Does a Greater Presence of Latinx* Faculty or Administrators Raise the Completion Rates of Various Cohorts of Community College Students?

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July 18, 2021

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Abstract

Though California Latinx students are over-represented in the state's community college system, they are under-represented in its success measures. At the same time, on nearly all California Community College campuses, Latinx faculty and administrators are underrepresented compared to Latinx students. Using panel data collected from 108 California community colleges, we look for evidence regarding the expected influence of increasing the presence of Latinx faculty or administrators on student six-year cohort completion rates. Student completion occurs within six years of starting if one or more of the following occurs: a certificate, an associate degree, or university transfer/transfer ready status. We measure completion rates for all students, only Latinx students, and sub-samples of these two cohort types divided by economic advantage or college preparation. Based on panel-data regression analysis, a one-percentage-point increase in Latinx faculty or Latinx administrators' representation exerts a positive influence on nearly all cohort completion rates.

Keywords

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Introduction

Community colleges account for nearly 40 percent of all public postsecondary enrollments in the United States. In 2018, full-time student completion rates at these community colleges – as measured by associate degree, certificate, or university transfer attainment – were 24 percent for all and 21 percent for Latinx students (NCES, 2019a).[1] Efforts to increase these outcomes have been disappointing (Gordon, 2019). Moreover, amidst the COVID-19 Pandemic, about a quarter-million students declined to continue in California's community college system (Burke & Willis, 2021). This research seeks to answer the continued calls for evidence (Chapa & Schink, 2006; Bristol & Martin-Fernandez, 2019) on what policies may bolster overall and Latinx student completion rates.

As shown in Figure 1, between 1980 and 2017, disparities in proportionate representation in the United States population and comparable bachelor's degree attainment have narrowed for persons of color. Nevertheless, this attainment for Native Americans, Blacks, and Latinx remains underrepresented. What accounts for this? Kao and Thompson (2003) pointed to disproportionate access to the K-12 college-readiness curriculum, while Nitardy et al. (2015) and Oyserman and Lewis (2017) noted a link between these disparities and familial structure and self-efficacy. More recently, scholars have reasoned that diminished completion may stem from an understanding by persons of color that they face lower returns to educational attainment when compared to the returns afforded to their non-Latinx, White counterparts (Assari, 2019; Darity et al., 2018).

[Insert Figure 1 Here]

It remains that at least a plurality and sometimes majority of persons of color, particularly those identifying as Latinx, choose community college enrollment as the start of their higher education path.

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[1] We use the designation "Latinx" in place of "Hispanic," which is what the California Community College System used when they asked a student, faculty, or administrator to identify oneself by a single race/ethnicity at the time the data used here was gathered. The other race/ethnicity alternatives offered were Black, American Indian/Alaskan Native, Asian, Filipino, Multi-Ethnicity, Pacific Islander, White Non-Hispanic, and Unknown. We realize that the technical basis of adopting Latinx is ancestry from the Latin American region, which is different than Hispanic, whose technical identification is the use of the Spanish language or descended from Spanish-speaking populations (as described in https://hnmagazine.com/2017/09/difference-hispanic-latino).

Huber, Velez, and Solorzano (2017) noted increased higher education enrollment occurrence as a Latinx victory for their collective struggle. However, this enrollment success is incomplete without completion. Here, we concentrate on what variables are relevant to community college completion, focusing on Latinx-identifying students.[2] The primary reason for our focus on Latinx students is the plurality of such students in the California Community College System (CCCS). In the spring of 2020, students identifying as Latinx (Hispanic) in CCCS consisted of 47 percent of all enrolled, with White non-Hispanic at 24 percent and Black at 5.3 percent.[3]

Previous research like Arbona and Nora (2007), Calcagno et al. (2008), Crisp and Nora (2010), Strayhom (2012), Clotfelter et al. (2013), and Arellano (2020) found that precollegiate academic preparation, English proficiency, and economic status to be highly predictive of higher education degree attainment. Nevertheless, Cole (2007), Reardon and Galindo (2009), Hoffman (2014), and Sandoval-Lucero (2014) emphasize that policy-alterable choices such as faculty composition, student support services, and academic and social integration are also important determinants of Latinx success in higher education. As illustrated in Figure 2, our interest in faculty composition stems from the disparity in the proportion of Latinx students compared to Latinx administrators, full-time faculty members, and part-time faculty members in California community colleges and across all higher education in the United States.

[Insert Figure 2 Here]

Many promote the hiring of faculty and administrators that better correspond to the racial/ethnic identities of the students at a college or university to increase the success of students of color (Fiske, 1988; Torres et al.*,* 2004; Kollen, 2019). However, this outcome is far from certain. Latinx faculty often describe their work environment as challenging as they assume and perform prescribed roles not asked of White faculty (Urrieta & Chavez, 2009). Such demands are now more prevalent as campuses emphasize social justice and the de-centralization of whiteness (Wedderburn & Ramdeholl, 2021). Though there is

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[2] See Croopnick (2021) for a master's thesis that uses similar data and methods but focuses on the impact of a greater percentage of Black faculty on Black male community college success.
[3] Calculated from enrollment values at https://datamart.cccco.edu.

social value inherent in diverse campus experiences, whether increased Latinx representation among faculty or administrators corresponds with increased student completion remains understudied. Using an objective measure of completion rate in student cohorts across California community colleges and years, this research offers a quantitative addition to this literature.

We next offer a brief review of the previous research determining whether teachers' racial/ethnic composition influences student outcomes. Following that is a description of the theoretical model proposed of the factors expected to influence differences in the completion rate of a student cohort. This model guides the data needed for the regression analysis described in the fourth section. A description of the regression technique and results are in section five. We then summarize the evidence found to support the conclusion that a more significant presence of Latinx faculty or administrators in either a K-12 or community college setting raises the completion rates of many forms of community college student cohorts. We finish with implications for policymakers looking to increase the completion rates of Latinx and all community college students.

Literature Review

Hiring diverse faculty and administrators, particularly in a manner meant to match their demographics to the diversity of students on a college campus, is an often-touted goal. As summarized by Los Angeles Community College District Chancellor Rodriguez (2014, p. 5): "[h]aving administrators and faculty of color that reflect the diversity of the students we serve is not only beneficial to students of color but the entire student body." Nonetheless, as Bristol and Martin-Fernandez (2019) report, the degree to which faculty and administrative diversity corresponds with student outcomes has not been fully established. In this review, we summarize the existing research on this topic and do so with an intentional focus on studies at the collegiate level, including faculty or administrative composition as part of their analysis. Where necessary, our review includes a few K-12 based studies due to their salience and limited research conducted at the higher education level.

Qualitative Studies

Interview-based analyses have established that Black and Latinx community college students value faculty diversity (Jordan, 2008; Lucero et al., 2017). Pickett et al. (2017) concluded that Black male community college students desire greater faculty diversity, providing that faculty-student relationship-building is the goal of such diversity. Studies intending to document the experiences of under-represented faculty also reveal the value of diversity. Armstrong and Stewart-Gambino (2016) and Strum (2010) reasoned that such diversity is critical for preparing citizens for an increasingly diverse world. Turner (2013), Johnson (2010), and Vasquez-Heilig et al. (2019) determined the importance of social capital generated through diverse college students matched with an equally diverse set of administrators and faculty on campus. Contreras (2017) likewise noted the irony of an under-representation of Latinx faculty at designated Hispanic Serving Institutions. While these studies offer detailed descriptions of lived experiences, they caution against the generalizability of their findings to the entire study body.

Quantitative Studies

Quantitative research has often highlighted socioeconomic inequalities and prior academic preparation as significant predictors of a community college student's degree or transfer attainment (Goldrick-Rab, 2010). For example, Vasquez Urias (2012) found that Latinx males who could attend community college full-time at a campus located in the suburbs were significantly more likely to complete than similarly prepared Latinx males attending part-time and central city campuses. These findings were unchanged for Black community college males (Vasquez & Wood, 2014). Arbona and Nora (2007) reported that the prominent predictors of future bachelor's degree attainment for Latinx students were strong degree achievement expectations in high school, rigorous high school course completion, and immediate/continuous college enrollment following high school.

To explore these multi-year relationships more fully and expand the analysis to peer demographics, Crisp and Nora (2010) offered an investigation of Latinx student academic persistence to the second and third year of community college attendance. They found that Latinx students attending an institution at which 25 percent or more of their peers identified the same raised the odds of third-year persistence by 150 percent.

Regarding faculty composition and student-faculty relationships, quantitative studies remain relatively scarce. However, there is limited evidence that more robust student-staff relationships correlate with increased markers for student success. Tovar (2015) examined the determinants of both Latinx community college students' GPA and found the most substantial positive predictors were regular meetings with faculty, accounting for six percent of the variance in GPA. Similarly, Wood (2012) found that an increase in academic integration increased the likelihood that a Black male completes his first year of college.

