed foreign-born here may have been born abroad to U.S. citizens. Further, native-born students include those born in Puerto Rico or other U.S. territories or in the United States to foreign-born parents. Contact authors for information on the 2000–1 sample.

Table 2 Regression Coefficients, Mean Difference in Level and Value-Added Reading and Math Performance, Foreign-Born and Native-Born, 1997–98 and 2000–1

Foreign-born coefficient:	LEVEL		VALUE ADDED	
	1997–98	**2000–1**	**1997–98**	**2000–1**
Reading				
Fifth grade	0.122*** (0.019)	0.083*** (0.018)	0.126*** (0.010)	0.089*** (0.010)
N	64,971	71,141	64,971	71,141
Eighth Grade	−0.004 (0.024)	0.014 (0.027)	0.037*** (0.010)	0.058*** (0.013)
N	57,465	57,152	57,465	57,152
Math				
Fifth grade	0.061*** (0.022)	0.115*** (0.021)	0.105*** (0.010)	0.108*** (0.012)
N	66,629	72,509	66,629	72,509
Eighth grade	−0.029 (0.028)	0.099*** (0.010)	0.062*** (0.012)	0.148*** (0.013)
N	59,749	59,024	59,749	59,024

Notes: [a]The dependent variable is test score standardized to mean of 0 and a standard deviation of 1. [b]Value-added regressions include a lagged test score and a flag indicating lagged test score was not missing. [c]Robust standard errors, adjusted for within-school clustering, in parentheses.

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

(somewhat over four-fifths). Notice, however, that more than one third of the native-born students hail from homes in which a language other than English is spoken, and a good percentage are LEP as well.[16]

In addition to demographic differences, the foreign-born differ from the native-born in their tenure in the New York City public schools. Native-born students on average have attended New York City schools for a longer period. By the fifth grade, native-born students average nearly five years in the public schools, which is consistent with kindergarten entry. The average for foreign-born students, on the other hand, is less than four years, consistent with entry in the first grade. By the eighth grade, the difference has widened: native-born students average 7.7 years in the New York City public schools, again suggesting the dominance of kindergarten entry; while foreign-born students have an average tenure of only 5.2 years, reflecting entry throughout the elementary and middle school years.

Interestingly, there are differences in the schools attended by foreign-born and native-born students (not shown), which will be captured in our

16. Notice that we measure whether students are LEP, not whether they received services or what kind of services they received.

Table 3 Mean Characteristics of Students by Nativity, Fifth and Eighth Grades, Reading Sample, 1997–98

	FIFTH GRADERS		EIGHTH GRADERS	
	Native-Born	**Foreign-Born**	**Native-Born**	**Foreign-Born**
Free lunch eligible	0.76	0.79	0.72	0.78
Reduced-price lunch eligible	0.07	0.08	0.09	0.09
Female	0.51	0.50	0.51	0.50
Asian and other	0.08	0.24	0.07	0.23
Black	0.39	0.26	0.40	0.30
Hispanic	0.36	0.30	0.34	0.30
White	0.17	0.19	0.18	0.17
Language other than English	0.36	0.64	0.35	0.63
Age	10.48	10.54	13.52	13.59
Years in NYC public schools	4.92	3.80	7.65	5.18
Took LAB	0.06	0.14	0.04	0.14
LAB percentile	26.35	31.44	17.56	20.32
Limited English Proficient (LEP)	0.04	0.08	0.03	0.11
Part-time special education	0.10	0.05	0.09	0.04
Took reading test last year	0.94	0.79	0.95	0.83
Took math test last year	0.95	0.84	0.95	0.87
Number of students in sample	55,925	9,046	45,773	11,692
Proportion of students in sample	0.86	0.14	0.80	0.20

Notes: [a]Eligibility for free lunch is calculated only for students with nonmissing data: approximately 94% of all students. [b]Foreign-born students are students not born on U.S. soil. [c]Limited English Proficient students are those students that score less than or equal to the 40th percentile on their Language Assessment Battery (LAB) exam.

regressions by school fixed effects. As an example, the average school attended by a native-born student is smaller and has higher spending and a slightly larger teacher-pupil ratio.[17]

These disparities between the foreign- and native-born students suggest that we should expect something of a nativity gap in unadjusted test scores even if there is no specific difference due to nativity per se. How much of a gap exists, and how much is explained by these factors, are empirical questions to which we now turn.

6. RESULTS

Fifth Grade

As shown in Table 4, the 1997–98 fifth-grade reading and math results point consistently to an immigrant advantage. In reading, the foreign-born

17. Information on the differences in schools is available from the authors. See also Ellen et al. (2002).

score an average 0.122 standard deviations higher than native-born students (see column 1). Controlling for prior performance has little impact on the estimate of the nativity gap; the value-added estimate of the disparity is 0.126 (see column 2). And while production function estimates reduce the magnitude of the advantage by almost half, the 0.066 advantage is statistically significant. Results in mathematics are similar, pointing, again, to an immigrant advantage.

