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Higher Education and Economic Opportunity in California

SUMMARY

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Technical appendices to this report are available on the PPIC website.

Higher education could be one of California's most effective tools for combating economic and social inequities. College graduates experience large wage gains and their jobs offer more benefits than those of workers without bachelor's degrees. College graduates are also relatively insulated from recessions—including the current downturn—and benefit the most from recoveries.

However, lower rates of college access and completion among Latinos, African Americans, and low-income Californians exacerbate the state's economic divide and puts California further behind in meeting its workforce needs. And even though a college degree benefits Californians in all racial/ethnic and income groups, these benefits vary by family income and race/ethnicity.

In this report, we focus on pathways to a bachelor's degree, outlining the economic benefits of completing college, identifying inequitable outcomes, and exploring how inequities can be addressed by the state and its higher education institutions. Among our key findings:

- **A college degree has economic benefits across all demographic groups.** Average earnings for full-time, year-round workers in each of the state's largest racial/ethnic groups are about twice as high for college graduates as for high school graduates. Other labor market outcomes—unemployment rates, labor force participation, and job quality—are also better for college graduates. But this "college wage premium" varies across groups.
- **Low-income, Latino, and African American students are less than half as likely to make it from 9th grade to a college degree as their peers.** Many of the obstacles along this pathway hamper the efforts of students to reach their educational goals.
- **California's share of recent high school graduates who enrolled in a four-year college ranked 41st in the nation in 2018, and the vast majority of low-income, Latino, and African American students who complete high school never attend a four-year college.** This is significant because students who begin at four-year schools are much more likely to obtain degrees than those who start at a community college.
- **California ranks 4th in the country in the share of recent high school graduates who enrolled in a two-year college.** But too few community college students transfer to four-year universities.
- **Low-income, Latino, and African American students are especially underrepresented in the college majors that have the highest labor market returns.** In many colleges, those majors—most notably engineering and computer science—cannot accommodate student demand.

Policymakers and higher education institutions have many tools to increase access and completion. But at every step in the path from high school to college completion, an emphasis must be placed on ensuring that low-income and underrepresented students have the information, access, and support they need to reach their educational goals. From expanded and re-oriented high school preparation and outreach programs, to aggressive inclusion of low-income students in the admissions process, to financial support that makes college truly accessible and sustainable, California and its higher education institutions must find ways to make higher education a ladder of economic mobility.

Introduction

California is well-positioned to expand economic opportunity through higher education. The state has a large higher education system and an ambitious goal of universal access to higher education. Demand for college is very high, and so is the belief in college as a way to a better life. Across race/ethnic, income, and educational attainment groups, the vast majority of parents (at least two-thirds) in California hope that their children will earn at least a bachelor's degree (Baldassare et al. 2020), and nine in ten Californians believe that having a four-year college degree is important for economic and financial success (Baldassare et al. 2018).

Most high school graduates in California enroll in college, and large shares of college students in California come from groups historically underrepresented in higher education. Even so, gaps in access and completion remain, and there is much room for improvement.

If it is to play a key role in reducing economic inequities, higher education must become more widely available and more effective. The challenge is especially acute now that the COVID-19 pandemic has caused so much educational and economic disruption. At the same time, the current economic and health crisis underlines the importance of improving educational progress and broadening economic well-being.

In this report, we focus on access to college and completion of a bachelor's degree among groups that have been historically underrepresented in higher education, including students from low-income families, Latinos, and African Americans. The vast majority of Latino and African American high school graduates are from low-income families (86% and 79%, respectively), compared to about half of Asian American graduates and one-third of white graduates.[1] First, we examine the extent to which higher education leads to strong labor market outcomes. Second, we measure educational progress among underrepresented groups, identifying key points along the pathway from high school to college completion. Third, we look at higher education practices, policies, and programs that can improve college completion among underrepresented students.

College Graduates Fare Well in the Labor Market

Completing college leads to better economic outcomes. College graduates earn far more than workers with less education, and the difference has grown over time. In California, the college wage premium—the difference in wages between college graduates and high school graduates—is at record-high levels.[2] Average annual earnings for California workers with at least a bachelor's degree now exceed $70,000; these earnings are tens of thousands of dollars higher than the average annual wage for less-educated workers (Figure 1). Moreover, these average earnings have continued to grow even as the share of workers with a college degree has grown: in 1990, 27 percent of all full-time year-round workers in California had at least a bachelor's degree; by 2018 that figure had reached 40 percent.

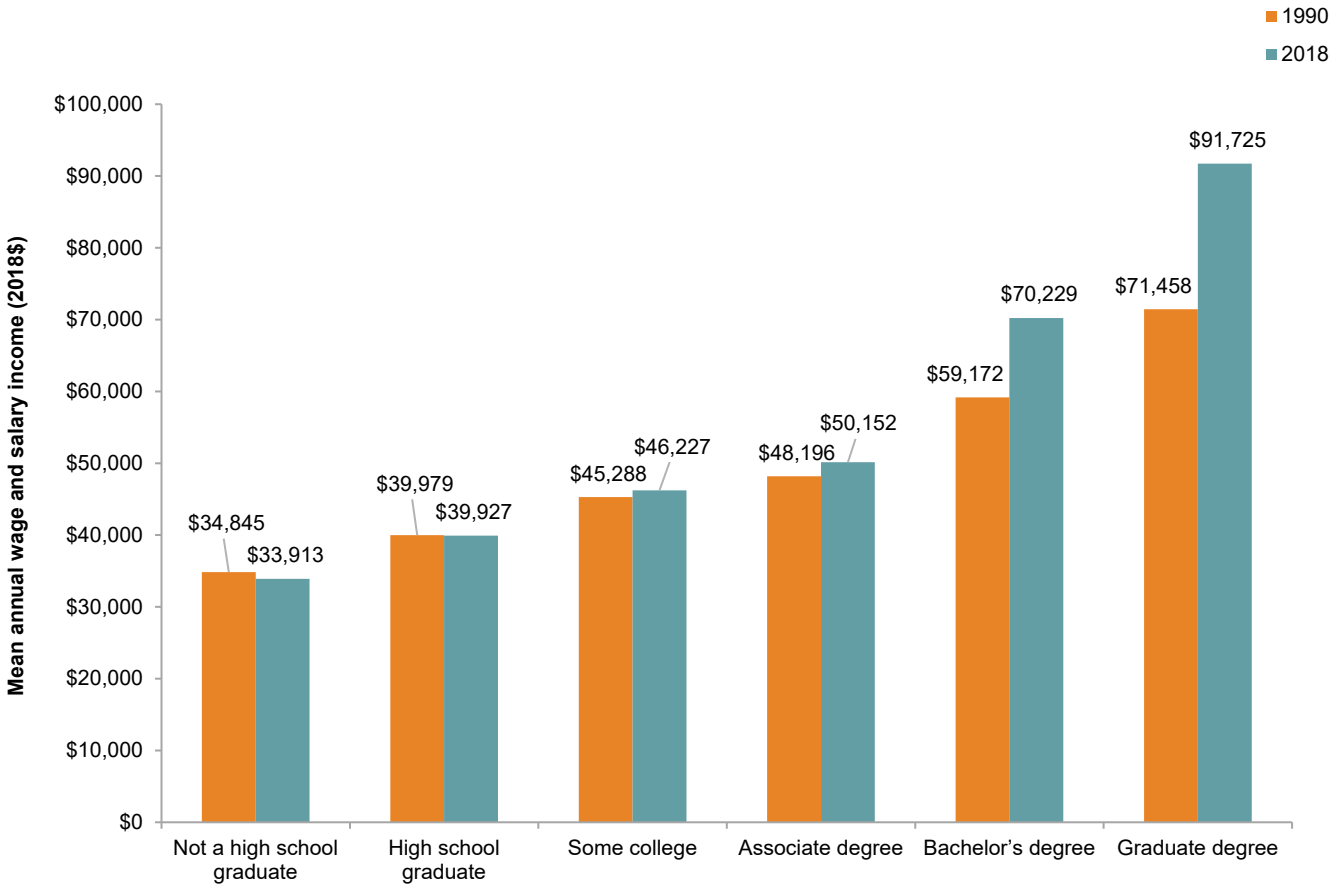
[1] The definition of low-income students varies across systems. Our synthetic cohort approach relies on the California Department of Education (CDE) category "socioeconomically disadvantaged" students to establish high school graduation rates and college enrollment rates of recent high school graduates for low-income students. We use transfer rates and baccalaureate completion rates (separately for first-time college freshmen and transfer students) of Pell grant students to serve as a proxy for college outcomes for low-income students. See Technical Appendix A for details.