Though the above is noteworthy, they do little to address the central question in this research study regarding faculty/administration diversity and student completion at community colleges. Gilmore (2019) finds that Black and Latinx student completion rises as indices of greater faculty diversity rise; however, she also records a correlation between greater faculty diversity and lower completion rates for White and Asian students. Correspondingly, Hagedorn et al. (2006) found that increased representation of Latinx faculty and increased Latinx peers corresponded with increased likelihood of Latinx student success measured by both one through three-year retention rates. Though these authors cannot account for immediate student-to-faculty or peer interactions, they reason that increased Latinx faculty or peers increase the probability of such interactions. We adopt this inferential assumption for our study.

Fairlie et al. (2014) is perhaps the most often cited study concerning faculty racial/ethnic composition and community college student success. They studied the determinants of individual student success in a community college through a meticulous accounting of faculty and student interaction by race/ethnicity at the De Anza Community College in the San Francisco Bay Area. They reported that disparities in the dropout rates and grade performance between Whites and persons of color (Blacks in particular) diminish by 20 to 50 percent when a matched race/ethnicity instructor educates a student. Their findings suggest that raising the share of Black instructors by one standard deviation would increase the retention rate of Black students (measured by a year of enrollment) by 2.5 percentage points (from a base of 62 percent), closing about a third of the White to Black retention gap.

While these findings are undoubtedly notable, Fairlie et al. (2014) documented a potential student performance tradeoff in their outcomes. Their online appendix Table 7 lists the interaction effects they detected between the racial/ethnic categories used of White, Black, Hispanic [Latinx], Asian, and other minorities for a student and instructor on the outcomes of a student in a course. They accounted for a higher student outcome by (1) [not] dropped the course, (2) passed the course, (3) course grade, (4) course grade higher than B, and (5) student enrolls in the same subject course next term. Excluding the same race/ethnicity interactions, which act as the base of comparison, there are 100 different possibilities for how a different race/ethnicity student and an instructor can influence an outcome. Fourteen of these are negative, with five indicating that a Black student does worse with a White instructor, and two of them indicating that a White student does worse with a Black instructor.

Given the limited studies conducted in higher education, we also examined teacher composition evidence from K-12 education. Using a large-scale teacher and student matched data from an urban Texas K-12 school district, Hanushek et al. (2005) looked at how same-race student/teacher pairs corresponded with predicted student standardized test performance for students of color. They find that Black teachers (relative to White) are more effective at raising standardized test scores of Black students. The measured influence was equivalent to a tenth of the standard deviation of test scores. Regarding Latinx teachers with Latinx students, the size of the detected effect was still positive but far smaller in magnitude (0.02 of the standard deviation).

Similarly, Dee (2004) reexamined data from the Tennessee STAR Experiment, which involved the random assignment of 24,000 K-3 students across 79 schools to classrooms/teachers and student outcomes tracked longitudinally beginning in 1985. He exploited the strength of this original design in a regression analysis meant to determine the effect of teacher/student pairing by race/ethnicity. He finds that an own-race teacher (here, either Black or White) exerts a statistically significant return of four to five percentile points for math and two to three percentile points in reading compared to other-race matched students. Dee concludes that "…recruiting minority teachers can generate important achievement gains among minority students; however, these results also suggest that one of the real and

typically overlooked costs of such efforts may be a substantial reduction in the educational achievement of non-minority students" (p. 209).

The previous quantitative studies all relied on individual student data. As is used in this study, few previous studies have instead relied upon cohort-based data. An exception being Wassmer et al. (2004) that used panel data from California community college cohorts in the late 1990s to question what determines differences in first-time, first-year student cohort success (measured as university transfer). Race/ethnicity differences in a cohort emerged as the largest in magnitude determination of either inclusive (number of transfers / all students) or narrow (number of transfers / all qualified to transfer students) measures of transfer rate success. More recently, Kurlaender et al. (2016) investigated the extent to which variations in aggregate outcomes in California community college cohort-level outcomes were a product of student academic preparation when entering the institution. They found that student conditions before community college entrance (poverty, race/ethnicity, and academic preparation) were strongly predictive of aggregate institutional success rates. However, they also noted salient marginal impacts of attending a more effective institution for student persistence, transfer, and degree completion. Kurlaender et al. (2016) call for further research to unveil what institutional policies/characteristics correlate with the efficacy of student success at a community college. This study attempts to answer that call.

Theoretical Framework

Aljohani (2016) offered a thorough summary of the theoretical frameworks used to model factors driving student retention and success in higher education. Perspectives covered include physiological, psychological, sociological, cultural, organizational, environmental, interactional, and economic. Many take root in the widely cited theory of Tinto's (1975, 1993) "Institutional Departure Model." The fundamental aspect of this theory is that students exit from higher education due to a lack of integration into higher education's social and academic institutional environments. With this causal reasoning, Tinto centered the first-year student experience as an imperative for retention. It forms the base of the necessary "academic integration" and *"social integration"* from one environment to another. Tinto's

theory centers on traditional students attending residential four-year institutions. It has come under criticism when using it to understand best the experiences that determine academic success for students of color in commuter-based community colleges. As discussed in Braxton et al. (2004) and Museus (2014), many now favor the importance of what they refer to as "social-academic integration." Through this lens of integration, campus institutional agents (faculty and administrators) offer the needed validation of students of color at two-year places of higher education and hence a factor of importance to their persistence and eventual academic success. As Deil-Amen (2011, p. 84) noted, "[r]ecognizing the pivotal role of such academically-focused contact in vastly different institutions highlights the opportunity for identity commonalities for marginalized students."

Tinto's theory, and the extension that focuses on the academic and social integration that more appropriately applies to community college students of color, informs our empirical analysis in multiple ways. First, these theories support the notion that the entry-year characteristics of a student cohort are likely to be the most meaningful in determining student completion rates measured over a more extended period. Therefore, we use the student and institutional characteristics of a cohort's entry year as explanatory variables for the dependent variable of completion rate calculated over six years. Second, it supports our working theory that distinct types of student cohorts may experience institutional policies differently regarding their aggregate success at a community college. As a result, we disaggregate cohorts into only Latinx compared to all race/ethnicities; and then into college preparation levels, economic affluence, and the intersection of both. Finally, the literature review offered by Deil-Amem (2011) on the importance of socio-academic integrative moments to two-year college student success, and the role of a culturally engaging campus environment to the success of racially diverse students described by Museus (2014), highlights the potential causal paths between greater Latinx representation among faculty and administrators, and the success of California community college student cohort.[4]

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[4] One could argue that we include the percentage of classified staff at a community college that are Latinx as an additional causal factor that may impact the academic success of Latinx students at the college using the socialization of racial minorities in educational setting as developed by Stanton-Salazar (1997). We chose to not do that here and instead concentrate on the higher-order institutional agents of faculty and administrators more likely to generate the academically focused contact highlighted in

Model

Based upon the literature review and the integration theory described previously, we next offer a model of the general factors expected to influence differences in student cohort completion rates across colleges and across time.[5] The denominator used to measure the Cohort Completion Rate is the number of first-time community college students who complete six or more units in their first semester and finish any math or English courses in their first three years. The Cohort Completion Rates numerator being the number of these students who finish within six years of starting, one or more of the following: a certificate, an associate degree, or university transfer/transfer ready status.

As modeled below, an educational production function that depends on the three broad inputs of the student cohort, institutional, and external characteristics generates the output of a Cohort Completion Rate:

(1)   Cohort Completion Rate = f (*Student Cohort Characteristics,*
                    Institutional Characteristics, External Characteristics).

Student Cohort Characteristics and some Institutional Characteristics (like the race/ethnicity composition of the faculty and administrators at a campus) vary both by the institution and over time. Fixed in time are some Institutional Characteristics like location, the area served, and campus size. In addition, education delivery choices also make up the characteristics of an institution that influence a cohort's success rate and can vary over time. Both Student Cohort and Institutional Characteristics are essential determinants of a cohort's completion rate. As an example of External Characteristics, students in the cohort entering a community college in the fall of 2008 (in the middle of the Great Recession) faced a far

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the literature cited her. Another reason for the exclusion of classified staff being the more pronounced underrepresentation of Latinx administrators (15.1%), full-time faculty (12.8), part-time faculty (10.1%) in comparison to the 34.1% percenatge representation of Latinx students in the fall of 2010 at California community colleges (as derived from https://datamart.cccco.edu/datamart.aspx). This compares to 24.3% Latinx representation among classified staff. Nevertheless, our focus on faculty and administrators is not meant to say that the future researchers should not study the role of classified staff to student cohort success.