When we turn to the other variables, the results are largely consistent with expectations and the findings of prior research. To begin, prior-year test scores are strong predictors of current-year performance: 0.770 and 0.802 in the value-added models in (2) and (5) and somewhat lower in the education production function models in (3) and (6). Further, students with prior-year test scores earn higher scores than students without such data, perhaps reflecting the recent entrance of the latter into the New York City public schools, whether from other U.S. schools or schools in other countries, or perhaps, their exit from an exempt status—limited English proficiency or special education. As is typical in education production function models, students eligible for free or reduced-price lunch earn lower scores than ineligible students; performance is lower among black and Hispanic students than white and Asian students; and performance declines with age, which may be capturing grade retention. Here, girls do worse on both reading and math tests.

There are also few surprises in the education variables. Students who take the LAB do worse on reading tests (as indicated by the −0.921 coefficient on Took LAB), but reading test scores increase with the score earned on the test (as indicated by the 0.014 coefficient on LAB Percentile). Finally, controlling for performance on the LAB, LEP-eligible students do somewhat better than the ineligible (the coefficient is 0.180). Taken together, these provide a nuanced view of the importance of language proficiency on academic performance. Students considered at risk for LEP (measured by being tested for eligibility for services) do worse than those not considered at risk, but within that population, higher scores on the LAB suggest higher scores on reading tests, with a positive discontinuity at a score of 40—the score that indicates eligibility for LEP services. While our analysis does not include information on whether students received services to improve their English language skills and, if so, what type of service was received, the results indicate that students who are LEP-eligible do better than otherwise similar students who are not eligible.

A particularly interesting finding is that the coefficient on the Language Other Than English variable is positive. That is, students who live in a home where a language other than English is spoken earn *higher* reading scores than those living in homes where English is spoken, once we control for the direct

Table 4 Reading and Math Test Regression Coefficients, Fifth Grade, 1997–98

	READING			MATH		
	(1) Level	(2) VA	(3) EPF	(4) Level	(5) VA	(6) EPF
Foreign-born	0.122*** (0.019)	0.126*** (0.010)	0.066*** (0.009)	0.061*** (0.022)	0.105*** (0.010)	0.049*** (0.008)
Prior-year test score		0.770*** (0.006)	0.651*** (0.006)		0.802*** (0.005)	0.696*** (0.005)
Have prior-year test score		0.468*** (0.023)	0.369*** (0.020)		0.335*** (0.022)	0.276*** (0.022)
Free lunch			−0.132*** (0.010)			−0.091*** (0.008)
Reduced-price lunch			−0.052*** (0.012)			−0.042*** (0.011)
Female			−0.037*** (0.005)			−0.048*** (0.005)
Age			−0.033*** (0.007)			−0.025*** (0.007)
Asian and other			0.061*** (0.013)			0.086*** (0.012)
Black			−0.076*** (0.012)			−0.131*** (0.011)
Hispanic			−0.052*** (0.012)			−0.087*** (0.010)
Language other than English			0.031*** (0.008)			0.052*** (0.007)
Took LAB			−0.921*** (0.055)			−0.622*** (0.056)
LAB percentile			0.014*** (0.001)			0.011*** (0.001)
LEP			0.180*** (0.041)			0.208*** (0.044)
Part-time special education			−0.260*** (0.011)			−0.166*** (0.011)
Admission Cohort 1997			0.183*** (0.039)			0.027 (0.036)
Admission Cohort 1996			0.077*** (0.018)			0.123*** (0.018)
Admission Cohort 1995			0.047*** (0.016)			0.092*** (0.016)
Admission Cohort 1994			0.024* (0.013)			0.060*** (0.013)
Admission Cohort 1993			0.005 (0.008)			0.014* (0.007)

Table 4 Continued

	READING			MATH		
	(1) Level	(2) VA	(3) EPF	(4) Level	(5) VA	(6) EPF
Constant	−0.016 (0.019)	−0.466*** (0.026)	0.079 (0.077)	−0.008 (0.020)	−0.350*** (0.024)	0.082 (0.076)
Observations	64,971	64,971	64,971	66,629	66,629	66,629
R-squared	0.00	0.54	0.60	0.00	0.58	0.63

Notes: [a]Robust standard errors, adjusted for within school clustering, in parentheses. [b]Models 3 and 6 use school-level fixed effects. Cohort dummies are defined by the number of years in NYC public schools as of October 31. As an example, Admission Cohort 1997 indicates the student entered between November 1, 1996, and October 31, 1997. Other cohort variables are defined conformably. The omitted cohort entered on or before October 31, 1992, and have at least five years in the school system.

