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Grade level and achievement of immigrants' children: academic redshirting in Hong Kong

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Abstract

Data from Hong Kong PISA 2003 show that 15-year-old Hong Kong students who have immigrant parents from mainland China are grossly overrepresented in grades below the modal grade attended by most native Hong Kong students. Same-age comparison, when grade level is not taken into account, puts immigrants' children at a disadvantaged position in the mathematics, reading, and science literacy tests. The academic advantage of immigrants' children in Hong Kong is only revealed after grade is statistically controlled. Also, mainland immigrant students who are repeaters outperform native Hong Kong repeaters. Immigrant redshirting is a possible driving force behind these results.

Keywords

immigrant students; academic redshirting; grade retention; nativity gap; PISA

Introduction

Immigrant assimilation has occupied social scientists for decades and has more recently become a focus for researchers engaged in comparative and international education. The question of how immigrants assimilate can be approached from different perspectives. Economists tend to focus on immigrants' labor market assimilation, defining assimilation as the process of convergence in labor market outcomes between arrival cohorts of immigrants and natives (e.g., Borjas, 1994, 1995). Political scientists and social psychologists have studied psychological socialization and political incorporation of immigrants as forms of immigrant assimilation (García Bedolla, 2005). Sociologists have concentrated on marital and spatial assimilation, the processes in which immigrants come to marry or live side by side with natives (Alba & Logan, 1993). Regardless of academic discipline, researchers are generally concerned about immigrants' educational assimilation because education is related to individuals' future life chances. However, assimilation should not be confused with a mono-culturalism that requires immigrants to discard their cultures of origin to embrace the culture of the destination country unconditionally. I adopt Alba and Nee's (2003) view of assimilation as the decline in social, economic, and political differences. When

“assimilation” is applied to education, it refers to the convergence in educational attainment or achievement between immigrants and natives.

The availability of large-scale international education data, especially the Programme for International Student Assessment (PISA) and the Trends in Mathematics and Science Study (TIMSS), has stimulated much research on immigrant students’ education. These data show substantially lower scores among immigrant students in almost all countries (Mullis, Martin, Gonzales, & Chrostowski, 2004; Organisation for Economic Co-operation and Development [OECD], 2004). In 2003, immigrant students had lower achievement in 14 OECD and 3 partner countries (OECD, 2006).

My purpose in this article is to shed light on immigrant students’ academic achievement in Hong Kong through an examination of immigrant students’ grade (or year) levels. In April and May of 2007, I visited three secondary schools in Hong Kong. I interviewed school administrators in these schools and conducted two focus groups in each school of mainland immigrant students in Grades 7–9. Building on that qualitative study, in this article I show the benefits of immigrant students’ placement in lower grades. As a methodological contribution, my focus on grade-level placement is important for researchers using PISA because the PISA study (unlike TIMSS) sampled students who were about 15 years old, rather than students of any age in a particular grade level. Immigrant students, who tend to be overrepresented in lower grades, will appear to be disadvantaged as they compete in the PISA literacy tests against students in higher grades. In Hong Kong, as in other PISA countries, immigrant students at age 15 are more likely to study in lower grade levels as compared with their same-age native counterparts. Research on immigrant educational outcomes using PISA needs to incorporate grade level in order to properly understand the nativity achievement gap.

This study finds that the nature of the nativity achievement gap for Hong Kong is quite different from that reported in the OECD’s 2006 report, once grade level is taken into account. From my interviews and focus-group data, I have discovered that grade placement in Hong Kong is a concerted strategy jointly adopted by parents and schools. The results from my analysis of Hong Kong PISA suggest that this pragmatic strategy may be a rational decision to help immigrant students overcome educational disadvantage.

International research on immigrant students’ educational assimilation

Many factors are known to influence immigrant students’ educational performance. They include individual, family, school, and school-system factors. The most studied individual factor is the immigrant student’s home language, and the lower performance of immigrant students has been attributed to their usually more limited English proficiency (Rumberger, 1991). Through her study on immigrant adolescents from 10 OECD countries that participated in three international surveys of PISA 2003, TIMSS 1995/1999, and the Programme of International Reading Literacy Study Fluency (PIRLS) 2001, Schnepf (2007) finds that fluency in the host country’s language is an important factor. Immigrant students’ educational disadvantage can be completely accounted by host language proficiency in the UK, the USA (based on PISA), and Canada (based on TIMSS). However, in Continental

Europe, the cause of immigrant students' educational disadvantage goes beyond their lack of skills in the host country's language. It is worth noting that the effect size of the immigrant disadvantage is generally smaller in TIMSS than in PISA for the same country (see the unconditional nativity gap in Table 2 in Schnepf, 2007). This is because TIMSS is a grade-based sample and PISA is an age-based sample. More discussion of the same-grade and same-age comparison will follow.

Another well-known factor associated with the nativity gap is the child's family background. A considerable portion of immigrants' poor performance can be accounted for by their low socioeconomic status (SES), measured by parental education, occupational status, family income, family structure, or forms of household possessions. SES is consistently found to be an important factor in accounting for the weaker performance of immigrant students in virtually all international studies (e.g., Buchmann & Parrado, 2006; Levels & Dronkers, 2008; Marks, 2005; OECD, 2006; Schnepf, 2007).

Research on immigrant students' education has also investigated school effects. Recent US research finds that the school's SES composition is significantly associated with school performance of immigrants' children but not with school performance of natives' children (Pong & Hao, 2007). However, when immigrant and non-immigrant students are combined in an analysis, Dronkers and Levels (2007) do not find in PISA 2003 that school composition, measured by ethnicity or SES accounts for the lower performance in mathematics of immigrant students from Latin America, Northern Africa, or Western Asia. In most countries, school factors do not account for much of the nativity differences in the face of SES. Using PISA 2000, Marks (2005) finds that in a few countries (Austria, Greece, and Belgium), the nativity gap is further reduced (beyond that accounting for socioeconomic background) by students' "academic location" – an index that combines grade level and the type of school program (academic, vocational, and work preparation).