[5] We are aware that this adopted methodology by the California Community College Board of Trustees counts those that start at one community college with an outcome goal in mind, but finish at another, as not successful. By us relying on such a metric, bias may occur in the regression estimates if this movement from one college to another not randomly distributed over all campuses and times observed. But if this movement from one college to another varies by college in a consistent manner over the years observed, the inclusion of college-fixed-effects in the panel-data regression estimation accounts for it.

different economy – and hence the opportunity cost of employment opportunities – when deciding to stay in college than one entering in the fall of 2011 (coming out of the Great Recession). Choosing variables that represent each of these general factors that determine differences in a cohort's completion rate avoids the problem of omitted variable bias when detecting the independent influence of Latinx representation among a community college's administrators or faculty. Equations (2) through (4) list the specific variables used in this analysis to account for the general factors just described where:

(2) *Student Cohort Characteristics* = f (Female_Percentage, Age21to24_Percentage, Age25to39_Percentage, Age40Plus_Percentage, Black_Percentage, Asian_Percentage, Filipino_Percentage, Latinx_Percentage, Native_American_Percentage, Pacific_Islander_Percentage, White_Percentage, Pell_Grant_Recipient_Percentage, Full_Time_Student_Percentage),

(3) *Institutional Characteristics* = f (Number_Credit_Sections, Avg_Enrollment_Per_Credit Section, Evening_Credit_Section_Percentage excluded, Hybrid_Credit_Section_ Percentage, Educ_Opp_Prog_Enroll_Percentage, Faculty_Full_Time_Percentage, Latinx_Faculty_Full_Time_Percentage, Latinx_Faculty_Part_Time_Percentage, Latinx_Admin_Percentage),

(4) *External Characteristics* = f (2009_Cohort_Start, 2010_Cohort_Start, 2011_Cohort_Start).

The California Community College data used here only provides Student Cohort Characteristics for the entire student cohort in which Latinx students are a subset. Thus, we measure the characteristics of all the students at the college that the Latinx cohort attends in the academic year that the cohort starts, and not just the characteristics of the Latinx cohort itself. These features account for the basic demographics of binary gender, four age categories, eight race/ethnicity categories, low family income/wealth as measured by the cohort's share receiving a Pell Grant, and the percentage attending full time.[6]

Institutional Characteristics account for education delivery and assistance choices under the college's control. These include the number of credit sections offered, average student enrollment in all credit sections, and the percentage divisions of the delivery of courses by day (before a 5:00 pm start),

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[6] Pell Grants refer to the Federal Pell Grant Program which provides economic assistance to those who demonstrate need based on their calculated expected family contribution (EFC) when completing the annual FAFSA application. Though a person's EFC relies on complicated variables, the vast majority of those awarded a Pell Grant annually earn less than $30,000/year. For more information, visit https://pellgranteligibility.org/gaining-eligibility-for-the-federaxl-pell-grant-program/ .

night, or hybrid form of all or partial online delivery. We also account for the percentage of the cohort enrolled in California's Educational Opportunity Program Services (EOPS). EOPS offers academic tutoring and other forms of support to only less affluent students and requires a funding match for each EOPS-enrolled student from the college.[7] The characteristics of a college's faculty and administrators expected to influence cohort completion are the percentage of faculty on a full-time appointment (either tenured or tenure track) and the percentage for each category that designates Latinx as their single choice of race/ethnicity. Given the earlier research findings suggesting increased student success with same ethnicity/race matched student/professor relationships, we focus here on the composition of Latinx faculty and administrators and its role in Latinx student success. Finally, we account for *External Characteristics* by including five dummy variables representing each of the years of possible start for a cohort after the excluded (base) year of 2007.[8]

Data

We restrict our examination of cohort outcomes to California to account for differences in community college institutions that would need controlling when using data from multiple states. All data used in the analysis is publicly available by visiting the California Community College Chancellor's Office or its Student Success Scorecard.[9] We use data from 108 campuses within the California Community College (CCC) System, representing over 90 percent of all campuses in 2020. Included are cohorts that began in 2007, 2008, 2009, 2010, and 2011. A subdivision of the overall cohort for a starting year and college occurs through those designated Unprepared for college-level work. This distinction occurs if the lowest

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[7] The State of California established EOPS in 1968 with the expressed purpose "to encourage the enrollment of students handicapped by language, social, and economic disadvantages, and to facilitate the successful completion of their educational goals and objectives" (California Education Code § 69641, Sec. 134, p. 2). The state only partially funds a community college's implementation of this program using a categorical grant meaning the college must hold such funding in a separate account and spend it within the fiscal year only to assist the targeted populations. Importantly, the EOPS grant requires a match by the community college itself. The basis of state award of college allocations for EOPS is need, as supported by data submitted by community college districts with districts and colleges incurring non-reimbursable financial obligations at a minimum of 15% of the mean EOPS state allocation over the last three years (California EDC § 69648).

[8] It would be ideal to also include specific college experience measures, including integration or interaction measures, which show the specific processes through which greater presence of Latinx faculty and administrators influences student outcomes. Unfortunately, this is not recorded in the data. Even if we had the resources to try to gather it from 108 different colleges over five different start years, it would be very difficult if not impossible due to the historic nature of this information. Thus, we rely upon the inclusion of college and year effects to control for these experience measures.

[9] These are respectively found at https://datamart.cccco.edu and https://scorecard.cccco.edu/scorecard.aspx.

math or English language course is remedial.[10] An even further cohort subdivision occurs through first-year community college students categorized as Economically Disadvantaged. According to this CCC Chancellor Office distinction, an economically disadvantaged student: (1) received a Board of Governor's Waiver or PELL grant, or (2) is a CalWorks or Workforce Investment Act participant, or (3) is a Department of Social Services TANF client.

Table 1 offers descriptive statistics for all variables included in the panel-data regression analysis. As shown at the top of the table, we measure completion rates of the Latinx student cohort by (1) an overall measure defined as Latinx_Overall_Comp_Rate, (2) for only those academically prepared with Latinx_Acad_Prepared_Comp_Rate or unprepared with Latinx_Acad_UnPrepared_Comp_Rate to start community college, and (3) for only those economically advantaged defined as Latinx_Econ_Advantage_Comp_Rate or disadvantaged with Latinx_Econ_DisAdvantage_Comp_Rate. Note that Table 1 also contains descriptive statistics for these different classifications of students for the entire group of students (including Latinx) in a cohort that we designate with the prefix "All" replacing "Latinx." We later report upon findings regarding the influence of higher percentages of Latinx faculty and administrators upon the completion rates of all race/ethnicity cohorts.

[Insert Table 1 Here]

We test for collinearity among our explanatory variables by first deriving correlation coefficients between two explanatory variables listed in Table 1 and find only the correlation between the percentage of students Latinx and the percentage of part-time faculty Latinx higher than 0.70. We obtain a more direct multicollinearity test through a simple OLS regression using the overall completion rate as the dependent variable and all explanatory variables in Table 1. Variance Inflation Factor (VIF) values

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[10]For the cohort data used here, prepared for college was determined by level of English and math courses completed in high school. Using this *deficit framework,* which since has been increasingly questioned, and unprepared student was required to take either a high-school level math or English course based on placement testing. Signed into law in 2017, Assembly Bill (AB) 705 alters this institutional norm of sorting students into remedial high-school-level coursework based on English language and mathematics placement testing outcomes. Using more of an *asset* framework, this bill dictates the placement of first-year California college students into classes that optimize their opportunity to complete transfer-level math and language arts courses within one year of enrollment in its initial implementation phase. Furthermore, the statute limits placement into remedial courses to students who are "highly unlikely to succeed without them" (California Community College Chancellor's Office, 2017, p. 1). It prohibits such placement based upon standardized placement tests alone.

calculated after this regression for each explanatory variable in the regression model yield only four higher than five. Potential explanatory variables subject to multicollinearity – based upon the indicated VIFs in parenthesis – include percentages of the cohort who identify as White (22.3), Latinx (21.6), Asian American (8.8), and Black (5.5). Thus, the later found statistical insignificance of these explanatory variables may be due to multicollinearity.

Regression Method and Findings

When undertaking a regression analysis for the desired purpose of offering a policy recommendation, the analyst must take great care to control for other factors that influence the outcome under consideration besides the policy variable. The model described in the previous section accounts for the other factors that influence a cohort of community college students' rate of success besides the Latinx composition of faculty and administrators, and importantly, does this through the inclusion of both college-specific and time-specific fixed effects. The inclusion of these effects is possible using a panel data set requiring testing to determine the most appropriate form of regression estimation.

We first ran a test-case OLS regression using the overall Latinx student completion rate as the dependent variable with only time-fixed effects. The STATA-provided Breusch-Pagan/Cook-Weisburg heteroskedasticity test (Baum, 2001) rejected the null hypothesis of its absence ($p = 0.02$). The Wooldridge Test (Drukker, 2003) also rejected the null hypothesis of no autocorrelation in the panel data ($p = 0.0001$). The appropriate Hausman Test (Cameron and Trivedi 2010, 267) comparing the use of a random-effects panel data estimation to a fixed-effects indicated the latter as more appropriate ($p = 0.05$). Finally, the STATA-provided XTCSD test found evidence of cross-sectional dependence ($p = 0.001$). As De Hoyos and Sarafidis (2006, p. 483) described, the presence of cross-sectional dependence severely reduces the efficiency of regression estimates in a panel-data regression and thus needs addressing.