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

effects of limited English proficiency and the student's other educational characteristics. Understanding the relationship between academic performance, home language, and LEP services is interesting and important and we plan to explore this in future research.[18]

Turning to the Admission Cohort variables, the results are consistent and intriguing. Performance is lowest for the earliest cohort—entering in 1993 and for the most part monotonically increasing for both reading and math. That is, the most recent entrants perform the highest. Of course, these findings must be interpreted with care because of the significant correlations between cohort and other regressors. While the cohorts include both native and foreign-born students, the more recent ones are disproportionately foreign-born. Cohorts entering in kindergarten or before were less than a tenth foreign-born. Cohorts entering in first grade were closer to one-quarter foreign-born, while cohorts entering after first grade were between one- and two-thirds foreign-born. Further, more recent entrants may not have prior-year test scores, so the pure advantage conferred by recent entrance may apply to relatively few students.

Fifth and Eighth Grade, Reading and Math, 1997–98 and 2000–1

As described earlier, we perform similar analyses in eighth grade and for two different academic years. Table 5 displays only the coefficients on the foreign-born dummies, in the interest of simplicity. Columns 1 and 2 show mean difference in levels and value added (VA) in reading, and column 3 shows

18. The total effect of LEP status can be found by combining the coefficients on LAB score and LAB less than or equal to 40.

Table 5 Regression Results, Reading and Math Tests, Foreign-Born Coefficient Only, by Grade and Year

	READING			MATH		
	(1) Level	(2) VA	(3) EPF	(4) Level	(5) VA	(6) EPF
Fifth Grade, 1997–98						
Foreign-born	0.122*** (0.019)	0.126*** (0.010)	0.066*** (0.008)	0.061*** (0.022)	0.105*** (0.010)	0.049*** (0.008)
Observations	64,971	64,971	64,971	66,629	66,629	66,629
R^2	0.00	0.54	0.60	0.00	0.58	0.63
Fifth Grade, 2000–1						
Foreign-born	0.083*** (0.018)	0.089*** (0.010)	0.046*** (0.009)	0.115*** (0.021)	0.108*** (0.012)	0.055*** (0.009)
Observations	71,141	71,141	71,141	72,509	72,509	72,509
R^2	0.00	0.47	0.52	0.00	0.55	0.60
Eighth grade, 1997–98						
Foreign-born	−0.004 (0.024)	0.037*** (0.010)	0.035*** (0.009)	−0.029 (0.028)	0.062*** (0.012)	0.038*** (0.009)
Observations	57,465	57,465	57,465	59,749	59,749	59,749
R^2	0.00	0.58	0.61	0.00	0.56	0.59
Eighth grade, 2000–1						
Foreign-born	0.014 (0.027)	0.058*** (0.013)	0.030*** (0.008)	0.099*** (0.027)	0.148*** (0.013)	0.068*** (0.008)
Observations	57,152	57,152	57,152	59,024	59,024	59,024
R^2	0.00	0.54	0.62	0.00	0.59	0.65
Prior-year test score	No	Yes	Yes	No	Yes	Yes
Demographic characteristics	No	No	Yes	No	No	Yes
Educational characteristics	No	No	Yes	No	No	Yes
School fixed effects	No	No	Yes	No	No	Yes
Cohort variables	No	No	Yes	No	No	Yes

Notes: [a] Robust standard errors, adjusted for within school clustering, in parentheses. [b] Demographic characteristics are: eligible for free lunch, eligible for reduced-price lunch, female, Asian/other, black, Hispanic, age, and a dummy indicating free lunch data is nonmissing. Educational characteristics are: language other than English frequently spoken at home, took the Language Assessment Battery (LAB), percentile on the LAB, scored at or below the 40th percentile on the LAB, part-time special education participation, prior-year test score, and whether student took test in prior year. Cohort variables are dummies for the number of years in NYC Public Schools.

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

the foreign-born coefficients from the estimated reading production function (EPF). Columns 4, 5, and 6 present comparable results for math performance.

Interestingly, while the results in columns 1 and 4 provide mixed evidence on the sign and magnitudes of the nativity gap—favoring the foreign-born in

the fifth grade, but showing largely insignificant results in the eighth—the value-added results indicate consistently higher value added among immigrants. There is a considerable variation in the size of the advantage, ranging from 0.037 standard deviations in the eighth grade reading (1997–98) to .148 in eighth-grade math (2000–1). Finally, the estimates from the fully specified production functions are similarly consistent—immigrants outperform native-born students, ceteris paribus—and the range of estimates is narrower. The estimate of the nativity gap ranges from a low of 0.030 in eighth-grade reading in 2000–1 to a high of 0.068 in math in that same grade and year.

Interestingly, in the fifth grade, the size of the unadjusted gap is reduced by as much as one-half as adjustments are made for differences in students and schools. In the eighth grade, the disparity emerges with control variables, having been obscured by compositional differences and other differences driving disparities in performance.

Is the Production Function Different for Foreign-Born Students?

Our analyses thus far have constrained the coefficients (or marginal effects) of variables in the production function to be the same for native-born and foreign-born students. There are, however, many reasons to suspect that there are productivity differences across groups: immigrants might well respond differently than native-born students to demographic or educational characteristics or school resources. In particular, given the significance of the language variables in the production function results and the correlation between immigrant status and these variables, immigrants might respond differently to English language programs.