With increasing availability of international data, researchers have begun to examine country and world-region effects. Within a host country, there may be large achievement differentials between immigrant students from different countries or regions. In the USA, immigrant Latino students have lower performance than immigrant Asian students (Kao, 2004; Pong, Hao, & Gardner, 2005). Using PISA, Levels and Dronkers (2008) find that first- and second-generation adolescents from Western Europe, Southern and Central America, Northern Africa, and Western Asia show lower scores in mathematics than their socioeconomic comparable native (third- or higher generation) students in their destination countries. Also, socioeconomically comparable immigrant students from other regions, such as Southeast Asia or North America have higher scores in mathematics than native students in their destination countries.

Characteristics of destination countries are important too. Buchmann and Parrado (2006) show that, in TIMSS 1995, immigrant disadvantage in mathematics achievement is large and statistically significant in Northern and Western European countries. These countries have exclusionary immigration policies. In contrast, immigrant disadvantage is small or insignificant in Southern European countries and "immigrant countries" that include North

America (Canada, USA) and Pacific Rim countries (Australia, New Zealand). These countries have inclusionary immigration policies.

To further understand the influences of both immigrants' country of origin and country of destination, Levels, Dronkers, and Kraaykamp (2008) study PISA 2003 mathematics scores of students who emigrated to 13 Western nations from 35 different native countries. The authors find the level of economic development and political stability of an immigrant's home country impacts on the child's eventual academic success. Immigrants from poor countries tend to be more selected, and, therefore, their children outperform their other immigrant students who emigrate from countries with a higher level of economic development. Children of economic migrants have higher math scores than children of political immigrants or refugees. The authors also highlight the importance of social characteristics of the host countries, although these are less influential than those of the origin countries. They find that the size of the immigrant community, a proxy for immigrant social network, is positively associated with immigrant students' achievement in mathematics.

Lower grade level as a reason for immigrant students' achievement disadvantage

Despite previous international research that finds prevalent achievement disadvantage of immigrant students, countless stories have been told of their resilience, and how immigrant students beat all odds to excel in school. A number of US studies have documented an immigrant paradox, that is, foreign-born students from low socioeconomic backgrounds are relatively successful. Some groups of immigrant students outperform their co-ethnic native counterparts (e.g., Kao, 2004; Schwartz & Stiefel, 2005). Explanations for the immigrant paradox vary. The widely accepted explanations include immigrant parents' optimism towards their children's future (Kao & Tienda, 1995), social capital in ethnic-immigrant communities (Zhou & Bankston, 1994), bilingualism (Portes & Hao, 1998), and strategies immigrant communities use to overcome racial and ethnic discrimination (Louie, 2004).

Researchers rarely consider the grade level as a reason for immigrant students' lower academic achievement. In fact, grade retention among immigrant students is very common.¹ Based on previous findings of widespread immigrant educational disadvantage, one would suspect that immigrant students' grade retention is due to academic failure. This may be the case, but there is an alternative explanation in which the immigrant child is deliberately put into a lower grade. In the USA, this phenomena is known as "academic redshirting". This is a strategy immigrant parents pursue, often with recommendations from the school authority, to promote the achievement of their foreign-born children in school by selecting a lower grade level.

Most immigrant parents know very well that the school is very important for their offspring's social mobility. However, immigrant parents are often ill at ease at their

¹This is based on my exploratory analysis using PISA 2003 (results available upon request). In virtually all PISA 2003 countries, more immigrant children than native children study below the modal grade.

children's schools and they feel uncomfortable interacting with their children's teachers. They lack cultural capital to navigate their children's schooling. Anecdotally, I found that in Hong Kong, immigrant parents quietly exercise their choice of grade level as their children enter a new school. Even though immigrant parents are unable to help their children study for tests or school assignments, and because of poverty or residential segregation they are limited from exercising school choice, grade-level placement is one decision that is within the control of immigrant parents.

This practice of placing immigrant students in lower grades with younger peers can be compared to the practice of college coaches who ask their student-athlete to delay one or more semesters in order to grow physically or until the athlete has improved his skills. This practice of "redshirting" in athletics has been found also in the choice by US parents who decide to hold their children back until they are more ready for kindergarten or first grade. Researchers thus describe this strategy as "academic redshirting" (Frey, 2005; Graue, Kroeger, & Brown, 2002). For immigrants, there are two types of academic redshirting. The first occurs if immigrant students repeat a grade when they move from their home-country schools to the new schools of the host country. The second occurs when schools in the origin country initiate instruction for children at an older age than do schools in the destination country.

Research on academic redshirting has found positive results in the USA. The school achievement of redshirted children is at least at the level of their younger classmates (Graue & DiPerna, 2000). Repeaters often catch up with non-repeaters in the same grade for the repeated year (Alexander, Entwisle, & Dauber, 2003). In the USA and abroad, older students have a small academic advantage over younger students in a given grade (Buchmann & Parrado, 2006; Datar, 2006; Stipek & Byler, 2001). Thus, voluntary retention among immigrants likely produces a positive effect on achievement. With one extra year to re-learn what they know, pick up new skills, learn the loop, and become test-smart, redshirted immigrant students are likely to be advantaged educationally compared to their same-grade peers.

Redshirts cannot be compared to their same-age peers, however, because same-age comparison sets a higher standard for them (Alexander et al., 2003). We cannot expect redshirts who have only experienced the 9th-grade curriculum to perform on the same level as students in the 10th grade. Such disadvantage as a result of redshirting may vary by subjects. For example, skills in mathematics are less likely to be learned outside of the classroom than skills in reading. Therefore, we would expect the grade level to have a larger impact on math scores than on reading scores.