[2] One concern is whether these gains are simply the reflection of a selection effect. The best evidence suggests that the skills and networks acquired in college account for almost all of these wage differences (Card 2001).

While college graduates have continued to make wage gains, earnings for less-educated Californians have stagnated. College graduates today earn 28 percent more than college graduates did just one generation ago (adjusted for inflation) whereas earnings for less educated workers have remained flat or even declined.[3] Gains and wages are highest for those who earn graduate degrees, but workers with no more than a bachelor's degree have also experienced substantial gains.

FIGURE 1

Wages are far higher for California's college graduates



SOURCE: Authors' calculations based on 1990 decennial census and 2018 American Community Survey one-year estimates.

NOTES: Wage and salary income for full-time year-round workers in California above the age of 16 with income greater than $0. These estimates are regression-adjusted for age, race/ethnicity, gender, marital status, birthplace, citizenship, and ability to speak English well. Dollars are calculated using covariate means from the 2018 ACS sample and are adjusted for inflation using CPI-U-RS. See Technical Appendix A for details.

The college wage premium is widely experienced across demographic groups. In each of the state's largest racial/ethnic groups, average earnings for full-time year-round workers are about twice as high for college graduates as for high school graduates. Even so, there are large differences in the college wage premium, with white and Asian graduates earning substantially more than Latino and African American graduates (Figure 2). These differences can be partly attributed to factors such as academic majors and the selectivity of colleges

[3] The wage premium appears to have levelled off in recent years. See Valletta (2016) for an insightful discussion of the national trend.

attended—which are discussed below.[4] Some of these factors are themselves a reflection of structural differences in opportunity and resources. But other factors, including labor market discrimination, are also at play.

FIGURE 2

The college wage premium varies widely across racial/ethnic groups in California

SOURCE: Author calculations based on 2018 American Community Survey one-year estimates.

NOTES: Wage and salary income for full-time year-round workers in California above the age of 16 with income greater than $0. These estimates are regression-adjusted for age, gender, marriage status, birthplace, citizenship, and ability to speak English well. Dollars are calculated using covariate means from the 2018 ACS sample and are adjusted for inflation using CPI-U-RS. See Technical Appendix A for details.

Because the American Community Survey does not include information on students' family incomes when they were in high school or college, we cannot create college wage premium estimates for low-income students. Data from state-level records, including the Current Population Survey, also do not report retrospective family incomes. However, the majority of Latino and African American students in California are from low-income families, so the wage outcomes for those groups are similar to outcomes for low-income students.

The Opportunity Insights group at Harvard University has done research that highlights the economic value of college for low-income students (Chetty et al. 2017). Because that work uses de-identified data from individual tax returns (which can be merged with college tuition paid as reported by colleges on Form 1098-T) over many years, generational gains in income related to college attendance can be measured. Notably, though, the data only indicate whether a student attended a particular college, not whether she/he graduated.[5] In general, work by

[4] We control for other factors such as, age, citizenship, and geographic location in our wage regressions. See Technical Appendix B for those results and accompanying discussion.

[5] Nor does the data indicate the educational attainment of the parents of low-income students.

Opportunity Insights has shown that students from low-income families (those in the bottom quintile of family income) have strong wage gains relative to their parents, and that subsequent earnings for students at selective colleges are only slightly below those of students from higher income quintiles.

Other labor market outcomes are also better for college graduates than for less-educated workers (Technical Appendix Table B1). College graduates are more likely to be in the labor force, less likely to be unemployed, and more likely to accrue wealth and assets.[6] They also are more likely to have benefits such as sick leave and paid vacations, the ability to work from home, and retirement or pension plans. College graduates also tend to be less affected by recessions and benefit more during recoveries than less-educated workers (see text box).

College graduates do better in recessions and recoveries

College graduates not only earn more and have higher-quality jobs, but they are less vulnerable in economic downturns. The COVID-19 recession has already led to far larger declines in employment than occurred in the Great Recession, and less-educated workers are bearing the brunt of the declines. Nationwide, employment losses have totaled over 9.2 million workers between February 2020 and September 2020 (among adults age 25 and over, according to the Bureau of Labor Statistics). In contrast, during the entire Great Recession employment declined by about 7 million (over a much longer time period). Less-educated workers—those without a bachelor's or graduate degree—have been most vulnerable to job losses, accounting for over 80 percent of all employment declines in the current downturn.

Recessions reshape our economy not only through job losses but also in the uneven nature of economic recoveries. Just as recessions tend to favor more highly educated workers, so do recoveries. After the Great Recession, employment growth among highly educated workers was robust while employment among less-educated workers never fully recovered. Even in the wake of huge job losses over the past several months, employment levels of college graduates in the United States are far higher today than when they peaked before the Great Recession (by about 11 million). In contrast, there are now almost 20 million fewer jobs for workers without college degrees than there were before the Great Recession (see Technical Appendix Figure A1).

Monthly employment data by educational attainment is less precise in California, but early indications are that the same patterns are occurring here. Less-educated workers have exceptionally high unemployment rates, with perhaps one in five now unemployed. Unemployment rates for college graduates are far lower (around one in ten) than for less-educated workers—although these rates are the highest on record. Indeed, the graduates of 2020, many with student loan debt, face the worst job market since the Great Depression. We do not yet know how severe and long lasting this recession will be.

[6] See Hans Johnson, "College Graduates Have Higher Net Worth" (PPIC blog, 2017).

College Completion and Economic Gains Are Lower among Underrepresented Groups

Although the economic gains of college are robust and well known, they do not accrue evenly across demographic groups in California. This is largely because most California students—including the majority of underrepresented students—do not complete college. But there are also equity gaps in the economic returns of a college degree.

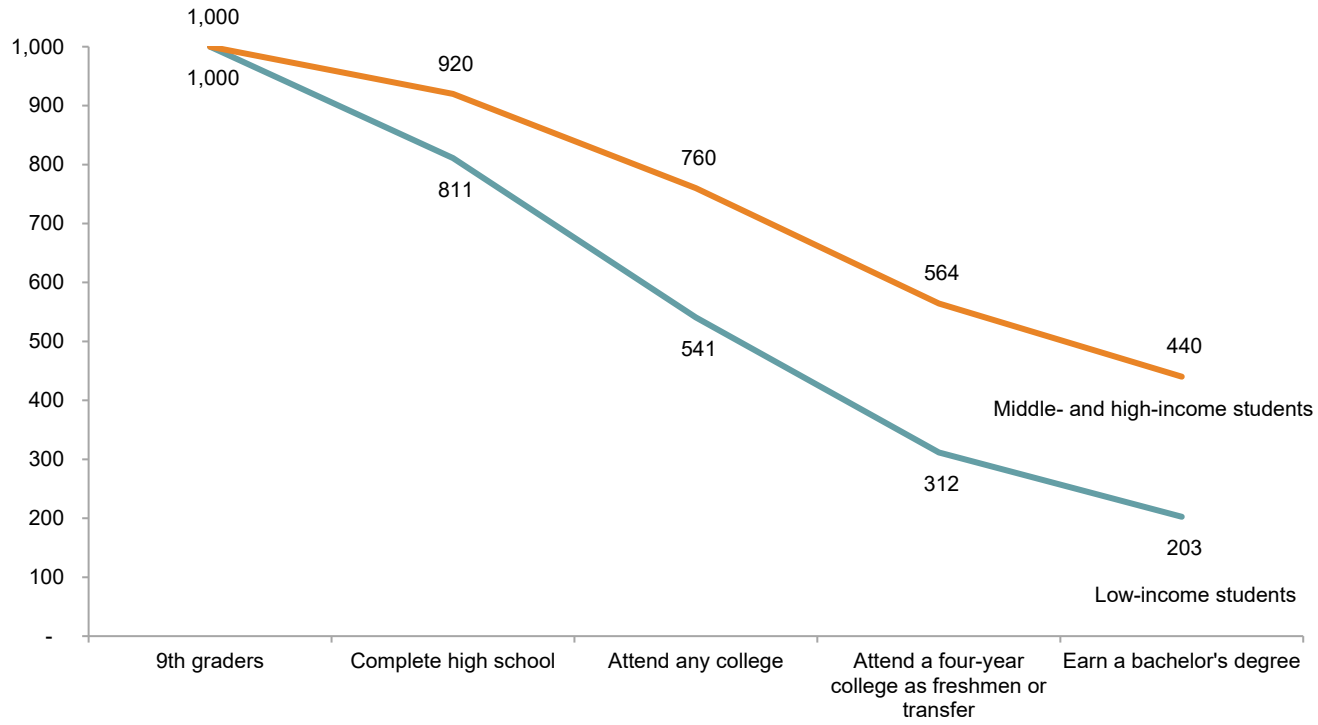
Many Students Face Barriers along the College Pathway