As described above, we estimated a set of models in which we allowed the coefficients to differ between the native- and foreign-born students. To preserve space, Table 6 shows key coefficients for fifth and eighth grade reading in 1997–98.[19] The coefficients on the foreign-born interactions capture the difference in responsiveness between native-born and foreign-born students. The complete set of interactions on all variables in the production function, as well as several selected sets, is statistically significant, as shown by the F statistics at the bottom of the table. Also while the coefficients of the foreign-born in the production function differ statistically from those of the native-born, most differences between groups are substantively small. Thus, for example, the results indicate that the prior-year test score is a somewhat less important predictor for the foreign-born than for the native-born—the coefficient for native-born fifth-grade students is 0.676, and the foreign-born coefficient is 0.028 lower.

19. Complete results are available from the authors.

Table 6 Selected Reading Test Production Function Coefficients, 1997–98, Interaction Model

	Fifth Grade	Eighth Grade
Prior score	0.676***	0.719***
	(0.007)	(0.007)
Asian and other	0.078***	0.038**
	(0.015)	(0.016)
Black	−0.131***	−0.112***
	(0.013)	(0.018)
Hispanic	−0.118***	−0.101***
	(0.013)	(0.015)
Language other than English	0.029***	−0.006
	(0.009)	(0.010)
Took LAB	−0.840***	−0.772***
	(0.068)	(0.106)
LAB percentile	0.013***	0.014***
	(0.001)	(0.002)
LEP	0.146***	0.304***
	(0.050)	(0.086)
Constant	0.173**	0.919***
	(0.086)	(0.094)
FB*Prior Score	−0.028**	−0.058***
	(0.013)	(0.010)
Foreign-born	−0.125	0.172
	(0.190)	(0.214)
FB*Asian and Other	−0.110***	−0.133***
	(0.030)	(0.030)
FB*Black	0.018	−0.025
	(0.033)	(0.032)
FB*Hispanic	0.004	−0.084***
	(0.030)	(0.028)
FB*Language other than English	0.118***	0.129***
	(0.024)	(0.024)
FB*Took LAB	−0.387***	−0.535***
	(0.118)	(0.138)
FB*LAB percentile	0.005***	0.010***
	(0.002)	(0.003)
FB*LEP	0.078	0.150
	(0.085)	(0.114)
Observations	64,971	57,465
R-squared	0.58	0.60
F-stat for interactions = 0	8.20***	12.86***
F-stat for demographic interactions = 0	79.95***	84.36**
F-stat for demographics and educational = 0	1284.12***	1229.41***

Notes: [a]Robust standard errors, adjusted for within-school clustering, in parentheses. [b]All interaction variables are the foreign-born variable interacted with the full set of variables as in table 4. [c]Demographic interactions are foreign-born interacted with free lunch, reduced-price lunch, female, age, Asian, black, Hispanic only. [d]Demographics plus educational variables exclude the cohort variables from the "all interactions" list only.

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

Language and race/ethnicity are two particularly interesting groups of variables. Recall that students who experience a language other than English at home are eligible for the LAB, and if they score lower than 40 percent on the LAB, they are eligible for services to address limited English proficiency. For all tests and grades shown, foreign-born students exposed to a language other than English at home do better than comparable native-born students, but those foreign-born students who take the LAB do worse than native-born students who take the LAB. Each additional percentage score on the LAB test adds more to the test score for foreign-born than for native-born students. Interestingly, in the presence of these controls, the impact of LEP eligibility is not significantly different for the foreign-born than the native-born; that is, foreign-born students who are eligible for LEP services do no better or worse than their native-born peers. The results for language effects are consistent across tests and grades, although the coefficients are not always statistically significant at the 5 percent or better level.

Equally interesting are the race and ethnicity results. Foreign-born Asian students do worse than their native-born ethnic peers, while no significant difference emerges between the foreign- and native-born blacks. Results are inconsistent for Hispanics. Finally, the coefficient on the foreign-born dummy variable becomes insignificant in these specifications, indicating that nativity by itself no longer matters.

In summary, some differences in marginal effects emerge between native- and foreign-born students, suggesting that some of the disparities in performance reflect differences in the impact of underlying factors. That said, the magnitudes of the differences in the coefficients are by and large relatively small, except for the language variables. In this case, the results suggest that additional work exploring the acquisition of English language skills among immigrants and its implications for their academic performance is warranted.

Regional Analyses

As is well known, the large size of the immigrant population in New York City is matched with an astonishing diversity. Thus, the summary foreign-born statistic may mask important disparities within the immigrant community. For example, students from the Dominican Republic are quite different than students from the former Soviet Union, and pooling them as we have done may mask important differences in their academic performance.