The finding of heteroskedasticity drove the choice of robust standard errors in the regression. The additional presence of first-order serial correlation and cross-sectional dependence points to the desirability of using fixed-effects-panel-data-regression results derived from the STATA-provided XTSCC command.

Hoechle (2007) shows that XTSCC is the most appropriate estimator because it accounts for all three of these concerns by calculating the Driscoll and Kray robust standard errors for regression coefficients.

Table 2 contains regression results by column using five different classifications of Latinx student cohorts as the dependent variables. Read across a row to understand the variation in effects calculated for a specific explanatory variable on cohort type completion rate.   The regression coefficient reported at the top of each cell indicates the percentage-point change in the column-specific completion rate from a one-percentage-point change in the respective explanatory variable. The standard error of a regression coefficient is below it in parenthesis.

[Insert Table 2 Here]

Consider first the rows of results in Table 2 under Institutional Characteristics that begin with the explanatory variable of the percentage of faculty with full-time (tenured or tenured track) status. For this early 2010's California community college data set, percentages range from 12.5 to 53.8. We find that a one-percentage-point increase in this value (occurring through the same reduction of a college's faculty in part-time status) corresponds with an approximate 0.05 percentage point increase in the completion rate for the overall Latinx cohort. This magnitude is similar for the academically unprepared and economically disadvantaged Latinx cohorts. However, note the far higher increase of 0.22 percentage points for the economically advantaged Latinx cohort completion percentage.

Regarding the policy variables of most interest here, a one percentage-point-increase in Latinx_Faculty_Full_Time_Percentage correlates with higher completion rates of all categories of Latinx cohorts, except the academically unprepared. These completion rate increases vary from 0.21 percentage points for the overall Latinx cohort to 0.40 percentage points for the economically advantaged.   More nuanced are the findings for Latinx_Faculty_Part_Time_Percentage in Table 2. A one percentage point increase in this explanatory variable indicates an expected decrease of -0.56 percentage points in the academically prepared Latinx cohort's completion rate and only a slight 0.09 percentage-point increase in the academically unprepared Latinx cohort's completion rate. On the administrative side, a one percentage point increase in Latinx representation exerts an expected positive influence on Latinx student

completion no matter the type of cohort. The highest expected effect is a 0.12 percentage-point increase in academically prepared and economically advantaged Latinx cohorts. These findings translate into a standard deviation increase of 11.2 percentage points in Latinx representation in a typical California community college's administrative personal, yielding an expected 1.4 percentage point increase in Latinx completion among these two types of cohorts. As also recorded in Table 2 under explanatory variables measuring Student Cohort Characteristics, a one percentage point increase in Latinx student representation at a college correlates with a 0.75 percentage point increase in the Latinx economically advantaged cohort's completion rate and a 0.09 percentage-point increase in the academically prepared Latinx cohort's completion rate.

Regarding the influence of other Institutional Characteristics, holding the number of credit sections constant and raising the average enrollment in these credit sections by five students (one standard deviation) corresponds with a 0.70 percentage point increase in the completion rate of academically unprepared Latinx students. Reducing the percentage of daytime credit sections offered at the college by one percentage-point, and offering them instead in the evening, improves the completion rate of the economically advantaged Latinx cohort by about a half of a percentage point. While shifting the same one-percentage-point of daytime credit sections to a hybrid form encompassing at least half-time online learning raises the Latinx completion rate of the economically disadvantaged cohort by 0.10 percentage points.

Also noted in Table 2, a one percentage point increase in students enrolled in Educational Opportunity Program Services (EOPS) – for economically disadvantaged students who are also academically unprepared – increases the completion rates of both these classifications of Latinx cohorts. However, of note, we have also found that greater EOPS participation lowers the completion rates of those not participating in it. Moreover, in the case of percentage cohort completion for the Latinx academically prepared, the recorded effect of a -1.65-percentage point decrease is the largest detected. Perhaps this finding is an artifact of the requirement that a California community college partially funds

an increase in EOPS participation out of its limited budget, thus reducing its spending capacity elsewhere.[11]

Lastly, from Table 2, relative to the non-recession cohort start of fall 2007, the overall Latinx completion rate is expected to be: (1) about 1.1 percentage points lower for a recession start during 2008, (2) no different for a cohort starting when the economy was coming out of the Great Recession in fall 2009, and (3) noticeably higher for post-recession cohort starts of fall 2010 or fall 2011. Note that the expected effects of years started, relative to a severe recession, are different depending on the type of Latinx cohort under consideration.

Table 2 offers the results of regression analyses that allow no possibility for variation in these influences based on the number of Latinx students at the college. A clear takeaway from the qualitative research reviewed earlier is that the positive influences of Latinx faculty on Latinx students are likely through one-on-one interactions and indirect mentoring. Thus, we believe it wise to investigate if the influences of greater percentages of full and part-time Latinx faculty change with Latinx student presence at the college. Also, a greater percentage of administrators that identify as Latinx could more easily argue for and implement policies that benefit (or at least do not hinder) Latinx students, the higher the representation of Latinx students on campus. For these reasons, Table 3 reports the results of an extended regression analysis that includes explanatory interaction variables between the critical explanatory variables under consideration here and the percentage of Latinx students found to exert a statistically significant influence.

[Insert Table 3 Here]

As recorded in Table 3, the intersection of Latinx student identity and economic situation and academic preparation meaningfully alters the influence we find for Latinx faculty. This influence is most notable for the economically advantaged Latinx students who attend institutions with higher

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[11]Most students in EOPS are receiving a PELL Grant. So Pell_Grant_Recipient_Percentage is intended to pick up students relying upon financial support for higher education from financially constrained households, while Educ_Opp_Prog_Enroll_Percentage is a smaller group of those receiving a Pell Grant that are also receiving academic assistance. As noted in Table 1, for all CCCs observed the respective average percentage were 21.65 Pell, and 4.13 EOPS.

concentrations of Latinx student peers. In this case, instead of the fixed 0.40 expected increase in their

completion rate for every percentage point increase in Latinx faculty (reported in Table 2), the expected

effect for a California community college at 13.5 percent Latinx students (the lowest representation in this

data set) is higher at an expected 1.13 [1.57 + (13.5 * -0.03)] percentage point change (calculated by

adding the effect with no Latinx students and the additional effect due to the lowest percentage (13.5) of

Latinx students observed in this sample. This effect is quite distinct from that derived for the college,

with 90.9 percent Latinx students (the highest in this sample) at -1.16 [1.57 + (90.9 * -0.03)]. From a

predicted positive to negative effect, the inflection point occurs in this data set at 56 percent Latinx

students. Thus, our findings suggest the impact of additional Latinx faculty on Latinx student success

may vary not only by student race/ethnic identity as previous research found but also by overall peer

composition and student economic and academic characteristics.

       When allowing for the possibility that the detected influence of Latinx part-time faculty

percentage on Latinx student cohort completion can vary by the college's Latinx student representation,

we only find it for the academically prepared and economically advantaged cohorts. For the academically

prepared, the constrained fixed effect of a one-percentage-point increase in part-time faculty identifying

as Latinx from Table 2 is -0.56 percentage-point in completion. As shown in Table 3, when accounting

for Latinx presence at a college, this effect varies from -0.97 [-1.10 + (13.5 * 0.01)] to -0.19 [-1.10 +

(90.9 * 0.01)] based upon the actual range of Latinx student percentages in this data set. For the

economically advantaged, the effect of a one-percentage-point increase in part-time faculty identifying as

Latinx, not allowing it to vary by Latinx student presence, is not statistically significant from zero. When

accounting for Latinx student presence, this effect widely varies from -0.56 [-0.746 + (13.5 * 0.014)] to

0.53 [-0.746 + (90.9 * 0.014)] based upon the actual range of Latinx student percentages in this data set.

The change from a negative to positive influence occurring at Latinx students comprising just over half of

the total students at the college.

       Moving to the final category of the expected influence of a one-percentage-point increase in the

percentage of a college's administrators identifying as Latinx, three of the possible five detected change

after accounting for interaction with Latinx student presence. As recorded in Table 3, for the academically unprepared Latinx cohort the calculated influence with interaction varies from -0.40 [-0.066 + (13.5 * 0.002)] to 0.12 [-0.066 + (90.9 * 0.002)]. The switching point from negative to positive being near one-third of a college's students identifying as Latinx. For both the overall and economically disadvantaged cohorts, the expected marginal increase in completion rates by adding one percentage point to the administration at the college identifying as Latinx consistently rises as a college's percentage of students identifying as Latinx increases.