Relatively few students make it all the way from ninth grade through college. Some drop out of high school, others graduate but never attend college, and many more attend but never complete college. Overall in California, at current rates of completion and transition, only about one-third of 9th graders will eventually complete college and earn a bachelor's degree.[7] Students from middle- and higher-income backgrounds are more than twice as likely as low-income students to make it all the way through (44% versus 20%, Figure 3). Asian American students are almost three times as likely to earn a bachelor's degree as Latino and African American students (51% versus fewer than 20%, Figure 4).

[7] See Technical Appendix A for details.

FIGURE 3

Most California 9th graders will not obtain a bachelor's degree

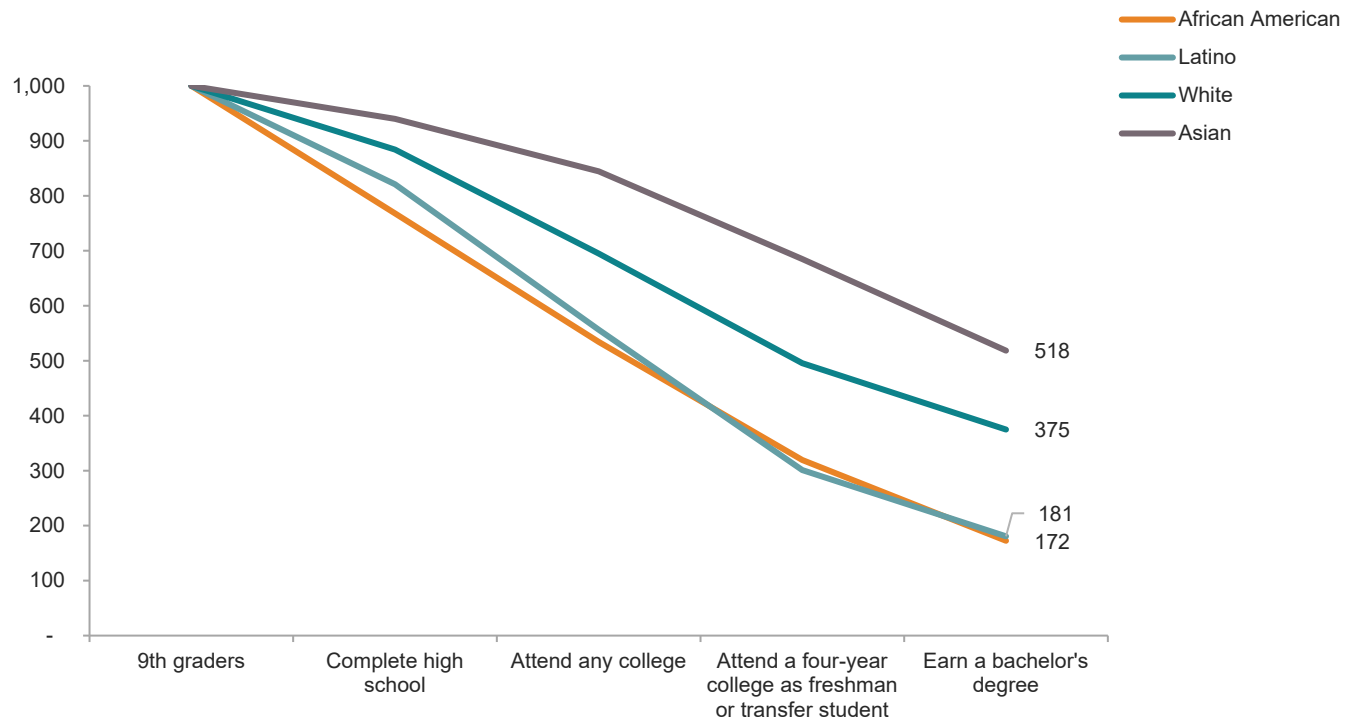


SOURCE: Author calculations based on current rates of transition per CDE, CCCCO, UCOP, CSU, and IPEDS data.

NOTE: Chart shows how many out of 1,000 9th graders will reach key milestones, based on current completion rates. See Technical Appendix A for details.

FIGURE 4

The educational trajectories of California 9th graders vary widely by race/ethnicity



SOURCE: Author calculations based on current rates of transition per CDE, CCCCO, UCOP, CSU, and IPEDS data.

NOTE: Chart shows how many out of 1,000 9th graders will reach key milestones, based on current completion rates. See Technical Appendix A.

The pathway from ninth grade to college completion is littered with obstacles, impediments, and difficult transitions. Despite differences at every step, a majority of low-income, Latino, and African American 9th graders do graduate from high school and enroll in college. Most of those students do not end up earning a bachelor's degree, even though this was their academic goal (Johnson and Cuellar 2020).

Family income is a key determinant of educational outcomes for many students. Within each race/ethnic group in California, low-income students are less likely to move along the pathway toward college completion than their higher-income peers (Figure 5).

