Title: The Hispanic-White Achievement Gaps in Early School Years: Evidence from the ECLS-K

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Brief Abstract

This paper investigates the ethnic academic achievement gaps and associated growth patterns from kindergarten to fifth grade between immigrant children of Mexican origin and native White, using the Early Childhood Longitudinal Study-Kindergarten data. We find that the Hispanic-white achievement gaps have been narrowed, which is contrast with the widening black-white achievement gaps. In particular, the 2nd generation Mexican children are able to catch up in reading and math, mostly due to their faster growth during first grade. Our analysis shows that the persisting achievement gaps in the fifth grade between immigrant children of Mexican origin may be largely due to the initial lags at kindergarten. Our findings highlight the pivotal importance of early intervention to boost immigrant children's assimilation process.

Introduction

Roughly one third of the immigrant children having at least one Mexican parents (Shields & Behrman, 2004). The academic achievement of the Hispanic children of Mexican origin, in particularly children of immigrants not only shape their own social status attainment trajectories, but also affect the overall competitiveness of labor force in the United States. Part studies have documented that children of the Mexican immigrants fall behind than native White children in a number of educational attainment indicators from cross-sectional studies (Kao and Thomsaon, 2003). Yet, there is less study of the achievement growth pattern of the children born to Mexican immigrants at national level.

First, most of studies are cross-sectional design, which compared the standardized test scores with absolute measures of achievement gaps. Both the 2007 report of the National Assessment of Educational Progress and the Child Well-Being Index 2008 report of the Foundation for Child Development showed that the Hispanic-White achievement gaps shrank at national level (The NAEP 2007 report, Hernandez and McCartney 2008). But these two reports neither reflected children's progression through grades, nor differentiated generational diversity within the Hispanic children. In addition, studies of immigrant children's progress used absolute measures of achievement gaps, which may conceal the underlying growth and distort the conclusion of the trends in achievement gaps(Reardon and Galindo 2006,2007).

Second, studies using the longitudinal data have overcome part of the problem and provide insights into the cohort experience of the Hispanic-White achievement gaps. Yet, these investigations often treated the Hispanic children as a homogenous group and did not differentiate the experience of children born to Mexican immigrants. For example, several studies based upon the Early Childhood Longitudinal Study have identified that the Hispanic-White achievement gaps have narrowed from kindergarten to fifth grade and the Hispanic children were at lower rates of learning during summer (Downey, Hippel and Broh 2004, Burkam et al. 2004, Fryer and Levitt, 2004, Fryer and Levitt, 2006). As these studies treated the Hispanic as a single homogeneous group, we still do not know the experience of subgroups of the Hispanic children.

This study aims to address this question by investigating the Hispanic-white achievement gaps among children at national level from kindergarten to fifth grade. With both absolute and relative measures of achievement gaps, we examine the heterogeneous growth patterns within the Hispanic children of Mexican origin. Using the Early Childhood Longitudinal Study, we use the piecewise growth curve modeling to estimate the effect of mother's acculturation on children's academic achievement.

Theoretical Focus

Our analysis is grounded in the assimilation and segmented assimilation theory (Warner and Srole, 1945; Portes and Zhou, 1993; Zhou 1997; Portes and Rumbaut, 2001). Classical assimilation theory portrayed assimilation as an integral part of the movement of immigrant groups into the American middle class (Warner and Srole, 1945). This assimilation theory predicts that the Hispanic children's academic achievement eventually improved as their generational status changed, and children born to Mexican immigrants would catch up with native born Whites. The segmented assimilation theory, by contrast, argued that the class assimilation theory did not apply for waves of recent Mexican immigrant children, as they are socially disadvantages upon entry into the United States (Portes and Zhou, 1993). The segmented assimilation theory emphasize the within group differences and predict worse educational outcomes of immigrant children as their generational status changed.

Data and Methods

We use the Early Childhood Longitudinal Study-Kindergarten (ECLS-K) to perform the analysis. The ECLS-K is conducted by the Department of Education at children's entry into kindergarten and in their progression through school to provide information on a number of educational outcomes. The nationally representative sample consists of a cohort of children who entered kindergarten in the fall of 1998. The original sample at the fall semester of kindergarten included 21,260 kindergartners from 1,280 schools. Various types of information were collected on the children at six different times in the study (ie, during the fall [1998; wave 1] and spring [1999; wave 2] of the children's kindergarten year, in the fall [1999; wave 3] and spring [2000; wave 4] of their year in first grade, spring [2002; wave 5] of their year in third grade and spring [2004, wave 6] of their year in fifth grade). We use the reading and math IRT test scores of five waves, and they are recalibrated in the fifth grade to make consistent comparison between grades.