As noted in Table 3, the expected increase in the overall Latinx student cohort completion rate from a one-percentage-point increase in Latinx administrators varies from 0.02 [13.5 * 0.0012] to 0.11 [90.9 * 0.0012]. As earlier shown in Table 2, without any account for the degree of Latinx student attendance at a college, the average effect is 0.04. While, for the same one-percentage-point increase in Latinx administrators, the expected increase in the completion rate of the economically disadvantaged Latinx cohort similarly varies from 0.02 [13.5 * 0.0013] to 0.12 [90.9 * 0.0013]. Moreover, as noted in Table 2, without any account for the degree of Latinx student attendance at a college, the average continuous effect is 0.03.

As Dee (2004), Fairlie, Hoffman, & Oreopoulos (2014), and Gilmore (2019) identified positive same race/ethnicity teacher influences on student success while also detecting negative impacts for unmatched students, we undertook one additional series of regressions. In this model, we utilized the same cohort classifications but measured student completion rates for these consistent classifications derived from all students, not just Latinx students. For a one percentage point increase in Latinx administrators, the positive results remain relatively consistent for the academically prepared and economically advantaged completion rates. The positive and constant influence of a higher percentage of Latinx administrators detected for all students' overall and economically disadvantaged cohorts rose in magnitude for the same types of Latinx cohorts as Latinx student presence at a college increased. A significant difference in the results in Tables 3 and 4 occurred for a one-percentage-point increase in Latinx representation in a college's administration. For the all-student cohort of this type, the detected

effect is always positive. The effect only turned positive for the Latinx-only student cohort of this effect after about a third of the students identified as Latinxs.

[Insert Table 4 Here]

We did not find the same consistency of completion rate effects detected for an increase in the Latinx_Faculty_Part_Time_Faculty across Tables 3 and 4. For an increase in Latinx_Faculty_Full_Time_Percentage, the nearly consistent positive influences on all forms of Latinx cohort completion rates were not favorable for all student cohorts until critical concentrations of nearly half Latinx students occurred at a college. When using cohort data from all race/ethnic groups, this positive influence of higher Latinx representation among part-time faculty extended to the: (1) overall cohort completion rate, (2) the academically prepared completion rate at a college with greater than 49 percent of its student body Latinx, (3) the academically unprepared completion rate, (4) the economically advantaged completion with Latinx students at greater than 48 percent, and (5) always to the economically disadvantaged completion rate.

Discussion

This research looked for evidence on the current social justice issue of increasing the completion rates among various Latinx student cohorts at a community college. Since community colleges provide the most economical and accessible path to a bachelor's degree (Handel & Williams, 2012) and are where Latinx students favor attendance (Bensimon & Dowd, 2009), this issue is vital. We explored whether it is reasonable to assume that raising Latinx representation among community college faculty and administrators corresponded with increased Latinx student cohort completion rates. Given other scholarly findings, we further examined whether there was any indication of this policy path being detrimental to overall student completion rates.

We find that in most instances, increasing Latinx representation among community college faculty and administrators has positive impacts on student success rates. Table 5 offers a synopsis of the direction (positive, none, or negative) of the statistically significant study findings for Latinx students (top) and all students (bottom). A prominent finding is that a one-percentage-point increase to the

percentage of administrators identifying as Latinx exhibits consistent and positive effects on the completion rates for all forms of Latinx student cohorts examined here, the sole exception being the academically unprepared. For the academically unprepared, the detected positive influence of greater Latinx representation in campus administration only occurred after the Latinx student percentage at a college reached approximately one-third. Perhaps there is a need for such a critical mass of Latinx representation for additional Latinx administrators to make a difference for this group. It may also be that policy, and budgetary changes relevant to increasing Latinx achievement among the academically unprepared are easier to prioritize and implement when more than one-third of the student body identifies as Latinx.

[Insert Table 5 Here]

Though we uncover near-universal positive impacts with increase Latinx faculty, there were a few exceptions to this finding. We detected no significant effect for the academically unprepared cohort and only a positive influence on the economically advantaged cohort of Latinx students after more than most of the students at the college Latinx. We wonder if the non-significance of higher Latinx full-time faculty is attributable to differential exposures to tenure and tenure-track Latinx faculty. For the years of our analysis, the requirement for classification as academically unprepared students was the first college course in math or English being remedial (not subject to collegiate credit). Previous research has documented that these courses usually take several semesters for students to complete, depressing student likelihood of obtaining a success measure (Bailey, Jeong, & Cho, 2009). Suppose tenured and tenure-track Latinx professors are less likely to teach the remedial English/math courses necessary for the success of the academically unprepared. In that case, it seems reasonable that such may explain the null impact for the academically unprepared cohort. Other impacts of a greater Latinx representation among part-time faculty on Latinx student cohort completion rates were either determined not to be different from zero (for the overall and economically disadvantaged cohorts) or negative (for the academically prepared or academically advantaged when Latinx student representation less than half).

We also chose to measure the expected return to a California community college of raising its Latinx representation among its faculty or administrators for all student cohorts, and here we report mixed findings. An increase in Latinx representation among full-time faculty decreases the completion rates of the academically prepared and economically advantaged cohorts. This decrease holds constant for academically unprepared and overall cohorts' completion rates until a college population is more than half Latinx.

Regarding part-time faculty, we did not find that raising the Latinx presence among part-time faculty has unintended consequences on all student cohorts. However, we did detect some adverse effects when raising Latinx representation among part-time faculty for all race/ethnicity cohort completion rates for the academically prepared and economically advantaged when the college's students are less than half Latinx. Strikingly, the impact of one additional percentage point in Latinx administrators remained positive for all race/ethnicity student cohorts, no matter their economic or academic background.

It is beyond the scope of this research to investigate what pathway the relationship between increased student success and Latinx-identifying faculty/administration takes. It may be that increasing Latinx faculty/administration provides informal relational mentoring that scholars find under-available for students of color (Cole & Barber, 2004). The mere visibility of Latinx scholars and leaders may lead to different student assumptions as to just who is permitted to succeed in this ecosystem (Buckley & Park, 2021). We encourage further research in this critical field.

Conclusion

What do these results suggest for a California community college that successfully increases its percentages of faculty or administrators that are Latinx regarding the expected effects of Latinx student cohort completion and the completion rates of all race/ethnicity cohorts? A summary of our findings offers a few insights:

- It is reasonable to assume that a higher percentage of Latinx administrators, at the margin, increases the community college completion rates of Latinx student cohorts and all race/ethnicity cohorts.

- If the percentage of full-time professors that are Latinx increases at a community college, at the margin, the result is likely to be an improvement in nearly all Latinx cohort completion rates. Furthermore, expect this action to do the same for the overall and academically prepared completion rates of all race/ethnicity cohorts if Latinx students at the college are in the majority.

- Increase the percentage of part-time instructors that are Latinx and expect, at the margin, a positive influence on the completion rates of the academically unprepared Latinx cohort and the economically advantaged Latinx cohort if greater than half of the students at college Latinx. This same expansion of Latinx part-time faculty representation likely raises the whole race/ethnicity cohort completion rates for the overall group, academically unprepared, and economically disadvantaged. For the academically prepared and economically disadvantaged, the expectation is that hiring more Latinx part-time instructors increases these cohort completion rates if Latinxs are the student majority at the college.

In closing, we must recognize that an improvement in Latinx student completion rates is not the only reason to alleviate the under-representation of Latinxs among college faculty and administrators in the United States. As Mello (2018) notes, other notable reasons to pursue this policy path include overcoming implicit bias in hiring practices, offering more role models of people of color inside and outside academia, and even the future survival of some academic disciplines. This research has shown that even if these are the goals of the expanded hiring of Latinx faculty or administrators, the expected outcomes for over three-fourths of the different types of student cohort types examined here are an improvement in cohort completion rates.

Acknowledgment

Declaration of Interest Statement

We have not experienced any financial interest or benefit from the direct applications of this research.

Data/Materials Availability

All data used in the analysis are publicly available at the California Community College Chancellor Office's *Datamart* https://datamart.cccco.edu) or its *Student Success Scorecard* (https://scorecard.cccco.edu/scorecard.aspx).