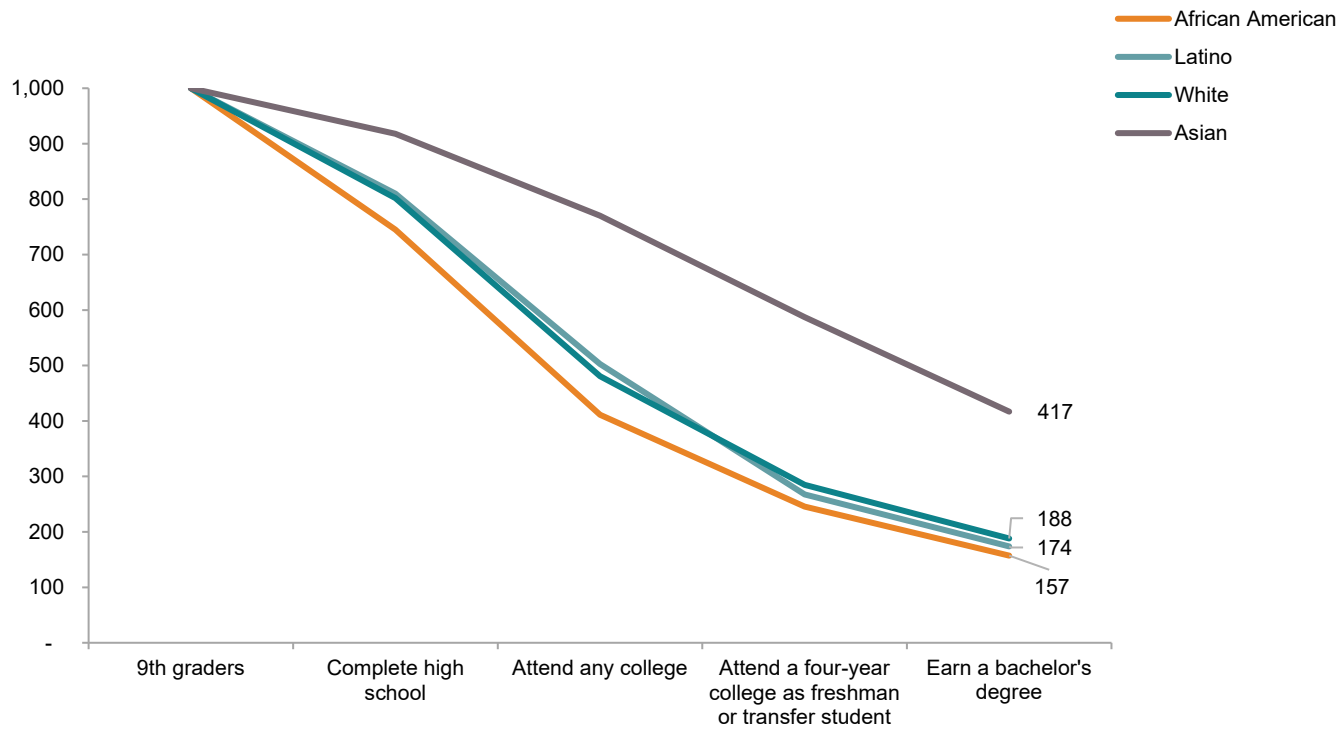
Low-income Asian students have much higher completion rates—on average—than other low-income students. One reason is that low-income Asian students are much more likely to have a parent who graduated from college than other low-income students. For example, 30 percent of low-income Asian high school students have at least one parent with a bachelor's degree, compared to only 6 percent among parents of low-income Latino high school students.[8] This matters because parents' education is a strong determinant of a child's eventual educational attainment (Butler, Beach, and Winfree 2008; Hertz 2006). Institutional factors also play a role. Low-income African American (17%) and Latino students (21%) are much more likely than Asian (4%) and white (3%)

[8] Comparable statistics for white and African American low-income high school students are 20 percent and 9 percent, respectively. Based on authors' analyses of 2018 American Community Survey data of California high school students living with at least one parent. Contact authors for details.

students to attend high schools with high concentrations of poverty.[9] Such schools tend to be under-resourced.[10] For example, about half of schools with high concentrations of poverty have at least one college preparatory course in biology, chemistry, or physics course taught by a teacher with improper credentials (Gao et al. 2019). Finally, low-income Latino and African American students are much more likely to start in a community college than a four-year college. Even adjusting for academic background, students who start in community colleges are much less likely to earn a bachelor's degree than those who start at a four-year college.

FIGURE 5

Rates of college completion are low for low-income Californians across racial/ethnic groups



SOURCE: PPIC based on current rates of transition per CDE, CCCCO, UCOP, CSU, IPEDS.

NOTE: Chart shows how many out of 1,000 9th graders will reach key milestones, based on current completion rates. See Technical Appendix A for details.

Difficult Points Along the Pathway

Based on the estimates we have outlined above, we find that low-income and other underrepresented students disproportionately fall off the pathway to college completion after they graduate from high school. We can identify three key sticking points:

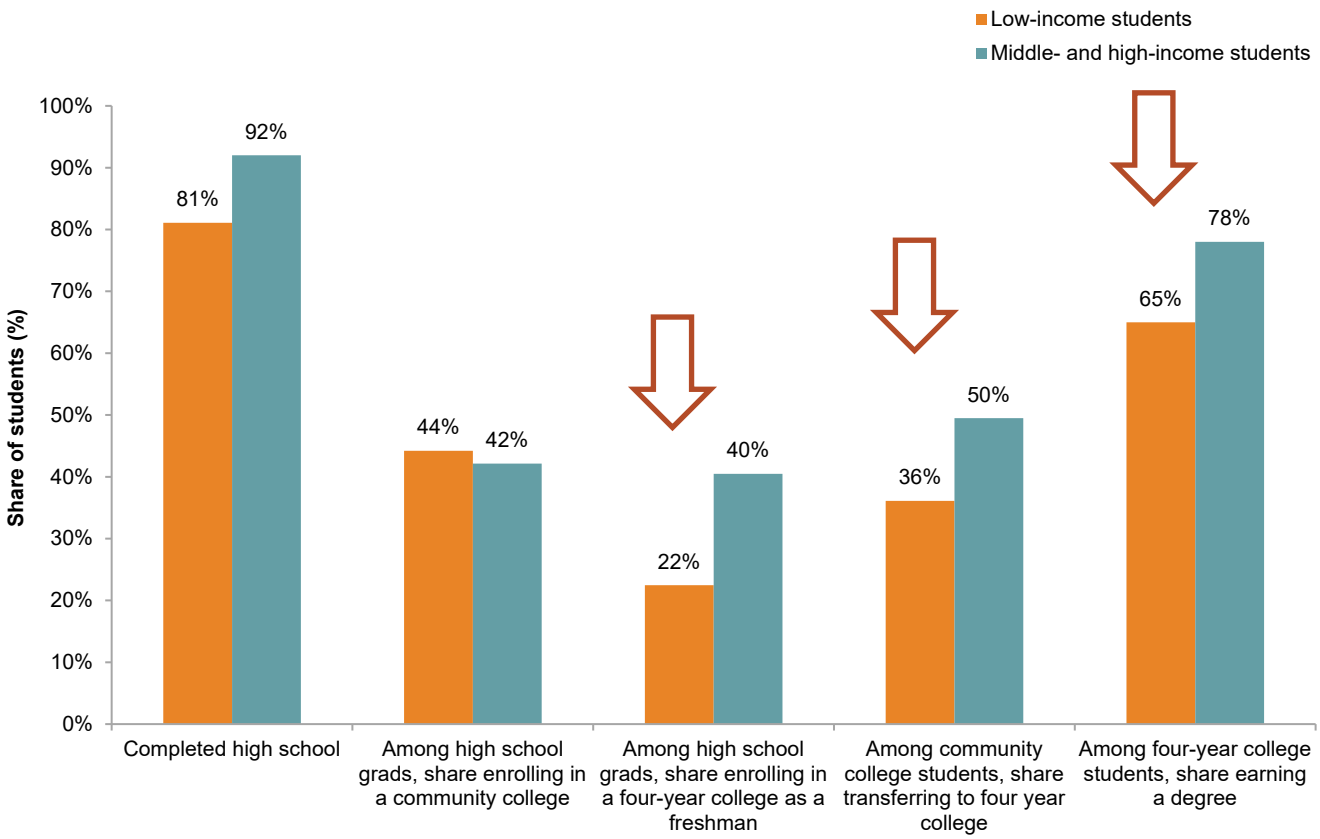
- Transitioning from high school to a four-year college
- Transferring from community college to a four-year college
- Moving from enrollment to completion at a four-year college

[9] Schools with high concentrations of poverty are those where 90 percent or more of students are defined by the California Department of Education as "socioeconomically disadvantaged." Based on authors' analyses of CDE data files of five-year high school cohort students.

[10] Overall, the average nonwhite district in California (educating more than 75% nonwhite students) receives $2,390 less per student than the average white district, and the average poor nonwhite district receives $3,974 less per student than the average poor white district (EdBuild 2019).

Two of the three difficult points involve the transition to a four-year college (either as a freshman or a transfer student). Transitions to four-year colleges are confusing and not well aligned across systems. The vast majority of low-income, Latino, and African American students who complete high school never attend a four-year college.

FIGURE 6
Largest gaps (and opportunities for improvement) occur at three key transitions



SOURCE: Author calculations based on current rates of transition per CDE, CCCCO, UCOP, CSU, IPEDS.
NOTE: See Technical Appendix A for methods.

Transitioning from high school to a four-year college

The transition from high school to a four-year college is replete with requirements, processes, and costs. In California, high school students planning on attending one of the state's public universities must complete the college preparatory courses known as the A–G requirements.[11] Completion of these courses is uneven (Figure 7), and drives much of the disparity in the transition from high school to a four-year college. A–G completion has been improving in recent years, but equity gaps persist.