Whereas redshirts have an advantage over their same-age peers in terms of curricular knowledge, their social/psychological outcomes are not so favorable. Previous research has found that redshirting is associated with lower scores in measures of self-concept and peer acceptance, a higher level of behavior problems (Byrd, Weitzman, & Auinger, 1997; Spitzer, Cupp, & Parke, 1995; Zill, West, & Lomaz, 1997), and greater likelihood of being placed in special education (Graue & DiPerna, 2000). Immigrant redshirts would face an added burden for being an immigrant. Bankston and Zhou (2002) report that immigrant

status adversely impacts self-esteem. Since immigrant students' psychological well-being is associated with immigrant status, on the one hand, and with students' learning, on the other hand, it is necessary to control for students' psychological well-being to reveal the positive impact of redshirting.

This study on immigrant students' achievement in Hong Kong is important for three reasons. First, Hong Kong is an immigrant society that hosts a sizable foreign-born population, and it represents a "controlled" setting because immigrants from mainland China share similar ethnic and cultural characteristics as the residents in Hong Kong. Research on Asian immigrants' educational achievement often faces the challenge of separating cultural factors from structural factors. The absence of ethnic and cultural differences in mainlanders' immigration to Hong Kong entails a natural control for ethnic and cultural differences, thus enabling us to see structural determinants of immigrant students' performance more clearly. Second, Hong Kong is one of the few school systems in PISA in which immigrants' children fare relatively well in literacy tests. According to an OECD report (OECD, 2006), second-generation students have higher test scores than native (third- or higher generation) students. Our understanding of Hong Kong immigrants' success may help policymakers to design policies and practices that assist immigrants' children to achieve successful educational outcomes. Third, this study examines more closely the same-age comparison in PISA. In Hong Kong, foreign-born students are substantially more likely than their same-age native counterparts to be placed in lower grades. My results would reveal to PISA researchers that, in same-age comparisons, immigrant disadvantage could be overestimated in the absence of grade level in the statistical model.

Major questions for this research are: How does the performance of mainland immigrant students in Hong Kong compare to the performance of their native Hong Kong counterparts? Can the performance of mainland immigrant students be interpreted as the consequence of academic redshirting?

The Hong Kong context

Immigration from the mainland to Hong Kong has been continuous since 1949, but the immigrants have been labeled differently. In the post-1949 period until the 1960s, they were "refugees". They became "new immigrants" in the 1970s and 1980s and "new arrivals" following Hong Kong's reunification with China in 1997 (Siu, 1999). In 1997, the 100 years of British colonial rule ended, and Hong Kong became one of China's two Special Administrative Regions (SAR; the other is Macau). Hong Kong's SAR status allowed mainland-born children who had one Hong Kong native parent to migrate to Hong Kong. This triggered more than a decade of children's immigration from mainland China to Hong Kong.

How might assimilation theories predict educational assimilation of mainland Chinese immigrant students in Hong Kong? The "segmented assimilation theory" (Portes & Zhou, 1993) predicts that the "mode of reception" plays a decisive role in the favorable, indifferent, or hostile reception of the second generation into the American mainstream. Different modes of incorporation make available various types of resources (e.g., favorable

government programs, pre-existing co-ethnic networks) or impose vulnerable conditions (e.g., undesirable location of residence and the lack of occupational mobility). These resources or vulnerable conditions determine immigrant groups' assimilation patterns.

In the case of Hong Kong, both negative and positive conditions co-exist for mainland Chinese immigrants. Vulnerable factors include the location where mainland Chinese immigrants settled and the state of the economy after Hong Kong's reunification with China. Recent immigrants arrived at one of Hong Kong's worst economic times. The Asian financial crisis started in 1997, and the economic downturn lasted well into the new millennium. Many mainland immigrants, especially male immigrants, were out of work or experienced declining wages (Lam & Liu, 2002). Recent immigrants are overrepresented in the poorest quarter of the income distribution (Post, 2004). When the economy is weak, the labor market for immigrant workers deteriorates more than for native workers, and there are reports of labor market discrimination against the mainland Chinese adult workers with low levels of education (Chiu, Choi, & Ting, 2005; Chiu & Lui, 2004). However, despite earlier reports about natives holding negative attitudes towards mainland immigrants (Chan, 1998), research using recent data is more positive. Hong Kong natives increasingly identify with mainland China, and they no longer consider mainland Chinese immigrants as occupying lower social status (Lau, 2005).

Meanwhile, Hong Kong government's policies have supported the educational integration of mainland Chinese immigrant students. The Education Bureau, the administrative branch of the government that manages all Hong Kong schools, implemented a number of policies in support of integrating mainland students.² These policies include the School-Based Support Scheme Grant, Induction Programme, Initiation Programme, and placement services.³ All these policies emerged and evolved since the Sino-British Joint Declaration in 1984. Noteworthy is that these same policies were not extended to other foreign-born children in Hong Kong until Year 2000. These favorable policies and practices likely contribute towards mainland immigrant students' educational progress.

In this positive context of reception, few recent immigrant students perceive discrimination against them (Lam, Tsoi, & Chan, 2005). After all, the school is supposed to be a place where universalism is most likely to be upheld. Even if teachers wish to discriminate, the blurry ethnic and cultural boundaries between mainland immigrant and local children make it difficult for them to do so. Unlike immigrant adults who have their set ways, immigrant students can learn Cantonese (language spoken in Hong Kong) and become assimilated into the Hong Kong mainstream culture relatively quickly. The absence of social, ethnic, and cultural differences may have provided a mode of incorporation to the advantage of mainland immigrant students.

Academic redshirting in Hong Kong

One salient characteristic of mainland immigrant students' education in Hong Kong is that they are old for their grade level (Chan, 1998). In Hong Kong, grade retention is

²The Bureau was previously named Education and Manpower Bureau (EMB) before July 1, 2007.