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Table 1: Descriptive Statistics.
(528 Observations drawn from 108 CA Community Colleges and Five Cohorts
starting in the fall of 2007, 2008, 2009, 2010, and 2011)

Variable Name	Mean	Standard Deviation	Minimum	Maximum
Dependent				
All_Overall_Comp_Rate	46.54	7.93	23.26	67.10
Latinx_Overall_Comp_Rate	40.25	6.14	18.0	57.90
All_Acad_Prepared_Comp_Rate	68.13	7.05	36.70	83.80
Latinx_Acad_Prepared_Comp_Rate	63.50	9.75	20.00	100.00
All_Acad_UnPrepared_Comp_Rate	39.65	6.50	20.45	60.30
Latinx_Acad_UnPrepared_Comp_Rate	35.38	5.66	16.30	52.70
All_Econ_Advantage_Comp_Rate	52.47	9.45	25.64	80.90
Latinx_Econ_Advantage_Comp_Rate	42.94	12.07	7.10	100.00
All_Econ_DisAdvantage_Comp_Rate	44.29	7.27	22.48	62.74
Latinx_Econ_DisAdvantage_Comp_Rate	39.68	6.09	18.40	59.30
Explanatory				
Faculty_Full_Time_Percentage	30.38	7.03	12.53	53.77
Latinx_Faculty_Full_Time_Percentage	12.27	6.28	0.00	37.21
Latinx_Faculty_Part_Time_Percentage	10.21	6.64	0.00	66.67
Latinx_Admin_Percentage	15.00	11.21	0.00	57.14
Student Cohort Characteristics				
Female_Percentage	53.02	6.72	18.77	69.30
Age21to24_Percentage*	31.36	6.34	4.41	100.00
Age25to39_Percentage	27.21	5.10	9.90	53.39
Age40Plus_Percentage	14.87	6.99	5.00	44.95
Black_Percentage**	6.86	6.89	0.19	44.40
Asian_Percentage	9.74	8.95	0.30	40.64
Filipino_Percentage	2.79	2.47	0.10	17.60
Latinx_Percentage	41.61	16.32	13.50	90.85
Native_American_Percentage	0.61	0.93	0.00	6.80
Pacific_Islander_Percentage	0.52	0.55	0.00	5.45
White_Percentage	30.00	15.61	1.30	75.80
Pell_Grant_Recipient_Percentage	21.65	9.77	3.83	53.69
Full_Time_Student_Percentage	48.39	9.48	10.41	76.10
Instutional_Characteristics				
Number_Credit_Sections	1404.33	771.15	254.00	4016.00
Avg_Enrollment_Per_Credit_Section	27.72	5.14	13.35	42.81
Evening_Credit_Section_Percentage***	26.67	5.32	12.03	43.94
Hybrid_Credit_Section_Percentage	15.97	8.46	0.00	66.38
Educ_Opp_Prog_Enroll_Percentage	4.13	2.23	0.92	13.82
Faculty_Full_Time_Percentage	30.38	7.03	12.53	53.77
Latinx_Faculty_Full_Time_Percentage	12.27	6.28	0.00	37.21
Latinx_Faculty_Part_Time_Percentage	10.21	6.64	0.00	66.67
Latinx_Admin_Percentage	15.00	11.21	0.00	57.14
External Characteristics				
2008_Cohort_Start****	0.197	0.398	0.00	1.00
2009_Cohort_Start	0.195	0.397	0.00	1.00
2010_Cohort_Start	0.203	0.402	0.00	1.00
2011_Cohort_Start	0.203	0.402	0.00	1.00

Notes: Excluded categories: *less than age 21, **unknown (mixed race/ethnicity and decline to state), ***percentage of all sections offered in daytime, and ****cohort began in the fall of 2007.

Table 2: Regression Results Using Completion Rate of Various <u>Latinx Student</u> Cohorts as the Dependent Variable^

Explanatory Variable	Overall_ Comp_Rate	Acad_Prep_ Comp_Rate	Acad_UnPrep _Comp_Rate	Econ_Adv_ Comp_Rate	Econ_DisAdv _Comp_Rate
			Dependent Variable		
Student Cohort Characteristics					
Female_Percentage	-0.021	-0.174	0.768	0.350***	-0.078
	(0.080)	(0.135)	(0.130)	(0.165)	(0.055)
Age21to24_Percentage	-0.044	-0.022	-0.076*	-0.044	-0.032
	(0.043)	(0.081)	(0.042)	(0.102)	(0.058)
Age25to39_Percentage	-0.159***	-0.314***	-0.186***	-0.410***	-0.140***
	(0.024)	(0.042)	(0.032)	(0.099)	(0.035)
Age40Plus_Percentage	-0.087**	0.476***	-0.177***	0.096	-0.024
	(0.039)	(0.230)	(0.030)	(0.200)	(0.039)
Black_Percentage	0.389**	0.393	0.313*	0.703***	0.367***
	(0.083)	(0.351)	(0.172)	(0.028)	(0.084)
Asian_Percentage	0.096**	-0.061	0.386***	-0.117	0.390***
	(0.040)	(0.058)	(0.042)	(0.174)	(0.073)
Filipino_Percentage	0.257	-0.052	0.226	0.689	0.291
	(0.181)	(0.251)	(0.155)	(0.507)	(0.198)
Latinx_Percentage	0.040	0.092*	0.099	0.747***	-0.005
	(0.038)	(0.053)	(0.064)	(0.101)	(0.035)
Native_American_Percentage	0.367	0.192	0.548***	1.633***	0.219
	(0.261)	(0.544)	(0.147)	(0.549)	(0.204)
Pacific_Islander_Percentage	0.019	0.921*	-0.067	1.090***	0.170
	(0.171)	(0.527)	(0.097)	(0.194)	(0.210)
White_Percentage	0.114***	-0.176	0.233***	-0.143*	0.118***
	(0.016)	(0.154)	(0.033)	(0.076)	(0.024)
Pell_Grant_Recipient_Percentage	-0.054***	-0.089	-0.057***	-0.143***	-0.067**
	(0.019)	(0.095)	(0.010)	(0.027)	(0.030)
Full_Time_Student_Percentage	0.085*	0.256***	0.065	0.125***	0.068
	(0.046)	(0.042)	(0.048)	(0.045)	(0.043)
Institutional Characteristics					
Number_Credit_Sections	-0.00061	-0.0049***	0.00057	-0.00022	-0.0010***
	(-0.00046)	(0.00062)	(0.00060)	(0.0016)	(0.00002)
Avg_Enrollment_Per_Credit_Section	0.101***	-0.152	0.143***	0.056	0.067
	(0.038)	(0.112)	(0.048)	(0.123)	(0.050)
Evening_Credit_Section_Percentage	0.081**	0.061	0.087*	0.526***	0.035
	(0.040)	(0.239)	(0.049)	(0.043)	(0.052)
Hybrid_Credit_Section_Percentage	-0.017	0.111	-0.0026	-0.136	0.102***
	(0.039)	(0.090)	(0.025)	(0.11)	(0.025)
Educ_Opp_Prog_Enroll_Percentage	-0.008	-1.645***	0.452***	-0.354***	0.298**
	(0.060)	(0.174)	(0.138)	(0.132)	(0.136)
Faculty_Full_Time_Percentage	0.050**	0.065	0.080***	0.219***	0.036*
	(0.19)	(0.053)	(0.020)	(0.050)	(0.020)
Latinx_Faculty_Full_Time_Percentage	0.211**	0.565***	0.113	0.399***	0.240***
	(0.088)	(0.115)	(0.085)	(0.133)	(0.088)
Latinx_Faculty_Part_Time_Percentage	0.043	-0.560***	0.086**	-0.140	-0.003
	(0.047)	(0.049)	(0.041)	(0.128)	(0.048)
Latinx_Admin_Percentage	0.035***	0.121***	0.020**	0.128**	0.031***
	(0.013)	(0.018)	(0.009)	(0.062)	(0.007)
External Characteristics					
2008_Cohort_Start	-1.120***	0.882***	-1.233***	-0.414	-1.047***
	(0.143)	(0.135)	(0.146)	(0.420)	(0.145)
2009_Cohort_Start	-0.435	1.562***	-0.810**	0.317	-0.530***
	(0.314)	(0.327)	(0.319)	(0.947)	(0.389)
2010_Cohort_Start	0.805**	2.827***	-0.110	3.672***	0.236
	(0.402)	(0.778)	(0.426)	(1.146)	(0.496)
2011_Cohort_Start	1.443***	1.123	0.987*	5.626***	0.748

	(0.517)	(1.176)	(0.525)	(1.345)	(0.672)
Constant	24.250***	68.377**	7.860	-26.888***	27.885***
	(9.006)	(26.885)	(9.630)	(4.567)	(9.893)

^ Using STATA "xtscc" command with "lag (4)" and college-specific fixed effects. Statistical Significance in Two-Tailed Test: ***99% +, **95 to 98.9%, and *90 to 94.9%. We use a two-tailed test for which a p=0.10 is the same as p=0.05 in a one-tailed test, or 95% confident that a regression coefficient is different from zero. If the reader prefers 95% confidence in even a two-tailed test, they can only count results with two or three asterisks.