At least partly because of structural factors (e.g., availability of course sections and qualified teachers), low-income, Latino, and African American students are much less likely to complete the A–G courses than other students. The vast majority of Latino and African American high school graduates are from low-income families

[11] The "A–G" courses include approved college preparatory courses in history (2 years), English (4 years), math (3 years), science (2 years), foreign language (2 years), visual and performing arts (1 year), and a college preparatory elective (1 year).

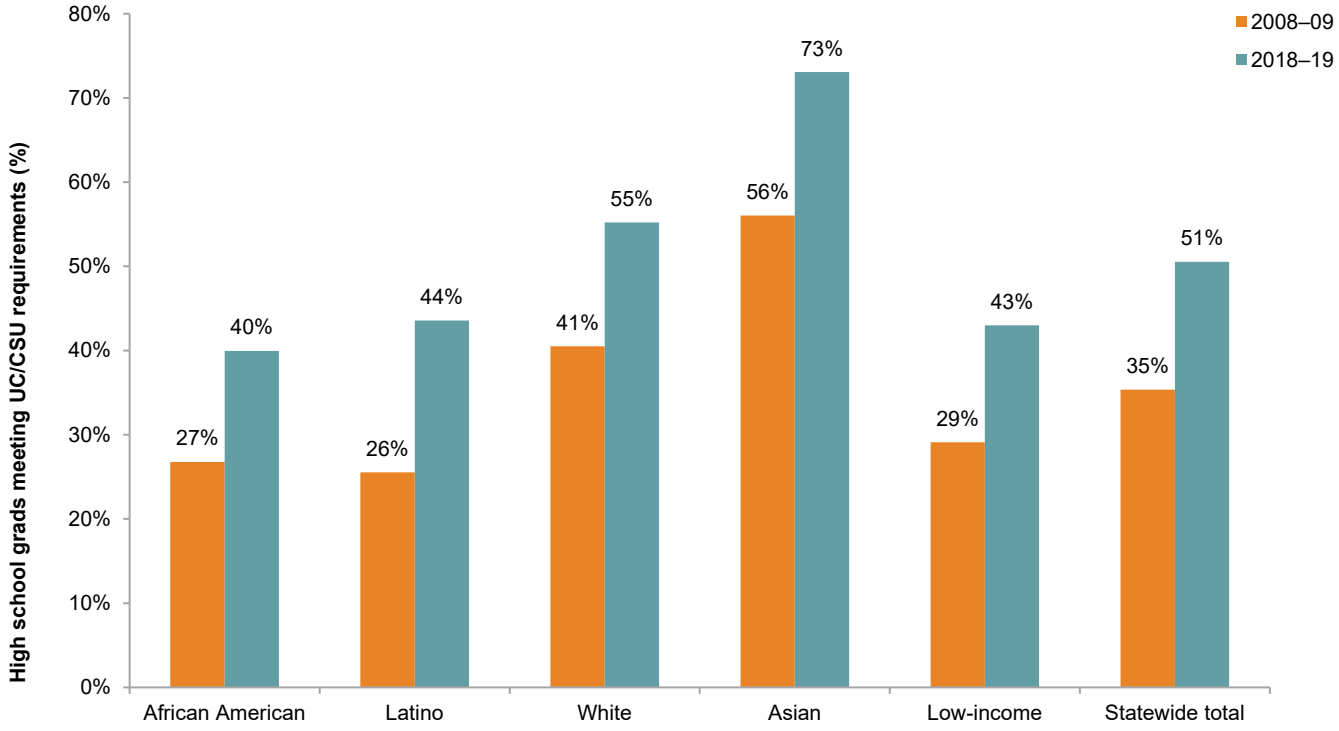
(86% and 79%, respectively), whereas about half of Asian graduates and one-third of white graduates are from low-income families.

Among students who complete the A–G requirement, enrollment in four-year colleges is relatively high, but gaps by income and race/ethnicity persist. Almost half (49%) of low-income students who complete the A–G requirement do not enroll in a four-year college, compared to slightly more than one-third (36%) of higher-income students. Similarly, Latino and African American students who complete the A–G courses are less likely to attend a four-year college than Asian and white students.

Why do students who have completed the A–G courses not enroll in a four-year college? Some do not have adequate high school grades (and therefore are not eligible for UC or CSU), some need more support in navigating the application process (including financial aid forms), many cannot afford the cost (or do not want to take out loans), and thousands are turned away from their campuses of choice because there is not sufficient capacity.

FIGURE 7

College preparation among high school graduates has improved, but equity gaps remain



SOURCE: Author calculations based on California Department of Education data.

NOTES: Some of the increase may be due to changes in CDE definitions. The 2018–19 data is based on following a cohort of 9th graders for four years, while the 2008–09 data is based on a single year (grade 12 to graduation). In 2016–17, when both measures were available, the share meeting UC and CSU requirements was 3 percentage points higher under the newer approach. Low-income includes students eligible for free and reduced price lunch or whose parents did not graduate from high school.

The capacity issue is especially troubling. Thousands of students who have done everything that was asked of them to qualify for one of the state's two public university systems cannot enroll in their first-choice campuses and programs because of limited capacity (Cook and Mehlotra 2020). Many of those students are able attend another four-year college, but some go to a community college and a small proportion do not attend college at all.

Six of CSU's 23 campuses are fully "impacted," meaning that there are more applications from qualified applicants than there are available spaces, and 8 of UC's 9 undergraduate campuses are unable to accommodate all qualified applicants. From fall 2015 through fall 2019, about 81,000 qualified CSU freshmen applicants were turned away because of capacity constraints.[12] In fall 2019, CSU began to redirect the vast majority of qualified-but-denied students to a campus that have spaces for them, but very few redirected students (4% out of about 20,000) enrolled in those campuses. Among qualified applicants to CSU, whites and African Americans were slightly more likely to be denied or redirected (12.9% and 12.2%, respectively), compared to 10.6 percent of qualified Latino applicants and 9.9 percent of qualified Asian applicants.

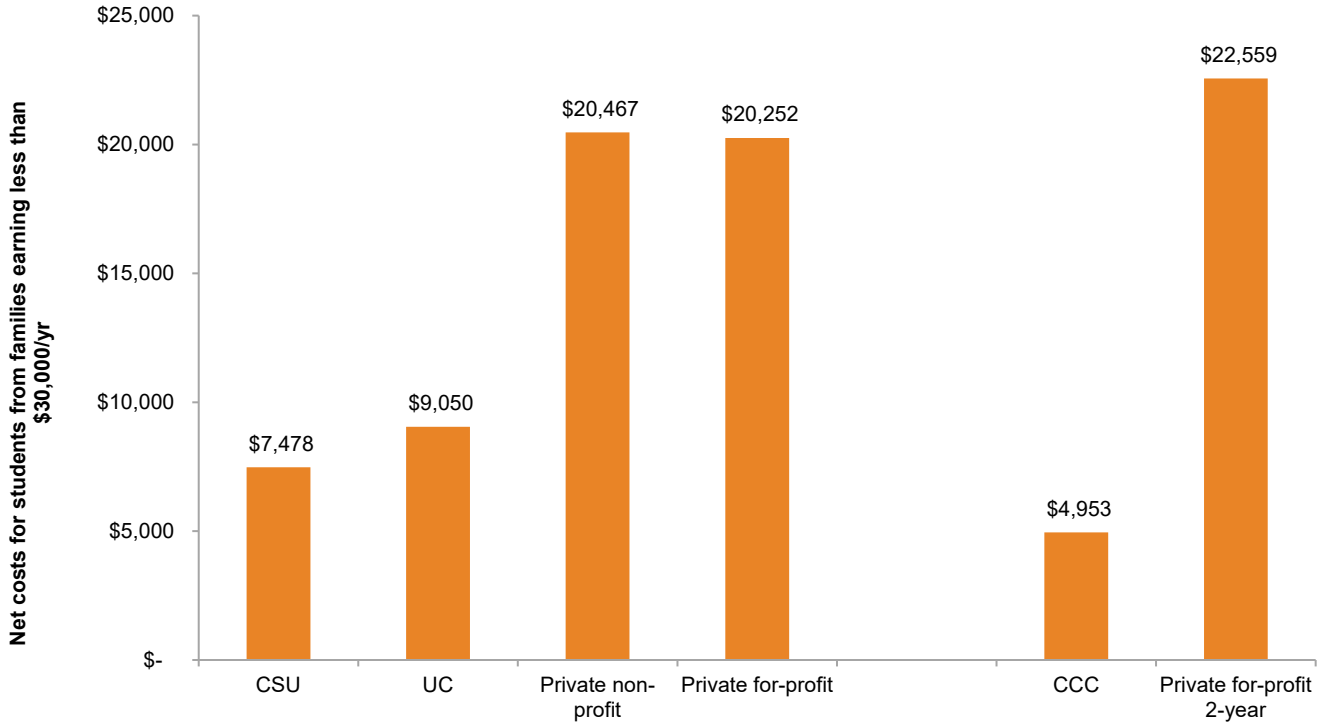
UC has long had a process for referring qualified students to campuses with open slots. Currently, only one campus (UC Merced) accepts referred students. In fall 2009 and 2010 (the latest available data), more than 23,000 qualified UC applicants were redirected from their campus of choice to UC Merced, and only 2 percent of those students enrolled.[13]