Table 7 shows that disparities in performance (both unadjusted and value-added performance) in 1997–98 across region groups vary widely in both

Table 7 Regression Coefficients, Mean Difference in Level and Value-Added Reading Performance by Region, 1997–98

	FIFTH GRADERS		EIGHTH GRADERS	
	Level	**VA**	**Level**	**VA**
Russia	0.679***	0.295***	0.667***	0.292***
	(0.057)	(0.033)	(0.066)	(0.032)
Eastern Europe	0.379***	0.237***	0.344***	0.224***
	(0.075)	(0.045)	(0.052)	(0.034)
Western Europe	0.377***	0.226***	0.212***	0.114***
	(0.072)	(0.054)	(0.060)	(0.043)
China	0.641***	0.334***	0.459***	0.168***
	(0.080)	(0.047)	(0.075)	(0.035)
East Asia	0.494***	0.275***	0.431***	0.186***
	(0.044)	(0.031)	(0.046)	(0.026)
South Asia	0.326***	0.222***	0.208***	0.074*
	(0.041)	(0.027)	(0.064)	(0.039)
West Asia	0.342***	0.261***	0.110*	0.069
	(0.072)	(0.046)	(0.058)	(0.043)
Africa	−0.014	0.157***	−0.036	0.051
	(0.068)	(0.051)	(0.072)	(0.048)
Dominican Republic	−0.234***	−0.022	−0.418***	−0.111***
	(0.038)	(0.025)	(0.046)	(0.027)
Caribbean	−0.037	0.079***	−0.135***	0.004
	(0.027)	(0.019)	(0.034)	(0.018)
Guyana	−0.230***	−0.030	−0.313***	−0.074**
	(0.043)	(0.027)	(0.052)	(0.030)
Latin America	−0.089**	0.048**	−0.243***	−0.064***
	(0.036)	(0.022)	(0.036)	(0.021)
Constant	−0.016	−0.461***	0.001	−0.500***
	(0.019)	(0.025)	(0.029)	(0.028)
Observations	64971	64971	57465	57465
R-squared	0.02	0.54	0.03	0.58

Notes: [a]Robust standard errors, adjusted for within-school clustering, in parentheses. [b]Models include regional dummy variables. See appendix for list of countries in each region.

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

fifth and eighth grades.[20] On raw scores, students from Russia outperform native-born students by almost 0.7 standard deviations in reading in both grades, while students from the Dominican Republic on average earn considerably lower scores than native-born students—between 0.2 and 0.4 standard deviations lower. Value-added scores diminish the differences, although

20. Results for math and for 2000–1 in both subjects are qualitatively similar and available from the authors.

Russians still score approximately 0.31 standard deviations higher than native-born students, while students from the Dominican Republic show −0.1 to no significant differences.

Notice, however, that there are also considerable differences in the characteristics of students across regions, as shown in Table 8. While only 56.8 percent of fifth grade Russian immigrants are free-lunch-eligible, compared to 94.7 percent of Dominican students. Similarly, only 2 percent of Russians are LEP-classified, while one-quarter of all Dominican fifth graders were LEP-classified in 1997–98. There are also substantial differences in tenure in New York City public schools. The average African immigrant has attended New York's public schools for less than three years, but the average West Asian student attended for more than four years. Results are similar in the eighth grade and in other years.[21]

To what extent do these underlying differences explain the regional disparities in performance? Table 9 shows the results of our regression analyses for fifth and eighth grade reading in 1997–98 and 2000–1.[22] As before, the disparities among immigrants from different regions, and for each region compared to native-born students, are considerably dampened by regression analysis. Clearly many of the interregional disparities are driven by sociodemographic, educational, and cohort characteristics captured in the regressions. To be specific, more than three-quarters of the 0.679 gap in level of fifth-grade reading performance in 1997–98 between Russians and native-born students seems to be explained by differences captured elsewhere in the regression. Similarly dramatic declines obtain for several other regions—Eastern Europe drops from 0.379 to 0.097; Western Europe from 0.377 to 0.121; China from 0.641 to 0.150; and East Asia, South Asia, and West Asia show the same pattern. Interestingly, while the unadjusted results show immigrants from some regions earning high scores and others falling below the native-born, the education production function disparities are positive, with Guyana the only consistent exception. Thus, the results make clear that the earlier result pointing to a nativity gap that favors the foreign-born is not driven merely by the performance of a single group, as some might have expected. Instead, students from several world regions outperform their native-born peers, spanning countries with exceptional educational systems and highly educated populations as well as countries with inadequate educational systems and low literacy rates. At the same time, there is no single immigrant experience, and future work is warranted that examines the causes of these divergent educational experiences.