³Information in this subsection comes primarily from the official website of the Bureau. For details, see <http://www.emb.gov.hk>

discouraged during the first 9 years of free and universal primary and junior secondary education. According to the Education Bureau⁴:

Students should normally be promoted at the end of each academic year and retention of a student in a particular class to repeat a whole year's work should be the exception rather than the rule.

Restrictions on repetition for ordinary P/S [primary school] students: The maximum number of repeaters should not exceed 3% of the total enrolment of the school. Students should only be allowed to repeat once in the whole primary course. Students are not allowed to repeat in P6 [grade 6, the last year of primary school].

Restrictions on repetition for ordinary S/S [secondary school] students: The maximum repetition rate of the S/S should not exceed 5%. A student is permitted to repeat only once from SI to S3 [grade 7–9], as the 3-year free education should be completed in not more than 4 years.

Despite these restrictions, over half (58%) of the mainland students attend a grade below the grade that most of their same-age peer attend (see Table 1). This could not have been produced by the usual, involuntary grade retention – a decision made primarily by the school as a result of academic failure.

The Hong Kong case suggests that a kind of academic redshirting is occurring; immigrant students are held back to increase their ability to compete. Such voluntary grade retention occurs when immigrant students first enter a Hong Kong school, falling under the radar screen of the government's retention policy. Typically, immigrant students who first arrive enroll in some full-time or part-time "Initiation Program". The Initiation Program provides information about mainstream schools. In order to be admitted to a mainstream school, the immigrant child has to pass an admission test designed and administered by that school. Mainland curriculum immigrant students often do poorly in English, although they may perform well in some other subjects, especially mathematics.⁵ In Hong Kong, the English language is highly valued by the school. If mainland immigrant students' English is not at an acceptable level, the school is likely to recommend placing the child in a lower grade.⁶ Also, school quality in mainland China varies a great deal, making it difficult for Hong Kong school administrators to detect immigrant students' true academic ability based on an admissions test. Therefore, Hong Kong school administrators have an incentive to recommend redshirting to avoid a reduction in the school's overall achievement. In addition, it may be a good practice because placement in a lower grade allows immigrant students extra time for social adjustment to the new school system and environment, without which learning may be compromised.

⁴See the official website of the Hong Kong Education Bureau. Retrieved September 10 2007, from www.edb.gov.hk/index.aspx?nodeID%41727&langno¼1

⁵Hong Kong's English curriculum is generally more advanced than that in the Mainland. The English language is important in Hong Kong, not only because it generates greater economic returns in the labor market but also because English is becoming the primary medium of instruction in Hong Kong's universities.

⁶Information gathered from an interview with a school principal, Mr. Kai Lok Tso, from Elegancia College, Hong Kong, on April 19, 2007.

Immigrant parents have no obligation to comply with the school administrator's recommendation. They can choose another school that admits their child at the appropriate grade, or they can seek help from the Education Bureau, who never fails to place an immigrant child in school. But the school quality is crucial. Many immigrant parents would rather see their child being an older student in a high-achieving school than being with same-age peers in a low-achieving school. Thus, choosing a school is often associated with choosing a grade. The decision to hold back an immigrant child is made by the school as well as by the immigrant parents.

In Hong Kong, most grade repetition occurs in two situations: (a) the transition from primary to secondary school and (b) the transition from lower secondary (Form 3) to upper secondary school (Form 4). At these transitions, every student has to take a competitive system-wide public examination in order to secure a place in the next level of schooling. The kind of school students enroll in depends on how well they do on the test. If, upon arrival, immigrant students are at these transition points, their families are most likely to request grade repetition so they have a greater chance to perform well in the examination held in the next school year.⁷

The Hong Kong case also suggests a second type of academic redshirting that arises from the difference in the age of school entry between mainland China and Hong Kong. According to the United Nations Educational, Scientific and Cultural Organization (UNESCO) education statistics (UNESCO Institute for Statistics, 2003), children in mainland China typically start primary school at about age 7, whereas children in Hong Kong begin primary schooling at around 6 years. In effect, most mainland immigrant students are "held back" by the mainland Chinese school system. In the USA, the appropriate age for children to start school has been a subject of debate for parents, teachers, administrators, and policymakers. Building on previous research on the effect of redshirting, Datar (2006) uses a sophisticated econometric method and finds that children who enter kindergarten a year older have significantly higher test scores. These children also follow a steeper test score trajectory during the first 2 years in school. Such benefit of delayed school entry may apply to mainland immigrant students as well. This type of academic redshirting, caused by the lack of alignment between national school systems, applies to immigrant students who begin school in their origin countries.

There is no clear a priori case for mainland immigrant students' educational performance. On the one hand, given mainland parents' high unemployment and poverty rates, their children are expected to underachieve. On the other hand, the lack of cultural differences, favorable education policies for immigrants, and immigrant academic redshirting all would enhance student performance. Which hypothesis is true is an empirical question.

Data and variables

This study is based on data from PISA 2003, which is a triennial cross-national test of 15-year-olds' scholastic achievement. PISA was developed jointly by the member countries of

⁷Information collected from an interview with a school supervisor, Ms. Oi Ping So, North Point Fujian Secondary School, May 4, 2007.

the OECD and the OECD's Directorate for Education. PISA purportedly aims to measure the extent to which students who are near the end of compulsory schooling have acquired the knowledge and skills essential for full participation in society. PISA provides comparative performance indicators of education systems in OECD member and partner countries.

The PISA data were collected by a two-stage stratified sample. First, the probability of a school with 15-year-old students being selected depends on its enrollment size, and then students were sampled within selected schools. Within each selected school, a list of all 15-year-old students were made, and 20–35 of them were selected with equal probability. The PISA 2003 assessment comprises four subject domains: reading, mathematics, science, and problem-solving.