Financial barriers are also significant. Even though California has a relatively generous state grant program (Cal Grants) and the UC and CSU systems offer grant aid as well, the net cost of attending a four-year college is still burdensome. Community colleges are arguably the least expensive option, partly because most students are able to live at home and save on room and board. Even so, many community college students still contribute to room and board, and it may take them more years to complete college. Although public colleges are much more affordable—on average—than most private nonprofits, the average annual net price is still quite high relative to family income (Figure 8). For example, for students from the lowest income group (family income of less than $30,000), net costs of attending college range from about $5,000 per year at the state's community colleges to over $20,000 at private colleges. For families at this very low income level, even $5,000 is extremely burdensome, and issues around food and housing insecurity have become prominent at the state's public colleges and universities.

[12] An additional 41,000 qualified transfer applicants were denied over this same time period.
[13] The race and ethnic distribution of these referral pool students is not available.

FIGURE 8

The cost of attending college is burdensome for low-income students



SOURCE: PPIC, based on IPEDS data for the 2017–18 academic year.

NOTES: Net cost is the difference between total cost and grant aid. Total costs include tuition, room and board, and other expenses associated with attending college.

Transferring from community college to a four-year college

California's community colleges are a bright spot in terms of access, enrolling large numbers of students who are underrepresented among college graduates. However, the majority of students who enter community college with the goal of transferring to a four-year college never do so. While about 80 percent of students from each race/ethnic group enter community college with the intent to transfer, there are large equity gaps in transfer rates.[14] Only about one-third of low-income students successfully transfer, compared to half of higher-income students. Asians are the most likely to transfer (50%) and Latinos the least likely (30%).

One of the obstacles for many students has been developmental (remedial) course requirements. Recent reforms (see Johnson and Cuellar Mejia 2020) hold a lot of promise for lowering this barrier and thereby improving the transfer pathway. Because low-income, Latino, and African American students are well-represented at the community colleges, improving transfer rates would go a long way toward addressing equity gaps in four-year college enrollment. However, there are other formidable barriers, including the difficulty of navigating lower-division course requirements that vary across four-year colleges and intended majors.

Moving from enrollment to completion at a four-year college

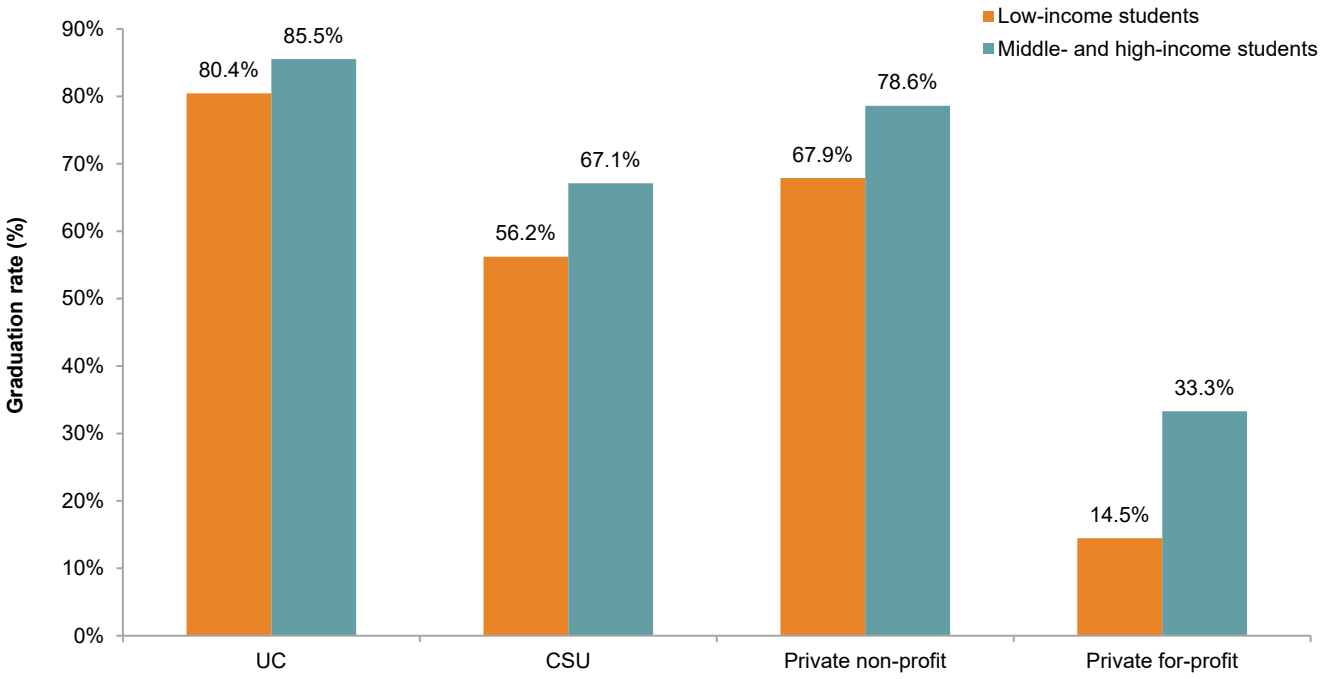
Substantial numbers of students make it to four-year colleges but do not graduate. Rates vary widely by type of institution (Figure 9), but the differences between low-income and higher-income students are not nearly as stark

[14] Upon entering community colleges, students are asked what their goals are (e.g., transfer to a four-year college, vocational certificate, associate degree). See Johnson and Cuellar, "Increasing Community College Transfers: Progress and Barriers" (PPIC, 2020).

as for other milestones on the pathway to college completion. Graduation rate gaps have narrowed somewhat over the past ten years, with the largest gains in graduation rates occurring among Latino and African American students. Moreover, transfer students to UC and CSU have very high graduation rates, with very little difference between low-income and higher-income students.

FIGURE 9

Low-income students have lower graduation rates



SOURCE: IPEDS 2016–17.

NOTES: Based on the share of first-time freshmen who graduate within six years at four-year colleges. Low-income students are those who receive Pell grants. See Technical Appendix A for details.

To some extent, the racial/ethnic gaps we observe reflect differences in income. At UC, six-year graduation rates for the 2013 entering cohort of California residents range from just under 80 percent among Latino and African American students to 90 percent among Asian/Pacific Islander students. At CSU, six-year graduation rates range from 48 percent among African American students to 57 percent among Latino students to about 70 percent among Asian/Pacific Islander and white students (Figure 10).