21. The 2000–1 results are available from the authors.
22. The 2000–1 results and math results are similar.

Table 8 Characteristics of Students by Region, 1997–98, Fifth and Eighth Graders

Region	Number of Students	Percent Free-Lunch Eligible	Percent Reduced-Price Lunch Eligible	Percent LEP	Percent Special Education	Percent Female	Years in NYC Public Schools
Fifth Grade							
Africa	206	77.7	7.3	6.3	4.9	51.0	2.7
Caribbean	1,911	83.5	6.4	1.0	5.5	54.0	3.1
China	459	69.1	10.2	6.5	3.3	50.1	4.1
Dominican Republic	1,409	94.7	2.3	25.1	5.3	49.7	4.4
East Asia	471	45.2	21.0	2.8	4.0	50.5	3.9
Eastern Europe	329	59.0	14.9	6.1	3.0	51.7	3.7
Guyana	729	84.1	8.2	0.0	6.6	52.8	3.1
Latin America	1,296	86.1	5.6	18.5	6.9	46.6	4.4
Russia	1,127	56.8	10.6	2.0	4.7	49.1	3.9
South Asia	638	71.3	10.2	5.8	5.8	45.9	4.0
West Asia	219	68.0	7.3	3.2	8.2	51.1	4.3
Western Europe	252	56.3	12.7	3.6	6.7	46.0	3.8
All foreign-born	**9,046**	**76.6**	**8.1**	**8.2**	**5.5**	**50.2**	**3.8**
All native-born	**55,925**	**73.5**	**7.0**	**4.3**	**9.7**	**51.1**	**4.9**
Eighth Grade							
Africa	224	70.1	8.9	6.3	2.2	49.6	3.4
Caribbean	2,890	74.7	7.4	2.0	4.6	52.7	4.2
China	678	66.4	12.4	10.8	3.7	49.0	6.0
Dominican Republic	1,667	92.2	2.1	35.5	4.4	49.2	6.0
East Asia	665	46.6	17.4	7.4	2.4	52.3	5.3
Eastern Europe	382	61.3	12.6	6.0	3.4	52.9	5.2
Guyana	956	77.2	7.6	0.5	4.0	53.2	4.3
Latin America	1,784	84.1	5.5	21.2	5.3	46.9	6.3
Russia	1,230	49.8	13.4	2.0	2.5	48.9	4.7
South Asia	693	70.9	11.4	8.1	2.0	47.0	5.5
West Asia	257	68.5	5.4	5.1	4.7	37.0	5.9
Western Europe	266	59.4	10.2	4.1	6.4	55.6	5.7
All foreign-born	**11,692**	**72.9**	**8.3**	**10.9**	**4.0**	**50.1**	**5.2**
All native-born	**45,773**	**66.8**	**7.9**	**3.1**	**8.6**	**50.9**	**7.7**

Table 9 Regional Regression Coefficients, Education Production Functions, Fifth- and Eighth-Grade Reading, 1997–98 and 2000–1

	FIFTH GRADERS		EIGHTH GRADERS	
	1997–98	2000–1	1997–98	2000–1
Russia	0.123*** (0.026)	0.069** (0.032)	0.169*** (0.033)	0.178*** (0.030)
Eastern Europe	0.097*** (0.036)	0.052 (0.041)	0.133*** (0.036)	0.098*** (0.036)
Western Europe	0.121** (0.047)	0.065 (0.041)	0.065 (0.041)	0.062 (0.044)
China	0.150*** (0.040)	0.159*** (0.033)	0.107*** (0.032)	0.077* (0.042)
East Asia	0.082*** (0.030)	0.033 (0.036)	0.102*** (0.029)	−0.014 (0.030)
South Asia	0.055** (0.026)	−0.015 (0.024)	−0.011 (0.037)	0.033 (0.032)
West Asia	0.107** (0.046)	0.092* (0.049)	−0.025 (0.037)	−0.086** (0.038)
Africa	0.089* (0.050)	0.181*** (0.049)	0.055 (0.048)	0.113** (0.046)
Dominican Republic	0.120*** (0.019)	0.069*** (0.022)	0.060*** (0.020)	0.085*** (0.015)
Caribbean	0.018 (0.017)	−0.028 (0.022)	0.004 (0.017)	−0.032** (0.015)
Guyana	−0.135*** (0.028)	0.004 (0.027)	−0.114*** (0.032)	−0.086*** (0.031)
Latin America	0.087*** (0.019)	0.068*** (0.022)	0.025 (0.018)	−0.005 (0.015)
Constant	0.055 (0.077)	0.086 (0.074)	0.839*** (0.083)	1.015*** (0.091)
Observations	64,971	71,141	57,465	57,152
R-squared	0.60	0.52	0.61	0.62

Notes: [a]Robust standard errors, adjusted for within-school clustering, in parentheses. [b]The model includes controls for free-lunch eligibility, reduced-price lunch eligibility, gender, age, ethnicity/race, English proficiency, Language Assessment Battery scores, special education status, last year's reading and math scores, and teacher qualifications. Cohort dummies control for the numbers of years in NYC public schools. The models include school fixed effects.

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

7. CONCLUSIONS

Our analyses of the academic performance of native-born and foreign-born students in New York City public schools suggest that immigrant students by and large perform better than native-born students in reading and math, even though the size of the nativity gap is diminished if one controls for the characteristics of students and schools. These results, estimated for a representative elementary school grade and a representative middle school

grade, are remarkably robust. In addition, while foreign-born students have different production functions than do native-born students, the differences are substantively small, except perhaps for the impacts of language-skill-related variables, where the foreign-born do seem to be affected differently.