Measurements

Black and Hispanic groups

We limit the sample to children living with biological mothers. We classify children into four groups according to their biological mothers' ethnicity and nativity:

- White children with US-born white biological mothers
- Black children with US-born black biological mothers
- Hispanic children with US-born Mexican biological mothers
- Hispanic children with Mexican-born biological mothers

IRT scale scores in reading and math

The IRT scale scores in the database represent estimates of the number of items students would have answered correctly at each point in time if they had taken all of the 186 questions in all of the first- and second-stage reading forms administered in all rounds and the 153 questions in all of the mathematics forms. The reading test scores reflect children' ability of reading comprehension. The math test scores reflect children's ability to add, subtract and multiply. Since the fifth grade test has included more difficult items, the ECLS-K recalibrated the scores of kindergarten, first grade and third grade, to make scores comparable across five grades.

Absolute measures of achievement gaps

- Raw score gaps in points
  Scores (black or Hispanic children) - Scores (white)
- Adjusted score gaps in standard deviation unit
  [Scores (black or Hispanic children) - Scores (white)] /std dev(whole sample).

Relative measures of achievement gaps

- Relative score gaps in ratio
  Scores (black or Hispanic children) / Scores (white)
- Growth rates between grade (six months)
  Score (Spring kindergarten) – Score (Fall kindergarten)
  [Score (Spring third grade) – Score (Spring first grade)] /4

Socioeconomic status. The ECLS-K uses composite variable of socioeconomic status at fall of kindergarten. Those above 60 percentile of SES distribution are defined as high SES, and those below 60% is defined as low SES.

Initial low starter. Children whose reading scores in fall of kindergarten are in the bottom 25 percentile of the reading distribution is defined as low starter. Children are defined as high starter if their reading scores are in the top 75 percentile.

Methods

Growth curve modeling is a direct tool to model changes. In the study of educational achievement, growth curve modeling has several appealing properties compared with the between-wave comparison approach. First, it reflects the cumulative nature of children's learning process. Case (1993) argued that the acquisition of cognitive skills is a cumulative process in early childhood, where prior achievement scores build the foundation for the next stage of growth. Growth curve modeling can accommodate this theoretical argument of children's learning process by modeling the initial differences and slope differences during certain periods. These estimates may capture the disadvantages children continuously face. Between-wave comparison analysis, by contrast, may conceal these critical differences, as two children with the same slope may differ substantially in the final scores.

Second, growth curve modeling is a flexible modeling technique to address changes in academic growth and within-group heterogeneity. Not only can it incorporate linear and nonlinear changes in test scores, but it can also allow for the specification of different growth patterns within different periods, such as a discontinuity of growth in a certain period after treatment. The piecewise growth curve model is particularly appealing to address my research questions on whether test scores cease to increase when children experience reach a certain period of maturity. At the same time, comparing the slopes of the changes in test scores allows me to evaluate the heterogeneous growth patterns with the Hispanic children according to their generational status. Third, the multilevel modeling method takes the data collection structure into account in doing statistical analysis. the ECLS-K has a multi-level probability sample design, where students are nested in schools and schools are nested in primary sample units. Therefore, estimation methods with the multilevel growth curve modeling can adjust the standard errors due to clustering.

Preliminary Findings

Figure 1a summarizes the overall patterns of the racial and ethnic achievement gaps. These four groups show a "stair-step" pattern in the rank of performance of reading and math test scores during children's elementary school years. White children with U.S.-born biological mothers score highest in any stage of elementary years followed by Hispanic children whose mothers are U.S.-born Mexicans. African Americans score in the third place for most of stages, and Hispanic children with Mexico-born biological mothers score the lowest, yet are able to exceed African American in the math after first grade.

Figure 1b shows that some Hispanic children are able close the ethnic gaps in math after controlling for their initial scores. All Hispanic children of Mexican origin are able to maintain their advantages of good starters, and the ethnic gaps shifts around zero. In reading, among children belonging to the top 25 percentile, the Hispanic children born to U.S.-Mexicans maintain their excellence up to the first grade, and catch up again in the fifth grade, despite slight drop in the third grade. Mother's nativity still make a difference in children's reading achievement even if their children have a good start. Other Hispanic children born to Mexican immigrants constantly scored around 0.4 standard deviations lower than White. Overall, these shrinking patterns indicate that the initial laps account for the lower academic achievements at fifth grade. The shrinking achievement gaps between the Hispanic children and the White are largely due to the faster growth at first grade (Figure 1c).