FIGURE 10A

Graduation rates are high at UC for all racial/ethnic groups

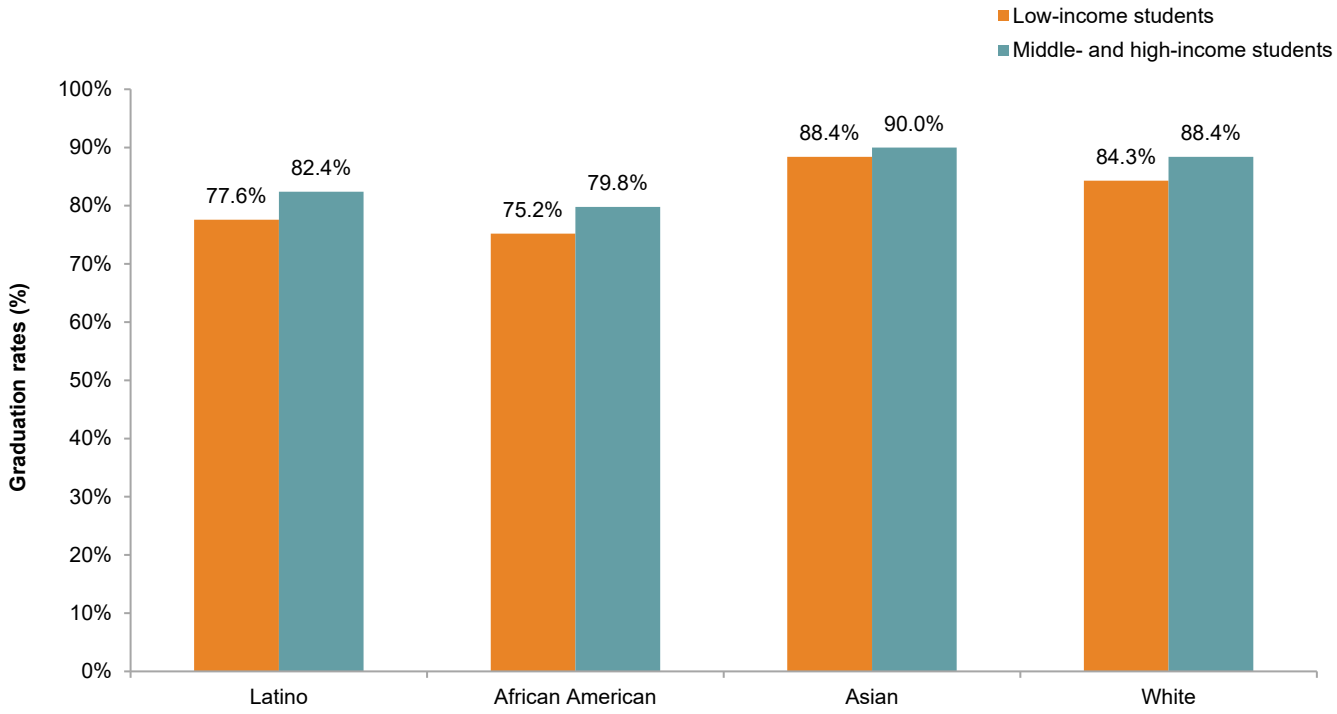
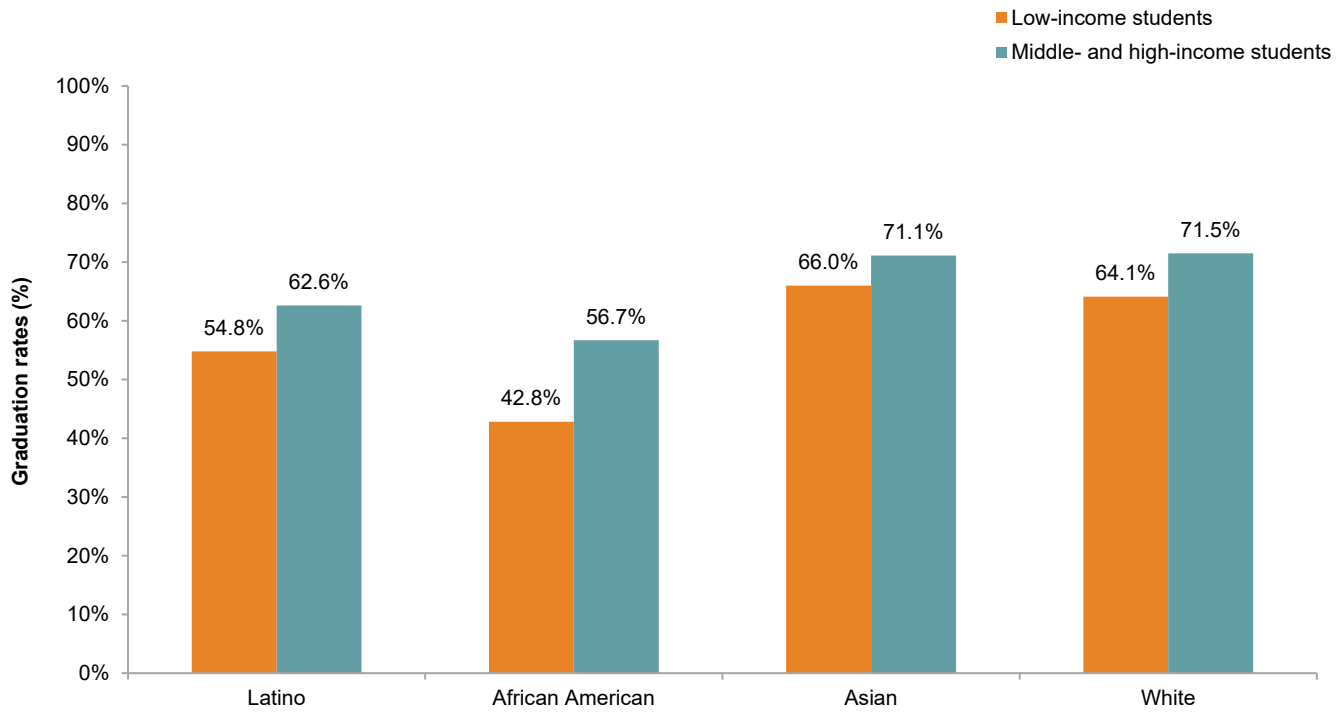


FIGURE 10B

CSU graduation rates vary widely across racial/ethnic groups



SOURCES: University of California Information Center Undergraduate Graduation Rates; California State University Graduation Dashboard.

NOTES: Based on the share of first-time freshmen who graduated within six years among the fall 2013 cohort. Low-income students are those who receive Pell grants. "Asian" includes Pacific Islanders. See Technical Appendix A for details.

Students do not finish college for a number of reasons, including academic problems, financial difficulty, and institutional barriers. For many students, financial costs of attending college are overwhelming (see text box). Difficulty in finding available courses can also be a challenge, especially for students who work or have family responsibilities. Finally, a lack of student support—both academic and to promote a sense of belonging—can lead to dropping out.

Student debt is more prevalent among low-income Californians

In general, the benefits of college overwhelm the costs. Even college graduates in the least remunerative majors enjoy lifetime earnings that are many times higher than the costs of attending college (Johnson et al. 2018). As college costs have risen, however, student debt levels have increased.

Partly because of state and institutional grant aid, California students are less likely to take on debt than students in the rest of the country. The majority (58%) of bachelor's degree graduates at the state's public universities graduate with no federal loan debt (the primary form of debt), and the average cumulative debt for those who take out federal loans is less than $20,000. Even so, students from low-income groups are more likely to take on debt.

Taking on debt can limit future economic mobility. Repayment of student debt lowers the amount of income for other purposes, including wealth-building investments such as retirement savings or home ownership. Some low-income students might decide not to attend college at all in order to avoid debt. In contrast, students from advantaged economic backgrounds are generally able to graduate from college with no or little debt (TICAS 2019).

Students who have made it to four-year colleges have succeeded academically and jumped through a lot of hoops; finding ways to help them graduate is essential to closing educational attainment gaps. It is also important to look at gaps in the economic benefits of college completion.