Sponsored by the Hong Kong Education Bureau, the Hong Kong PISA study ("HKPISA" hereafter; Ho et al., 2003) was conducted by the Hong Kong Centre for International Student Assessment, a research center housed in the Hong Kong Institute of Educational Research of The Chinese University of Hong Kong. A total of 4,478 students from 145 schools were surveyed between May and July 2003. These students were born between March 1, 1987 and February 29, 1988. They were spread across five grades – Grade 7 to Grade 11, but most of them (60.1%) were from Grade 10 (Form 4). The samples have approximately the same proportion of boys and girls. About 23% identified themselves as foreign born, and the vast majority of this group (21.3% of the total sample) was born in mainland China. For more details on HKPISA, see OECD (2003). In multivariate analysis, I use mean imputation to fill in missing values in order to retain the full sample (Allison, 2001).

Dependent variables

In PISA 2003, each student was assessed in four subject domains, but here I focus on three achievement outcomes that are part of the Hong Kong school curriculum: math, reading, and science. The Item Response Theory (IRT) scaling approach and plausible values methodology is used in PISA. Five estimates of ability – plausible values – are generated for each student. The plausible values represent a set of random values for each student from an estimated ability distribution of students with similar item response patterns and backgrounds. I use the first plausible value for each subject domain, but note that analysis of all five plausible values together produces similar results.

Independent variables

The major independent variable is the place of birth of the child, represented by the dichotomous variable of foreign born in the international dataset. The reference group is native students. I focus on the nativity gap, that is, the achievement differences between native and immigrant students. In HKPISA, the major foreign-born group is the mainland Chinese group, whereas the native students are those born in Hong Kong. There were very few students in the sample who were born outside Hong Kong or mainland China ($n = 1/472$). These students are combined with those with missing nativity to form a dummy variable of "other".

For one set of analyses of HKPISA, I compare the mainland Chinese immigrants (foreign born) with the Hong Kong natives (Hong Kong born). For another set of analyses of HKPISA, I compared three immigrant generations. The first generation refers to students born in mainland China. This is equivalent to the variable of mainland Chinese immigrant defined above. The second generation refers to students who themselves were born in Hong Kong but who had one or two mainland-born parents.⁸ The third or higher generation (“third-plus generation” hereafter) refers to Hong Kong-born students whose parents were also born in Hong Kong. “Native students” in this study refer to both the second and third-plus generation because these students were native by birth. Some native students have missing information of their parents’ place of birth. These students were included in the category of other.

For this study, an important major independent variable is student’s grade level, which is coded 0 for the modal grade, which is Form 4 (Grade 10) in Hong Kong. A positive value indicates that the student was above the modal grade, and a negative value means below the modal grade. Two other school variables are examined alongside student’s grade. One measures whether the student has ever repeated a grade, and the other is the age of school entry, that is, the age when the child enters the first year of primary school.

Student’s gender (being male) is included in all multivariate analyses. Student’s SES is the average of highest parental education and highest parental occupational status. Both variables were standardized before being averaged.

Three independent variables represent students’ psychological well-being. The first is school adjustment. This is constructed from variables measuring students’ feelings and attitudes towards school life. Responses have four values ranging from strongly agree to strongly disagree on six statements: (a) “I feel like an outsider (or left out of things)”, (b) “I make friends easily”, (c) “I feel like I belong”, (d) “I feel awkward and out of place”, (e) “Other students seem to like me”, and (f) “I feel lonely”. Items (b), (c), and (e) are reverse coded. School adjustment is an average of all six items. The internal reliability measured by the Cronbach alpha score is .74. The second psychological variable is students’ educational expectation. This is a dummy variable measuring whether or not students expect tertiary education. The third psychological variable taps teacher–student relations. PISA students gave responses from 1 to 4 to the statement: “Most of my teachers treat me fairly”. Note that this variable measuring perceived teacher fairness is skewed towards agreement.⁹

⁸This definition follows the definition used widely in US immigration research. Note that it differs from the OECD definition. In their recent report, OECD (2006) analyzed literacy performance of three generations in 17 countries from PISA 2003, including Hong Kong. Their definition of “native” children was broader and considered children as “native” if they had one foreign-born and one native-born parent. However, analysis not presented here suggested that students with one foreign-born and one native parent were similar to students with two foreign-born parents in terms of socioeconomic background characteristics. They were less similar to native students without any foreign-born parents. More problematic is that, as a result of the OECD definition, 133 students who reported China as their birth place were classified as “native” students regardless of the fact that they have one foreign-born parent.

⁹There were 9.7% indicating strongly agree and 65.8% indicating agree that teachers were fair.

Descriptive results

Immigrants versus natives

The overall sample mean based on the first plausible value is 555.7 for math literacy, 514.5 for reading literacy, and 545.1 for science literacy. The corresponding standard deviations are 97.6, 82.3, and 92.0. There are significant variations in these literacy scores by immigrant status. Summary statistics in the second and third columns of Table 1 show that, on average, 15-year-old immigrant students from mainland China performed significantly worse on measures of mathematics, reading, and science than did their native counterparts.¹⁰ The raw literacy gap in favor of native students is largest in math (45.21 points) and smallest in reading scores (24.8 points). Put differently, the nativity gap amounts to over .4 of a standard deviation for mathematics, almost one third of a standard deviation for reading, and approximately .4 of a standard deviation for science. These are substantial differences.

Note that the total numbers of the second and third-plus generation do not add up to 3,408 native students because 119 native-born children have missing information about parent's nativity that is necessary for distinguishing their second- or third-plus-generation status.

Table 1 also shows that parents of mainland Chinese immigrants had significantly lower SES. Immigrant parents had less education and held lower status jobs than did parents of native students. The summary statistics present a mixed picture on mainland Chinese immigrant students' psychological well-being. On the one hand, mainland students' school adjustment – feeling comfortable at school and having a sense of belonging – was significantly lower than that of native students, and they were significantly less likely than were native students to expect an education at the tertiary level. On the other hand, mainland students were significantly more likely to report that teachers were fair to them.