By contrast, the racial gaps have been widened even when African American children have the similar level of initial scores at kindergarten. Among children belonging to the top 25 percentile of reading distribution, those African American children increasingly score lower than non-Hispanic whites, and their lags in reading reach 0.6 standard deviation at third grade and fifth grade. With respect to math, African Americans' disadvantages have been 0.85 standard deviation at fifth grade.

Figure 1a

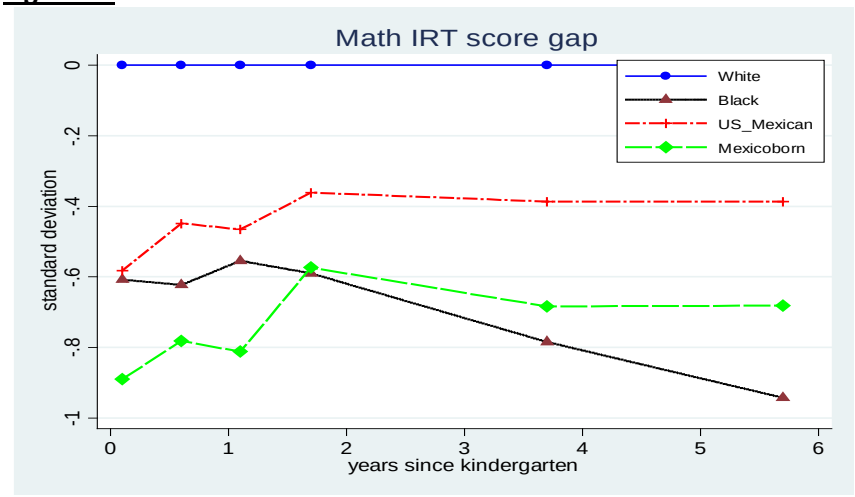


Figure 1b

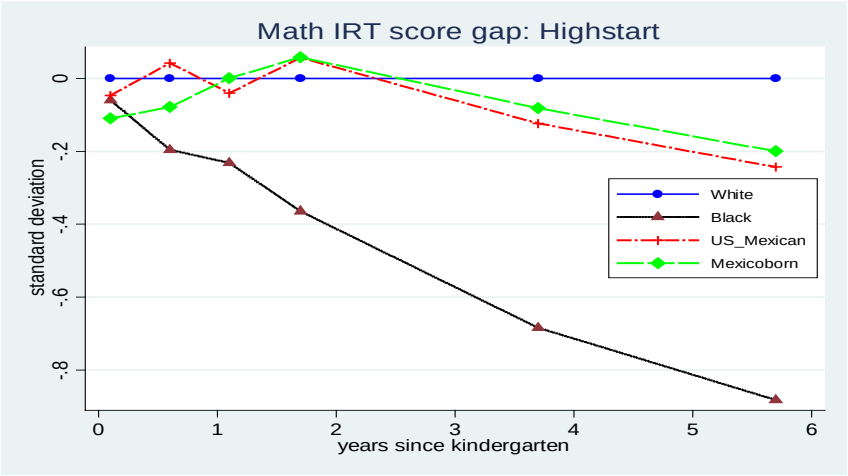
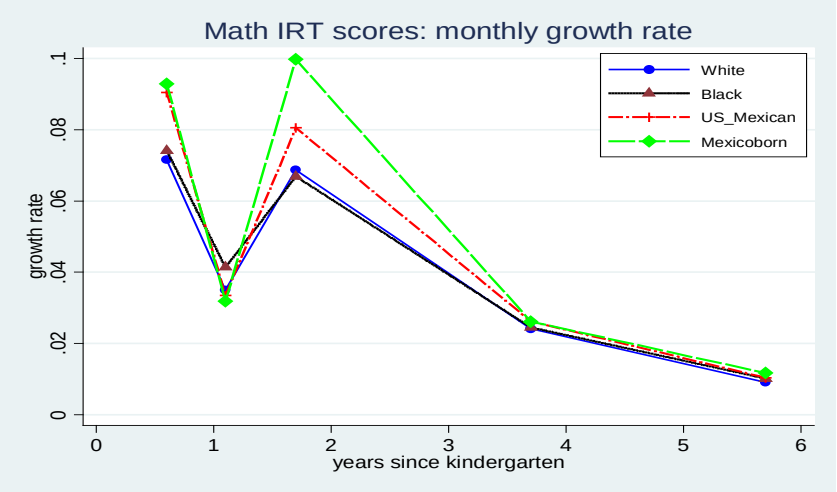


Figure 1c



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