Table 3: Regression Results Using Completion Rate of Various Types of <u>Latinx Student</u> Cohorts as the Dependent Variable^
(Latinx Faculty and Admin %s interacted with % Latinx Students)

Explanatory Variable	Dependent Variable				
	Overall_ Comp_Rate	Acad_Prep_ Comp_Rate	Acad_UnPrep _Comp_Rate	Econ_Adv_ Comp_Rate	Econ_DisAdv _Comp_Rate
Student Cohort Characteristics					
Female_Percentage	-0.020 (0.079)	-0.149 (0.137)	0.080 (0.1238)	0.328** (0.165)	-0.076 (0.055)
Age21to24_Percentage	-0.045 (0.044)	0.004 (0.0845)	-0.079** (0.042)	-0.014 (0.098)	-0.033 (0.058)
Age25to39_Percentage	-0.152*** (0.026)	-0.291*** (0.051)	-0.174*** (0.032)	-0.385*** (0.104)	-0.132*** (0.039)
Age40Plus_Percentage	-0.089** (0.038)	0.487*** (0.225)	-0.179*** (0.029)	0.135 (0.180)	-0.025 (0.038)
Black_Percentage	0.388** (0.084)	0.354 (0.348)	0.311** (0.173)	0.766*** (0.052)	0.365*** (0.084)
Asian_Percentage	0.342*** (0.059)	0.266*** (0.052)	0.362*** (0.038)	-0.104 (0.516)	0.375*** (0.067)
Filipino_Percentage	0.244 (0.179)	0.008 (0.269)	0.202 (0.143)	0.426 (0.418)	0.275 (0.189)
Latinx_Percentage	0.014 (0.026)	-0.034 (0.070)	0.054 (0.069)	0.985*** (0.090)	-0.034 (0.026)
Native_American_Percentage	0.371 (0.269)	0.120 (0.508)	0.555*** (0.162)	1.676*** (0.516)	0.223 (0.214)
Pacific_Islander_Percentage	-0.014 (0.164)	0.944* (0.554)	-0.124 (0.096)	0.936*** (0.227)	0.134 (0.191)
White_Percentage	0.110*** (0.016)	-0.177 (0.156)	0.226*** (0.031)	-0.148* (0.072)	0.114*** (0.024)
Pell_Grant_Recipient_Percentage	-0.053*** (0.019)	-0.083 (0.093)	-0.054*** (0.0121)	-0.115*** (0.020)	-0.065* (0.03)
Full_Time_Student_Percentage	0.084* (0.046)	0.264*** (0.048)	0.062 (0.048)	0.109** (0.048)	0.067 (0.043)
Institutional Characteristics					
Number_Credit_Sections	-0.00064 (-0.00046)	-0.0048*** (0.0007)	0.00054 (0.00058)	0.00034 (0.0015)	-0.0010*** (0.00028)
Avg_Enrollment_Per_Credit_Section	0.093*** (0.034)	-0.188* (0.111)	0.129*** (0.045)	0.031 (0.136)	0.058 (0.048)
Evening_Credit_Section_Percentage	0.086** (0.041)	0.066 (0.234)	0.096* (0.049)	0.544*** (0.032)	0.041 (0.054)
Hybrid_Credit_Section_Percentage	-0.016 (0.039)	0.115 (0.089)	-0.0014 (0.025)	-0.153 (0.108)	0.103*** (0.025)
Educ_Opp_Prog_Enroll_Percentage	-0.029 (0.068)	1.684*** (0.153)	0.4189*** (0.124)	-0.472*** (0.149)	0.276 (0.009)
Faculty_Full_Time_Percentage	0.055*** (0.19)	0.067 (0.057)	0.089*** (0.018)	0.224*** (0.050)	0.041* (0.021)
Latinx_Faculty_Full_Time_Percentage	0.213** (0.089)	0.525*** (0.108)	0.117 (0.085)	1.571***,^^^^ (0.105)	0.243*** (0.089)
Latinx_Faculty_Part_Time_Percentage	0.039 (0.046)	-1.101***,^^ (0.218)	0.081** (0.040)	-0.746***,^^^^ (0.304)	-0.0064 (0.046)
Latinx_Admin_Percentage	-0.014 ⇩ (-0.031)	0.121*** (0.019)	-0.066***,^^^ (0.019)	0.114* (0.061)	-0.024 ⇩ (0.027)
External Characteristics					
2008_Cohort_Start	-1.095*** (0.135)	1.116*** (0.201)	-1.191 (0.139)	-0.553 (0.451)	-1.021*** (0.141)
2009_Cohort_Start	-0.353 (0.281)	1.960*** (0.471)	-0.669** (0.294)	0.500 (0.979)	-0.439 (0.373)

2010_Cohort_Start	0.908** (0.363)	3.272*** (0.894)	0.068 (0.393)	4.004*** (1.177)	0.349 (0.467)
2011_Cohort_Start	1.547*** (0.477)	1.691 (1.299)	1.1664*** (0.5604)	6.027*** (1.388)	0.862 (0.654)
Interaction Effects (if statistically significant)					
Latinx_FullTime_Fac_% * Latinx_Student_%	-	-	-	-0.028*** (0.005)	-
Latinx_PartTime_Fac_% * Latinx_Student_%	-	0.0100** (0.0040)	-	0.014*** (0.004)	-
Latinx_Admin_% * Latinx_Student_%	0.0012* (0.00066)	-	0.0021*** (0.00051)	-	0.0013* (0.0007)
Constant	25.353*** (8.974)	71.676** (25.063)	9.760 (9.521)	-36.444*** (6.272)	29.09*** (9.468)
Within R-Squared	**0.185**	**0.091**	**0.147**	**0.259**	**0.124**

^ Using STATA "xtscc" command with "lag (4)" and college-specific fixed effects. ^^Effect changes to + at 110.0% of students Latinx.   ^^^ Effect changes to + at 31.4% of students Latinx. ^^^^ Effect changes to – at 56.1% students Latinx. ^^^^^Effect changes to + at 53.3% of students Latinx. Statistical Significance in Two-Tailed Test: ***99% +, **95 to 98.9%, and *90 to 94.9%.

Table 4: Regression Results Using Completion Rate of Various Types of <u>All Student Cohorts</u> as the Dependent Variable^

(Latinx Faculty and Admin %s interacted with % Latinx Students)

	Dependent Variable				
<u>Explanatory Variable</u>	**Overall_ Comp_Rate**	**Acad_Prep_ Comp_Rate**	**Acad_UnPrep _Comp_Rate**	**Econ_Adv_ Comp_Rate**	**Econ_DisAdv _Comp_Rate**
Student Cohort Characteristics					
Female_Percentage	0.118**	-0.048	0.139***	0.298**	0.047
	(0.050)	(0.068)	(0.043)	(0.043)	(0.050)
Age21to24_Percentage	-0.059***	0.018	-0.058*	-0.096*	-0.048
	(0.020)	(0.025)	(0.033)	(0.050)	(0.040)
Age25to39_Percentage	-0.069*	-0.141***	-0.069	-0.165***	-0.058
	(0.037)	(0.047)	(0.055)	(0.050)	(0.057)
Age40Plus_Percentage	-0.055**	0.238***	-0.119***	-0.010	-0.112***
	(0.022)	(0.043)	(0.025)	(0.077)	(0.034)
Black_Percentage	-0.070*	0.257***	-0.048	0.125	-0.105***
	(0.040)	(0.081)	(0.053)	(0.085)	(0.015)
Asian_Percentage	0.093***	-0.060	0.143***	-0.418***	0.358***
	(0.044)	(0.059)	(0.027)	(0.096)	(0.082)
Filipino_Percentage	-0.052	-0.109*	-0.124***	0.378**	-0.103
	(0.132)	(0.046)	(0.113)	(0.182)	(0.103)
Latinx_Percentage	-0.173**	-0.071	-0.142***	-0.010	-0.102***
	(0.071)	(0.067)	(0.070)	(0.115)	(0.024)
Native_American_Percentage	0.211	0.059	0.368***	0.202	0.295**
	(0.164)	(0.148)	(0.103)	(0.303)	(0.139)
Pacific_Islander_Percentage	0.178*	0.731*	0.205***	0.809***	0.103
	(0.096)	(0.331)	(0.076)	(0.227)	(0.074)
White_Percentage	0.031***	-0.055***	0.089***	-0.016	0.046*
	(0.009)	(0.018)	(0.009)	(0.041)	(0.026)
Pell_Grant_Recipient_Percentage	-0.007	0.095***	-0.031**	-0.00048	-0.028*
	(0.013)	(0.028)	(0.013)	(0.019)	(0.017)
Full_Time_Student_Percentage	0.107***	0.166***	0.089***	0.069	0.099***
	(0.036)	(0.024)	(0.034)	(0.071)	(0.021)
Institutional Characteristics					
Number_Credit_Sections	-0.0011***	-0.00090***	-0.00061**	-0.0014**	-0.0011***
	(0.00013)	(0.00028)	(0.00021)	(0.00055)	(0.00027)
Avg_Enrollment_Per_Credit_Section	0.077*	-0.011	0.098***	0.207***	0.0089
	(0.047)	(0.142)	(0.031)	(0.031)	(0.060)
Evening_Credit_Section_Percentage	-0.072***	0.032	-0.096***	0.110***	-0.090***
	(0.014)	(0.144)	(0.028)	(0.028)	(0.019)
Hybrid_Credit_Section_Percentage	-0.046***	-0.023	-0.041***	-0.022	-0.0013
	(0.011)	(0.064)	(0.011)	(0.030)	(0.018)
Educ_Opp_Prog_Enroll_Percentage	0.037	-0.394**	0.259***	0.0064	0.028
	(0.070)	(0.169)	(0.043)	(0.194)	(0.134)
Faculty_Full_Time_Percentage	0.020	-0.153***	0.081**	-0.086**	0.081***
	(0.19)	(0.032)	(0.031)	(0.036)	(0.018)
Latinx_Faculty_Full_Time_Percentage	-0.330*,^^	-0.174***	-0.264*,^^^^	-0.226***	-0.024
	(0.157)	(0.052)	(0.157)	(0.065)	(0.036)
Latinx_Faculty_Part_Time_Percentage	0.066**	-0.242**,^^^	0.098***	-0.532***,^^^^^	0.143***
	(0.028)	(0.115)	(0.030)	(0.176)	(0.031)
Latinx_Admin_Percentage	0.045***	0.103***	0.044***	0.045**	0.049***
	(0.009)	(0.013)	(0.008)	(0.019)	(0.009)
External Characteristics					
2008_Cohort_Start	-1.24***	-0.376**	-1.38***	-0.386***	-1.31***
	(0.14)	(0.212)	(0.099)	(0.094)	(0.113)
2009_Cohort_Start	-2.55***	-1.44***	-2.60***	-1.089***	-2.47***
	(0.29)	(0.298)	(0.215)	(0.184)	(0.355)
2010_Cohort_Start	-2.01***	0.564*	-2.15***	1.506***	-1.95***