The implications of our results for school policy are intriguing. How different are immigrants from native-born students? Not as much, perhaps, as raw score differentials suggest. And to the extent that there are differences, immigrant students typically perform better. Thus immigrants may not pose problems for the four areas of concern—equity, peers, accountability, or future labor market success. In fact, our results suggest that differences between immigrants and foreign-born are driven by the same factors that drive differences among native-born students, although responsiveness may be somewhat different. As an example, immigrants who live in homes where languages other than English are spoken do better than similarly situated native-born students, while immigrants who are assessed for English language proficiency do worse, ceteris paribus.

To some degree, these results are good news for New York City public schools. Immigrants make up over 17 percent of elementary and middle school children, and New York City's role as a port of entry seems likely to continue. The city has trouble helping many of its students reach adequate educational levels, and the job would be even more difficult if immigrant children needed help beyond what the native-born children need. But this study indicates that this may not be the case. Perhaps this is because the city already supplies immigrants with sufficient resources where they are needed. In fact, Schwartz and Stiefel (2004) provide evidence that resources are distributed on the basis of educational characteristics of students and neutrally with respect to immigrant status. Perhaps immigrants perform better because immigrant families are particularly motivated to "make it" in America and, to do so, they place a premium on education. Alternatively, immigrant students may, on average, come to the United States with better schooling backgrounds than their native-born peers. To the extent that prior-test performance inadequately captures academic preparation in the regression equation, our foreign-born variables may reflect those differences. Whatever the reasons, there is little evidence here that immigrant students are faring particularly poorly in city schools.

Some will wonder whether these results merely reflect the overall poor performance of New York City public school children. Perhaps the foreign-born advantage is not hard-won at all but, rather, the result of low performance by the native-born students. So how well do New York City students perform compared to other U.S. students? Recent NAEP results from five large urban districts (Lutkus et al. 2003) reveal that New York City (and Houston) scored

higher in fourth-grade reading than the three other urban districts, comparable to all "central cities," although lower than the national average.[23] Thus, while urban students do not perform as well as students in suburban districts, New York City students do not do poorly compared to other urban districts. Perhaps our immigrants are part of the reason.

In sum, our results suggest that nativity itself explains little of the disparities in performance across students. Instead, much of the disparity is explained by the same set of variables that explain differences in performance of native-born students—English language proficiency, prior performance, gender, and the characteristics of their schooling. This means that it may be best to channel new resources toward "old" persistent problems of socioeconomic and racial disparities in performance, which do continue to disadvantage poor, black, and Hispanic students, whether immigrant or native-born.

For helpful comments, we thank Dylan Conger, William Duncombe, Christopher Jepsen, an anonymous referee, David Figlio, seminar participants at New York University, University of Texas–Dallas, McMaster University, and participants at sessions of the American Education Finance Association 2004 meetings and the Association for Public Policy and Management 2004 meetings. The Spencer Foundation provided generous support for the project, and Luis Chalico and Charles Parekh were excellent research assistants. All responsibility for analyses and conclusions is ours.

REFERENCES

Berg, Nathan, and John Kain. 2003. The academic performance of immigrant and native-born school children in Texas. Unpublished paper, University of Texas–Dallas.

Bleakley, Hoyt, and Aimee Chin. 2004. Language skills and earnings: Evidence from childhood immigrants. *Review of Economics and Statistics* 86, 481–96.

Cook, M. D., and William N. Evans. 2000. Families or schools? Explaining the convergence in white and black academic performance. *Journal of Labor Economics* 18:729–54.

Demie, Feysia. 2001. Ethnic and gender differences in educational achievement and implications for school improvement strategies. *Educational Research* 43:91–106.

Ellen, Ingrid G., Katherine O'Regan, Amy Ellen Schwartz, and Leanna Stiefel. 2002. Immigrant children and urban schools: Evidence from New York City on segregation and its consequences for schooling. In *Brookings—Wharton Papers on Urban Affairs*, edited by William G. Gale and Janet Rothenberg Pack. Washington, DC: Brookings Institution Press, pp. 183–205.

Fryer, Roland G., and Steven D. Levitt. 2004. Understanding the black-white test score gap in the first two years of school. *Review of Economics and Statistics* 86:551–60.

23. The other cities are Atlanta, Chicago, and Los Angeles. For New York, only fourth-grade results are given.

Fryer, Roland G., and Steven D. Levitt. 2005. The black-white test score gap through third grade. NBER Working Paper No. 11049.

Gandara, Patricia, Russell Rumberger, Julie Maxwell-Jolly, and Rebecca Callahan. 2003. English learners in California schools: Unequal resources, unequal outcomes. *Education Policy Analysis Archives* 11 (36). Accessed 27 July 2005. Available epaa.asu.edu/epaa/v11n36/.