Another important characteristic of mainland immigrant students is that they tend to attend a grade level below the modal grade. Over 72% of the native children attended the modal grade; only 14% of the mainland children did so. Mainland children were overrepresented in lower grades: 37% in two grades below the modal grade and 21% in three grades below. By contrast, among the native children, only 3% were attending two grades below the modal grade, and hardly anyone in three grades below.

As mentioned above, there are two reasons why immigrant students tend to be overrepresented in lower grades. One is their older age at school entry. In my sample, the average age at primary school entry is 6.72 for mainland Chinese students, but 5.96 for their native Hong Kong counterparts. If we restrict the mainland sample to those who arrived in Hong Kong after their 6th birthday, the age of school entry increases to 6.9, almost a full year older than the average for native Hong Kong students. The second reason for immigrant students' overrepresentation in lower grades is their higher incidence of grade repetition. Table 1 shows that about 37% of the mainland immigrant students have ever repeated a grade compared to only 11% of the native Hong Kong students.

¹⁰Column 2 is the reference group for test statistics in Column 1.

Generational differences

Table 1 also contains summary statistics for three generations, shown in Columns 1, 3, and 4. The second generation had the highest literacy scores in all three domains. Although the second generation outperformed the third-plus generation, they had significantly lower SES measures. In contrast, no significant difference was found in any psychological measure or grade levels between the second and third-plus generations.

Multivariate analysis results

Immigrants versus natives

The apparently inferior performance of the first generation continues to be found after controlling for other variables in multivariate analysis. Tables 2, 3, and 4 present results from analyses on math, reading, and science literacy using the hierarchical linear modeling (HLM) procedure with random effects. In all the HLM models, students are the first-level units and schools are the second-level units. Null models are first estimated to obtain the within- and between-school variances. The between-school variances are 48%, 43%, and 46% for mathematics, reading, and science test scores, respectively. Consistent with previous OECD estimates (47% for mathematics reported in OECD, 2006), these are large between-school variances. They reflect high levels of segregation in terms of achievement among Hong Kong schools.

Model 1 in Tables 2, 3, and 4 includes only two variables: nativity and gender. Note that age is “controlled” because PISA is a sample of 15-year-olds. This basic model also shows the weaker performance of mainland Chinese immigrant students in all three domains. SES is not a significant influence on test scores. This result is consistent with the OECD analysis that reports insignificant effects of parental education and parents’ occupational status on test scores when the regression model includes only immigrant status and these two SES variables (see Table 3.5 in OECD, 2006). It is likely that the SES effect has been absorbed by the clustering nature of the HLM model that partitions within-school and between-school variances. In other words, schools are highly segregated by prior student achievement, which is correlated with SES. Within segregated schools, student achievement is unlikely to vary much by SES.

Model 3 shows the positive association between literacy and students’ psychological well-being, measured by their school adjustment, perceived teacher fairness, and expectation of tertiary schooling. Students’ educational expectation has the strongest association with literacy. Expecting tertiary schooling boosts literacy by about half of a standard deviation (48/98 $\frac{1}{4}$ 49%, 41/83 $\frac{1}{4}$ 49%, 48/93 $\frac{1}{4}$ 52% for math, reading, and science, respectively). However, taking into account immigrant students’ low educational expectations and lower school adjustment hardly changes the difference in performance. A *t* test suggests that the difference in the nativity gap is not significantly different between Model 2 and Model 3.

However, entering students’ grade in the model substantially changed the nativity gap. Including grade level in the statistical model (Model 4 in Tables 2, 3, and 4) switched the sign of the nativity gap from significantly negative to significantly positive in favor of mainland immigrant students. When grade level as well as SES and psychological factors

are controlled for, mainland students outperform native students by about 19% (18.6/98), 28% (22.9/83), and 21% (19.5/93) of a standard deviation in mathematics, reading, and science, respectively. The change in coefficient for mainland immigrant, from negative to positive, is largest for mathematics and smallest for reading test scores. This suggests that math achievement is more dependent on grade than is reading achievement. Clearly, the reason for mainland immigrant students' lower test scores was their placement in lower grades. Compared with same-age native students at the same grade level, mainland immigrant students did significantly better. This result is consistent with the academic redshirting hypothesis in that mainland immigrants' children are placed in lower grades to improve their competitiveness.

When the variable of ever repeated a grade is included in Model 5, the coefficient for mainland immigrant students remains largely unchanged. On average, repeaters receive lower test scores than nonrepeaters. However, the negative effect of repeating a grade is moderated by nativity status, as seen in the final model (Model 6). Whereas native Hong Kong students who have repeated a grade score lower than do their counterparts who have never experienced grade retention, mainland immigrant repeaters actually score higher. This is another piece of evidence consistent with the academic redshirting of immigrant students.

Generational differences

Table 5 presents two HLM models for each test score. These models are similar to Models 3 and 6 in Tables 2, 3, or 4, except that nativity is now replaced by generational status. Also, missing generational status is combined with immigrant groups coming from countries other than mainland China. Consistent with results on Hong Kong reported by the OECD (2006), stronger performance by second-generation immigrants is evident here. Comparing the two models for each test score, first-generation test scores are significantly lower than that for the third-plus generation not controlling for grade level but significantly higher when controlling for grade. When grade level is controlled, first-generation youth show higher mean test scores than second-generation youth, and the third-plus-generation youth show the lowest test scores. Again, the effect on test score of repeating a grade is moderated by students' nativity. Among repeaters, first-generation mainland Chinese students perform better than the second or third-plus generations. They also outperform non-repeaters in the same grade.

