INTERMEDIATE ALGEBRA/ALGEBRA II COURSE-TAKING IN 151 LOS ANGELES COUNTY PUBLIC HIGH SCHOOLS: AN EXPLORATORY STUDY

INTRODUCTION

A 1996 report, The Condition of Education in Los Angeles County, found that Latinos\(^1\) had the lowest enrollment rates in college-preparatory mathematics courses in the County. These statistics are particularly disturbing given recent research that links mathematics course-taking with both higher standardized test scores and future educational opportunities. This link, combined with the most recent National Assessment of Educational Progress (NAEP) finding that Latino graduates continue to trail their Asian and White counterparts in advanced mathematics course-taking, makes monitoring Latino enrollment in gateway courses exceptionally important. Beyond aggregate district-level enrollment rates, little is known in Los Angeles County about Latino enrollment in Intermediate Algebra/Algebra II.

This study explores Intermediate Algebra/Algebra II course-taking in Los Angeles County public high schools in 1995, by race/ethnicity. The purpose of this study is to examine mathematics course-taking at the school level to better understand differences in educational opportunities across schools and to reveal the extent to which Latinos enroll in important college-preparatory courses compared to Whites, Blacks and Asians. This study uses course enrollments as a key indicator of mathematics participation. The indicator was selected on the basis of its importance for assessing future educational and employment opportunities, as well as the quality and availability of data.

\(^1\) The term “Latino” refers collectively to Chicano, Mexican-American, Puerto Rican, and other Hispanic Origin students.
This analysis uses data from the California Basic Educational Data System (CBEDS) School Information Form (SIF), an annual statewide collection of public school enrollment data. Using aggregate school-level enrollment data on 151 comprehensive public high schools with grades 9-12, this study explores the impact of racial/ethnic group membership and school characteristics on Intermediate Algebra/Algebra II enrollment rates. Intermediate Algebra/Algebra II corresponds to CBEDS Assignment Codes (2404) *Intermediate Algebra* and (2408) *Intermediate Algebra/Trigonometry* (see Appendix A for Assignment Code definitions). Findings from this study can help policymakers better understand persistent differences in mathematics course-taking, achievement, and college preparation between Latinos and other racial/ethnic groups in Los Angeles County public high schools.

My overarching research interest concerns how well Los Angeles County high schools enroll Latinos in important college-preparatory courses compared to other racial/ethnic groups. Specifically, I answer the following questions:

**Research Question 1:** At what rates do Los Angeles County public high schools enroll Latinos, Whites, Blacks, and Asians in Intermediate Algebra/Algebra II?

Differences in school socioeconomic status (SES) may explain differences in Intermediate Algebra/Algebra II course-taking among racial/ethnic groups. Studies document that students in low-SES schools typically have less access to a rigorous mathematics curriculum, highly qualified teachers, smaller classes, and up-to-date mathematics textbooks (Oakes, 1990). So, it is interesting to ask whether any differences in course-taking detected under RQ1 disappear if school mean SES is controlled.

**Research Question 2:** Controlling for SES across schools, at what rates do Los Angeles County public high schools enroll Latinos, Whites, Blacks, and Asians in Intermediate Algebra/Algebra II?
KEY FINDINGS

This study found disturbing differences in Intermediate Algebra/Algebra II mathematics course-taking patterns among racial/ethnic groups enrolled in 151 Los Angeles County comprehensive public high schools. Latinos consistently have the lowest Intermediate Algebra/Algebra II enrollment rates compared to Asians, Whites and Blacks. In 1995, the average Latino enrollment rate across 151 Los Angeles County public high schools was 9%, compared to 11% for Blacks, 14% for Whites and 21% for Asians. Additionally, 53% of the total variance in Intermediate Algebra/Algebra II enrollment rates occurs between schools when controlling for racial/ethnic group. The remaining 47% of the variance exists within schools among racial/ethnic groups.

This study also found that significant differences in Intermediate Algebra/Algebra II enrollment rates persist among racial/ethnic groups even after controlling for mean school SES, measured by the number of students in a school participating in the Federal free/reduced lunch program. This finding indicates that even when racial/ethnic groups attend schools with the same percentages of students participating in the free/reduced lunch program, differences in Intermediate Algebra/Algebra II rates among the groups persist. Adopting the .10 significance level, the effect of being a member of a particular racial/ethnic group differs in schools with

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2 Intermediate Algebra enrollment rate is the proportion of a racial/ethnic group in a school that was enrolled in Intermediate Algebra/Algebra II in fall 1995. This measure is computed by dividing the number of students in each racial/ethnic group, such as Latinos, enrolled in Intermediate Algebra/Algebra II by the total number of students in that racial/ethnic group who were enrolled in the school. The number only includes students enrolled in Intermediate Algebra/Algebra II in fall 1995. Students who had not yet taken the course or who had taken it in a previous year were not included in the numerator.