|					
	(0.28)	(0.327)	(0.232)	(0.349)	(0.411)
2011_Cohort_Start	-1.75*** (0.36)	0.528 (0.446)	-1.91*** (0.323)	3.397*** (0.374)	-1.93*** (0.505)
Interaction Effects (if statistically significant)					
Latinx_FullTime_Fac_% * Latinx_Student_%	0.0070* (0.0036)	-	0.0054* (0.0033)	-	-
Latinx_PartTime_Fac_% * Latinx_Student_%	-	0.0054** (0.0017)	-	0.011*** (0.003)	-
Latinx_Admin_% * Latinx_Student_%	-	-	-	-	-
Constant	47.16*** (3.01)	71.39*** (10.27)	34.30*** (3.81)	40.85*** (7.58)	43.28*** (7.42)
Within R-Squared	**0.165**	**0.143**	**0.161**	**0.262**	**0.159**

^ Using STATA "xtscc" command with "lag (4)" and college-specific fixed effects. ^^Effect changes to + at 44.8% of students Latinx. ^^^ Effect changes to + at 48.9% of students Latinx. ^^^^ Effect changes to + at 41.3% of students Latinx. ^^^^^Effect changes to + at 48.4% of students Latinx. Statistical Significance in Two-Tailed Test: ***99% +, **95 to 98.9%, and *90 to 94.9%.

Table 5: Direction of Statistically Significant Influences of Greater Latinx Representation on Latinx and All Race/Ethnicity Cohort Completion Rates^
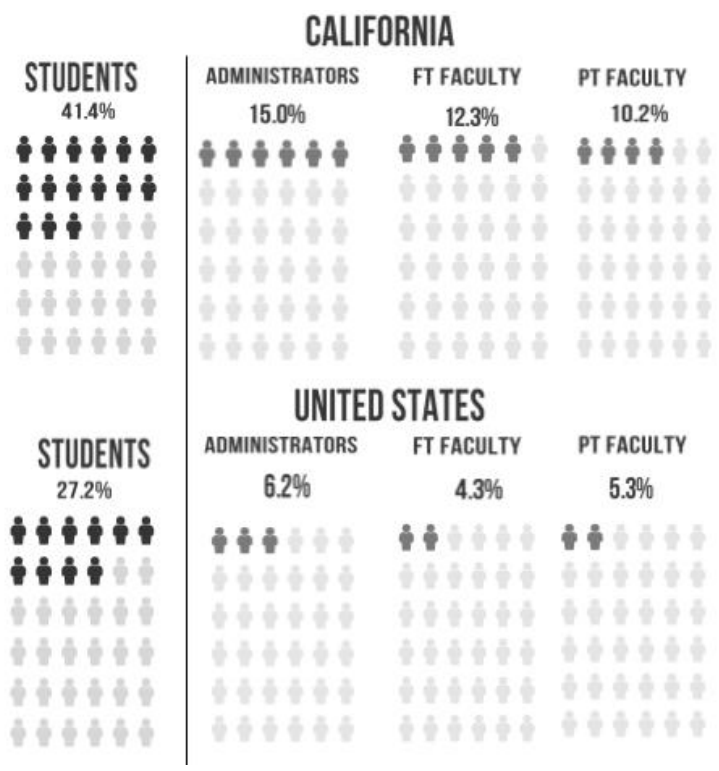
Latinx Cohorts

Explanatory Variable	Overall	Academically Prepared	Academically Unprepared	Economically Advantaged	Economically Disadvantaged
Latinx Full-Time Faculty %	positive	positive	none	positive (negative beyond 56% Latinx students)	positive
Latinx Part-Time Faculty %	none	negative	positive	negative (positive beyond 53% Latinx students)	none
Latinx Administrator %	positive	positive	negative (positive beyond 31% Latinx students)	positive	positive

All Race/Ethnicity Cohorts

Explanatory Variable	Overall	Academically Prepared	Academically Unprepared	Economically Advantaged	Economically Disadvantaged
Latinx Full-Time Faculty %	negative (positive beyond 45% Latinx students)	negative	negative (positive beyond 41% Latinx students)	negative	none
Latinx Part-Time Faculty %	positive	negative (positive beyond 49% Latinx students)	positive	negative (positive beyond 48% Latinx students)	positive
Latinx Administrator %	positive	positive	positive	positive	positive

^ Based upon previous regression findings in Tables 3 and 4.
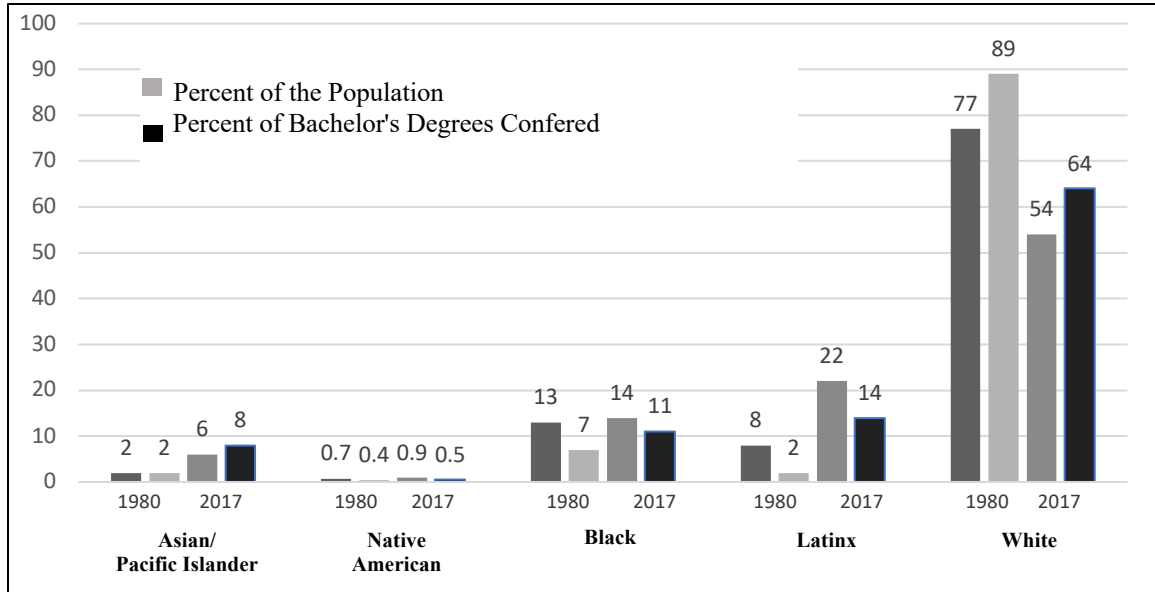
Source: National Center for Education Statistics (2019)

Figure 1

CALIFORNIA

| STUDENTS | ADMINISTRATORS | FT FACULTY | PT FACULTY |
| 41.4% | 15.0% | 12.3% | 10.2% |

UNITED STATES

| STUDENTS | ADMINISTRATORS | FT FACULTY | PT FACULTY |
| 27.2% | 6.2% | 4.3% | 5.3% |

Sources: CA: *California Community College Datamart* (https://datamart.cccco.edu). US: *Digest of Educational Statistics,* (2018), *"*Faculty in degree-granting postsecondary institutions, by race/ethnicity, sex, and academic rank: Table 315.2018"; *National Center for Educational Statistics,* (2020) "Characteristics of Postsecondary Students."

Figure 2

Figure Captions

(1) Percentages by Race/Ethnicity in the United States Young Adult Population
and Bachelor's Degree Holder for 1980 and 2017

(2) Representation of Latinx Students, Administrators, Full-Time, and Part-Time Faculty in CA (top) and
US (bottom) Community Colleges, 2015 – 2017