Summary, discussion, and conclusions

Using data from HKPISA, I was able to identify and analyze literacy performance of mainland Chinese immigrant students, who make up the majority of foreign-born children in Hong Kong. Conducting same-age comparisons, I first replicated OECD results, showing weaker performance in the PISA tests of mainland immigrant students. Fifteen-year-old mainland immigrant students performed worse than their same-age native Hong Kong peers in mathematics, reading, and science. The test score gaps remain largely unchanged when socioeconomic status and children's psychological well-being were taken into account. However, controlling for grade turned the results around. What mattered most to these test score gaps was the students' grade: Immigrant students were overrepresented in the lower grades. I first considered grade retention as an explanation for this grade placement, but this

does not appear to be the case. In Hong Kong, many immigrant students began school a year later than did native students. In addition, immigrant parents seem to have been engaged in “academic redshirting” aiming at increasing their children’s competitiveness at school. When I included grade in the multivariate analysis of PISA test scores, the nativity gap shifted from negative to positive, indicating that immigrant students scored higher than their same-grade native peers. Immigrant repeaters also scored higher than native repeaters.

This result has important implications for international and comparative research in education. Although PISA’s measures are supposed to reflect students’ broad knowledge and skills rather than the curriculum, it is reasonable to expect adolescent students to develop their literacy skills largely from school. Those who have the opportunity to learn 10th-grade mathematics, science, or reading perform better than students who do not have this opportunity. Students in lower grades are likely to score lower than their counterparts in higher grades. These Hong Kong results should lead us to question the extent to which PISA measures can be viewed independently of the school curriculum. The results should also caution PISA users as they perform analysis on immigrant students or students who may have experienced grade retention or academic redshirting. Failure to take grade level into account may result in misspecification of the statistical model, if immigrant status is correlated with lower grade placement.

Several pieces of evidence suggest academic redshirting is a practice common among mainland immigrants in Hong Kong. First, an impressive proportion, 58% of the mainland immigrant students are in a grade lower than the modal grade. This high percentage cannot be caused by grade retention as a result of academic failure, because Hong Kong government allows only a small percentage of students to be retained. Second, mainland immigrant students who arrived in Hong Kong after they reached the age of 6 reported that they began primary school, possibly back home, at around age 7. This is 1 year older than the typical age of primary school entry in Hong Kong. This kind of immigrant redshirting is largely a function of immigration, together with the lack of alignment between the Hong Kong and mainland Chinese school systems. Third, multivariate analysis shows that mainland immigrant adolescents in lower grades outperform their same-age and same-grade native peers, and mainland immigrants who repeated a grade outperform native Hong Kong repeaters. These facts are consistent with the academic redshirting hypothesis that postulates a concerted effort to improve immigrant students’ competitiveness in school by placing them in lower grades.

To what extent can the findings here be generalized to other countries? In an exploratory analysis not reported here, I have found that most PISA 2003 countries have foreign-born students overrepresented in below-modal grades. In some school systems including Hong Kong (Greece, Italy, Indonesia, Belgium, Macao, Portugal, Austria, France, and Czech Republic), the distribution of foreign-born students in below-modal grade exceeds 50%. It is unlikely that traditional grade retention alone produced such large below-modal-grade percentages. Academic redshirting among certain immigrant groups may be more prevalent than we know. Further investigation linking academic redshirting to national educational policies and practices will make a fruitful research agenda for international and comparative education.

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Table 1

Weighted sample means.

	mainland Immigrant 1st Gen	Native (<i>Hong Kong born</i>)		
		All Natives	2nd Gen	3rd + Gen
Male	.49	.51	.50	.50
<i>School Outcomes</i>				
Math literacy	515.81 **	561.02	570.15 **	554.59
Reading literacy	491.37 **	516.17	523.90 **	511.24
Science literacy	510.05 **	549.19	558.16 **	542.93
<i>Socioeconomic status</i>				
	-.38 **	.09	-.09 **	.27
<i>Psychological well-being</i>				
School adjustment	2.89 **	2.97	2.95	2.98
Perceived fairness	2.85 *	2.79	2.81 +	2.77
Expecting tertiary edu	-.08 **	.51	.66	.66
<i>School variables</i>				
Grade level:	-1.31 **	-.32	-.31	-.33
1 grade above	.00	.00	.00	.00
Modal grade	.14	.72	.72	.71
(10th)				
1 grade below	.28	.25	.25	.26
2 grades below	.37	.03	.03	.03
3 grades below	.21	.00	.00	.01
Age at school entry	6.72 ^a	5.96	5.97	5.96
Ever repeated	.37	.11	.09	.12
Observations	941	3,408	1,595	1,715

Note: 1st = first generation, 2nd = second generation, 3rd+ = third-plus generation. Results for students born in other countries ($n = 72$) and those having missing information on nativity ($n=57$) are not presented.

^aThe figure is 6.90 for those who were 6 years or older when they arrived in Hong Kong.

**
 $p < .01$

*
 $p < .05$

+
 $p < .10$.

Table 2

HLM analysis of math test scores.