Glick, Jennifer E., and Michael J. White. 2003. The academic trajectories of immigrant youths: Analysis within and across cohorts. *Demography* 40:759–83.

Hanushek, Erik A. 1986. The economics of schooling: Production and efficiency in public schools. *Journal of Economic Literature* 24:1141–77.

Hedges, Larry V., and Amy Nowell. 1998. Black-white test score convergence since 1965. In *The Black White Test Score Gap,* edited by Christopher Jencks and Merrideth Phillips. Washington, DC: Brookings Institution Press, pp. 149–81.

Hedges, Larry V., and Amy Nowell. 1999. Changes in the black-white gap in achievement test scores. *Sociology of Education* 72:111–35.

Hirschman, Charles. 2001. The educational enrollment of immigrant youth: A test of the segmented-assimilation hypothesis. *Demography* 38:317–36.

Jacob, Brian A. 2004. Remedial education and student achievement: A regression-discontinuity analysis. *Review of Economics and Statistics* 88:226–44.

Kao, Grace. 1999. Psychological well-being and educational achievement among immigrant youth. In *Children of immigrants: Health, adjustment, and public assistance,* edited by D. J. Hernandez. Washington, DC: National Academy Press, 410–77.

Kao, Grace, and Marta Tienda. 1995. Optimism and achievement: The educational performance of immigrant youth. *Social Science Quarterly* 76:1–19.

Lutkus, A. D., A. W. Weiner, M. C. Daane, and Y. Jin. 2003. *The nation's report card: Reading 2002, trial urban district assessment.* Washington, DC: U.S. Department of Education, NCES No. 2003-523.

Matsudaira, Jordan. 2004. Sinking or swimming? Evaluating the impact of English immersion versus bilingual education on student achievement. Unpublished paper, University of Michigan.

McEwan, Patrick J. 2003. Peer effects on student achievement: Evidence from Chile. *Economics of Education Review* 22:131–42.

Portes, Alejandro, and MacLeod Dag. 1996. Educational progress of children of immigrants: The roles of class, ethnicity, and school context. *Sociology of Education* 69:255–75.

Qin–Hilliard, Desiree Baolian, Erika Feinauer, and Blanca G. Quiroz. 2001. Introduction. *Harvard Educational Review* 71:v–x.

Reardon, Sean F. 2003. Sources of educational inequality: The growth of racial/ethnic and socioeconomic test score gaps in kindergarten and first grade. Unpublished Working Paper 03–05R, Population Research Institute, Pennsylvania State University.

Rosen, Rae, Susan Wieler, and Joseph Pereira. 2005. New York City immigrants: The 1990s wave. In *Current Issues in Economics and Finance*. New York: Federal Reserve Bank of New York, pp. 1–4.

Schnepf, Sylke Viola. June 2004. How different are immigrants? A cross-country and cross-survey analysis on educational achievement. Institute for the Study of Labor, Discussion Paper No. 1398.

Schwartz, Amy Ellen, and Leanna Stiefel. 2004. Immigrants and the distribution of resources within an urban school district. *Educational Evaluation and Policy Analysis* 26:303–28.

Schwartz, Amy Ellen, Leanna Stiefel, and Dylan Conger. 2002. Alternative regional classifications of New York City's immigrant children. Unpublished paper, New York University. Accessed 11 February 2004. Available http://urban.nyu.edu/education/regionpaper.pdf.

Singer, Audrey. 2004. *The rise of new immigrant gateways. Living city census series*. Washington, DC: Brookings Institution Press.

Stiefel, Leanna, Amy Ellen Schwartz, and Dylan Conger. 2003. Language proficiency and home languages in New York City elementary schools. Unpublished paper, New York University. Accessed 11 February 2004. Available http://urban.nyu.edu/education/nyclanguage.pdf.

Suarez-Orozco, Carola, and Marcelo Suarez-Orozco. 1995. *Transformations: Immigration, family life, and achievement motivation among Latino adolescents*. Stanford, CA: Stanford University Press.

Todd, Petra E., and Kenneth I. Wolpin. 2003. Towards a unified approach for modeling the production function for cognitive achievement. *Economic Journal* 113:3–33.

Waters, Mary C. 1999. *Black identities: West Indian immigrant dreams and American realities*. New York: Russell Sage Foundation.

APPENDIX. COUNTRIES IN REGION GROUPS

Russia:	Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Russia, Tajikistan, Turkmenistan, Ukraine, Uzbekistan
East Europe:	Albania, Bosnia & Herzegovina, Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Macedonia, Poland, Romania, Slovak Republic, Slovenia, Yugoslavia
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
China:	China, Hong Kong, Taiwan

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
South Asia:	Bangladesh, India, Pakistan
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
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
Dominican Republic:	Dominican Republic
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
Guyana:	French Guiana, Guyana, Surinam
Latin America:	Argentina, Belize, Bolivia, Brazil, Chile, Colombia, Costa Rica, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Uruguay, Venezuela