3 To better understand the scale of this measure, consider the following example. In a four-year high school where every student enrolled in Intermediate Algebra/Algebra II once during his or her high school career, I would expect the enrollment rate to have a value of .25 for all racial/ethnic groups. For example, consider a school that has 1000 students. If every student enrolled in Intermediate Algebra/Algebra II once during their high school career, I would expect 250 students to be enrolled in
different percentages of students participating in the free/reduced lunch program (Pooled F-test p-value = .07).

Figure 1 presents a prototypical plot of the fitted interaction model where the Intermediate Algebra/Algebra II enrollment rate is plotted as a function of the percentage of students in a school participating in the free/reduced lunch program. Notice that the effect of racial/ethnic group membership on the Intermediate Algebra/Algebra II enrollment rate differs in schools where different percentages of students participate in the free/reduced lunch program.

FIGURE 1: Intermediate Algebra/Algebra II enrollment rates as a function of the percentage of students in a school participating in the free/reduced lunch program.

*The slopes for Latinos and Blacks are not significantly different from zero.

Figure 1 also illustrates important information about the differences in the Intermediate Algebra/Algebra II enrollment rates between Latinos and other racial/ethnic groups across 151 comprehensive public high schools with grades 9-12 in any particular year. In this scenario, I would obtain an Intermediate Algebra/Algebra II enrollment rate of .25 or 25%, 250 divided by 1,000.
Los Angeles County. For example, notice that, across schools, Latinos consistently have the lowest Intermediate Algebra/Algebra II enrollment rates among all racial/ethnic groups. Equally disturbing, this model predicts only a one-percentage-point difference in Intermediate Algebra/Algebra II enrollment rates between Latino students in extremely low-poverty schools (PCTLUNCH < 9%) and Latinos in extremely high-poverty schools (PCTLUNCH > 73%). However, it is likely that the barriers Latinos face in obtaining quality mathematics opportunities in extremely high-poverty schools are very different from those in extremely low-poverty schools. Numerous studies document that high-poverty schools are unequal in many ways that affect virtually every educational outcome.

POSSIBLE EXPLANATIONS

There are no simple explanations for why Latinos are severely under-enrolled in Intermediate Algebra/Algebra II across Los Angeles County high schools. Although Latino students may face a set of shared experiences in Los Angeles County public high schools, many of the educational resources and barriers they confront are likely to be unique in each school setting. Several interrelated factors are likely to contribute to these findings.

First, Latinos may simply not be placed in Intermediate Algebra/Algebra II. School authorities may have low expectations of Latinos and may never clearly articulate the value of successfully completing a rigorous mathematics program. Teachers and counselors may do little to recruit Latinos into rigorous mathematics courses. Second, Latinos may “self-select” out of college-preparatory mathematics courses when a high percentage of Asians is enrolled in the school. Latinos may believe the stereotype that “all Asians” excel in mathematics and feel that they do not have the
math skills necessary to compete in these courses. Ironically, Latinos may self-select out of rigorous mathematics courses to avoid getting a low grade in a course that they believe might jeopardize their chances of going to college. Third, some schools may simply not have sufficient resources to provide students a high-quality mathematics program: teachers may be inexperienced and lack mathematics proficiency.

Whatever the cause or reasons for the disparities in Intermediate Algebra/Algebra II enrollment rates between Latinos and other racial/ethnic groups in fall 1995, one thing is certain. Latino Intermediate Algebra/Algebra II enrollment rates must increase in order to improve Latino mathematics achievement, their pool of eligible students for 4-year colleges, their preparation for college-level mathematics, and their chances of completing a bachelor’s degree.

POLICY IMPLICATIONS

These findings indicate that Latinos are severely under-enrolled in Intermediate Algebra/Algebra II in virtually every school in Los Angeles County compared to Blacks, Whites and Asians. The fact that Latinos comprise 53% of the students enrolled in Los Angeles County high schools yet have, on average, only a 9% Intermediate Algebra/Algebra II enrollment rate is a serious educational concern, particularly since this course is a pre-requisite to more advanced mathematics courses and to attending four-year colleges. Findings from this study suggest that differences in Intermediate Algebra/Algebra II course-taking among racial/ethnic groups are not endemic to a particular school type. Disturbing differences in Intermediate Algebra/Algebra II enrollment rates between Latinos and other groups exist at every range of school poverty concentration. These findings challenge the common belief that differences in Intermediate Algebra/Algebra II enrollment rates between Latinos and other
racial/ethnic groups exist because Latinos are concentrated in “high-poverty” schools with inadequate resources such as limited mathematics course offerings, out-of-date textbooks, and poorly trained teachers. The fact that Latino students consistently have the lowest Intermediate Algebra/Algebra II enrollment rates compared to other racial/ethnic groups, even after controlling for school mean SES, provides a noteworthy signal that other factors may contribute to this disturbing finding.

References