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
<i>Foreign born</i>						
mainland	-25.119*** (2.703)	-24.900*** (2.770)	-25.686*** (2.779)	18.642*** (3.293)	17.212*** (3.316)	9.971** (3.729)
other	-33.102*** (6.574)	-29.420*** (6.797)	-26.030*** (6.931)	-12.083 (6.612)	-13.017* (6.634)	-8.174 (7.266)
Male	19.571*** (2.433)	19.430*** (2.446)	20.743*** (2.419)	22.924*** (2.298)	23.096*** (2.300)	23.232*** (2.301)
Socioeconomic status		1.623 (1.375)	0.803 (1.374)	-0.768 (1.306)	-0.314 (1.310)	0.024 (1.313)
<i>Psychological Well-being</i>						
school adjustment			8.359** (2.835)	7.952** (2.693)	8.133** (2.703)	8.255** (2.707)
perceived fairness			5.878*** (1.695)	7.021*** (1.611)	6.781*** (1.617)	6.602*** (1.619)
expect tertiary education			47.967*** (2.537)	44.804*** (2.414)	45.371*** (2.420)	45.854*** (2.421)
Grade				35.127*** (1.558)	30.562*** (1.813)	29.911*** (1.821)
Ever repeated					-17.457*** (3.441)	-27.164*** (4.386)
mainland * repeated						24.105*** (6.117)
Other * repeated						-26.345 (17.072)
Constant	549.211*** (5.492)	549.428*** (4.708)	477.507*** (9.027)	487.491*** (8.570)	487.667*** (8.569)	488.295*** (8.568)
N	4478	4478	4478	4478	4478	4478

* $p < 0.05$

** $p < 0.01$

*** $p < 0.001$.

Table 3

HLM analysis of reading test scores.

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
<i>Foreign born</i>						
mainland	-10.376 (2.426)	-10.198 (2.480)	-11.253 (2.488)	22.921 (2.995)	21.597 (3.005)	15.066 (3.374)
other	-33.156*** (5.900)	-26.347*** (6.083)	-21.233*** (6.202)	-10.669 (6.007)	-11.598 (6.006)	-8.419 (6.569)
Male	-19.481*** (2.181)	-19.448*** (2.185)	-18.693*** (2.151)	-17.076*** (2.072)	-16.853*** (2.068)	-16.658*** (2.067)
Socioeconomic status		1.600 (1.229)	1.026 (1.226)	-0.131 (1.183)	0.144 (1.182)	0.394 (1.184)
<i>Psychological Well-being</i>						
school adjustment			5.580* (2.540)	5.315* (2.450)	5.292* (2.451)	5.345* (2.450)
perceived fairness			7.274*** (1.517)	8.164*** (1.464)	7.981*** (1.464)	7.836*** (1.464)
Expect tertiary education			41.194*** (2.261)	39.006*** (2.183)	39.334*** (2.182)	39.441*** (2.180)
Grade				27.106*** (1.418)	22.693*** (1.644)	22.127*** (1.648)
Ever repeated					-16.575*** (3.121)	-25.657*** (3.970)
mainland * repeated						22.234*** (5.536)
Other * repeated						-16.715 (15.455)
Constant	524.551*** (4.379)	524.793*** (3.763)	461.837*** (7.999)	469.273*** (7.711)	470.114*** (7.698)	470.989*** (7.692)
N	4478	4478	4478	4478	4478	4478

*
 $p < 0.05$ **
 $p < 0.01$ ***
 $p < 0.001$.

Table 4

HLM analysis of sciencetest scores.

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
<i>Foreign born</i>						
mainland	-20.713*** (2.611)	-19.811*** (2.672)	-20.293*** (2.668)	19.525*** (3.190)	17.983*** (3.207)	10.861** (3.614)
other	-28.182*** (6.350)	-24.103*** (6.555)	-21.929*** (6.654)	-9.508 (6.403)	-10.556 (6.415)	-8.134 (7.039)
Male	9.662*** (2.349)	9.463*** (2.358)	10.801*** (2.322)	12.691*** (2.223)	12.895*** (2.222)	12.998*** (2.225)
Socioeconomic status		3.339* (1.325)	2.089 (1.319)	0.752 (1.265)	1.200 (1.266)	1.636 (1.271)
<i>Psychological Well-being</i>						
school adjustment			6.345* (2.722)	6.039* (2.609)	6.232* (2.615)	6.393* (2.623)
perceived fairness			1.912 (1.627)	2.951 (1.560)	2.693 (1.563)	2.556 (1.569)
expect tertiary education			48.152*** (2.436)	45.675*** (2.336)	46.091*** (2.339)	46.857*** (2.342)
grade				31.596*** (1.509)	26.615*** (1.754)	26.039*** (1.765)
ever repeated					-19.077*** (3.329)	-29.333*** (4.251)
mainland * repeated						24.395*** (5.928)
Other * repeated						-13.056 (16.547)
Constant	542.502*** (5.139)	542.638*** (4.447)	487.553*** (8.664)	496.159*** (8.285)	496.434*** (8.274)	496.770*** (8.279)
N	4478	4478	4478	4478	4478	4478

*
 $p < 0.05$ **
 $p < 0.01$ ***
 $p < 0.001$.

Table 5

Generational differences in math, reading, and science literacy.

	Math	Math	Reading	Reading	Science	Science
<i>Foreign born</i>						
1st generation	-18.025*** (3.114)	16.722*** (3.967)	-5.333 (2.784)	20.430*** (3.584)	-12.531*** (2.986)	17.966*** (3.839)
2nd generation	14.677*** (2.579)	12.330*** (2.584)	11.975*** (2.308)	10.709*** (2.335)	15.057*** (2.472)	13.421*** (2.501)
other/missing	-7.573 (5.089)	2.573 (5.228)	-11.593* (4.550)	-2.150 (4.723)	-7.330 (4.878)	0.871(5.060)
Grade		29.982*** (1.812)		21.958*** (1.638)		26.015*** (1.755)
Ever repeated		-29.588*** (5.607)		-23.272*** (5.068)		-29.387*** (5.428)
1st generation * repeated		26.770*** (7.042)		19.874** (6.365)		24.608*** (6.817)
2nd generation * repeated		10.197 (8.048)		0.697 (7.276)		4.402 (7.792)
Other/missing * repeated		-23.756 (13.516)		-32.027** (12.219)		-17.157 (13.085)

Note: Other variables included in the model are male, socioeconomic status, school adjustment, perceived teacher fairness, and expect tertiary education. N = 4,478.

*
 $p < 0.05$

**
 $p < 0.01$

 $p < 0.001$.