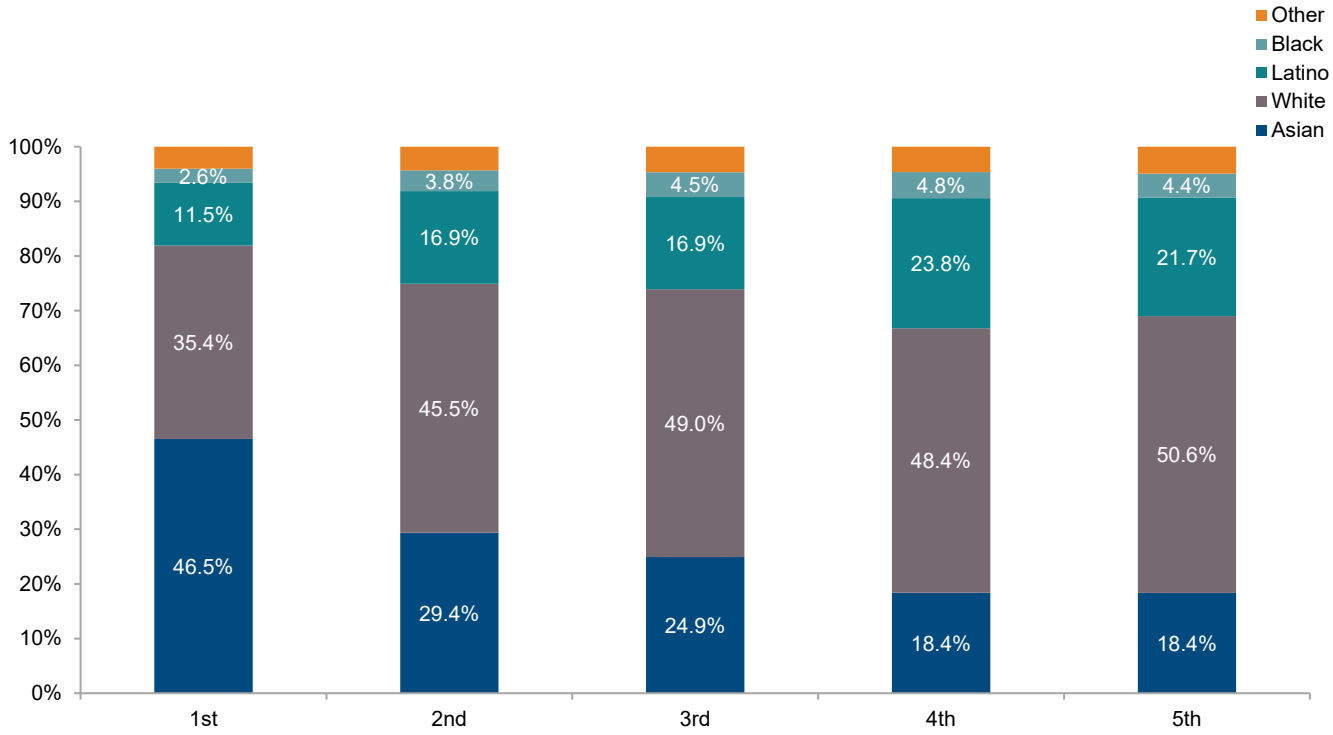
Labor Market Returns for a College Degree Are Lower for Underrepresented Student Groups

The underrepresentation of low-income, African American, and Latino students in the most remunerative majors and at highly selective colleges means that economic rewards of a college degree are not as great as they might otherwise be for underrepresented students. This limits, but does not erase, the economic mobility associated with graduating from college.

Among young adults in California (ages 25 to 34), Asian college graduates are more likely to hold degrees in the most remunerative majors (Figure 11). In contrast, Latinos, whites, and African Americans are more likely to major in fields with lower economic returns.

FIGURE 11

Asian American college graduates are more likely to hold degrees in majors with the highest economic returns



SOURCE: PPIC based on 2014–18 ACS for Californians aged 25–34 with a bachelor's degree.

NOTE: Based on median earnings for 118 majors. Majors are sorted into quintiles based on median earnings for full-time year-round workers.

Asian Americans make up more than half of graduates in the top three majors in terms of earnings: computer engineering ($92,200 median wage), electrical engineering ($91,000), and computer science ($84,700). At some universities, these highly remunerative majors are the most difficult to get into, with student demand exceeding supply.

Access to high-demand majors

The economic returns of a college education vary by field of study. Currently, access to highly remunerative majors, such as computer science and engineering, among low-income and underrepresented students, is limited not only due to admission caps but also to insufficient transparency on admission criteria. This lack of transparency has a significant impact on low-income high-achievers, who make different educational decisions based on the information available to them (Hoxby and Turner 2013).

While the level of selectivity ranges across campuses, almost all engineering and computer science departments stress the need for strong academic backgrounds, above and beyond minimum admission requirements. In some cases, criteria and expectations are outlined clearly. For example, Fresno State discloses average GPA and SAT scores among its freshman class, as well as major-specific local applicant thresholds. For the most part, however, systematic information and data on admission criteria is not collected or is, at the very least, vague and incomplete.

Such information is especially important for these majors, considering their lack of capacity. Engineering and computer science are impacted (meaning they cannot accommodate student demand) at 50 percent and 41 percent of CSU campuses, respectively, and both are impacted at five or more of UC's nine campuses.

At the same time, disparities in admission within schools suggest that factors other than differential applicant preferences and informational gaps are contributing to gaps in enrollment and graduation. Admission statistics from Fresno State, CSU Long Beach, and CSU Los Angeles show that Latino and African American applicants are significantly less likely to be admitted to engineering and computer science programs than are white and Asian American applicants. Gaps in college preparation can partly explain these disparities. Schools with high concentrations of low-income and Latino and/or African American students offer disproportionately fewer advanced and college preparatory courses that would make their students more competitive (US GAO 2016, 2018).

Once underrepresented students are admitted, however, additional factors contribute to lower success rates. For example, taking more AP classes in high school and attending a college with an institutional focus on undergraduate education—as indicated by low undergraduate-to-graduate-student ratios and low research expenditures relative to total expenditures—are both associated with higher persistence rates among underrepresented students in STEM (Griffith 2010). Moreover, inefficient sorting (based on preparation) of STEM students across campuses and insufficient provision of information on student prospects explain why underrepresented students at highly ranked UC schools have lower persistence rates than their counterparts (Arcidiacono, Aucejo, and Hotz 2016).

As is the case with highly competitive majors, highly selective colleges provide the strongest labor market returns. These stronger returns are partly a reflection of the admissions criteria at these colleges: they tend to enroll students from high schools with rigorous courses who have high grade point averages and standardized test scores. But some research shows that low-income "high achievers" are often under-matched and enroll in less selective colleges (Hoxby and Avery 2013). Research by Opportunity Insights indicates that low-income students

at elite colleges are more likely to move to the top income quintile after college than students who attend less-selective colleges.[15]

By the Opportunity Insights measure, colleges that are most effective at promoting economic mobility are those that enroll large numbers of low-income students who go on to earn incomes in the top quintile once they leave college. In general, public universities are more likely to enroll more low-income students (those in families making less than $30,000 per year) than private universities: 22 percent of first-year students at UC and CSU are low income, compared to 13 percent at private universities.[16] Indeed, according to the Opportunity Insights measure, CSU and UC campuses are among the leading colleges in the nation in promoting economic mobility, with Cal State Los Angeles at the top of the rankings. California's most selective private colleges admit very few low-income students. At Stanford University, for example, only 5 percent of first-year students are from the lowest-income families, and at many elite colleges—including Stanford, Cal Tech, and the Claremont colleges—students from the top 1 percent of family income are more numerous than students from the bottom 20 percent.

There is wide variation across public colleges. At the University of California, Berkeley, just 10 percent of first-year students are from the lowest-income families—but 36 percent of first-year students at UC Merced, the least-selective UC campus, are from the lowest-income families.[17] There is also significant variation in the CSU system: at two of the largest campuses, Cal State Los Angeles and Cal State Northridge, more than 40 percent of first-year students are from the lowest-income families, compared to only 7 percent at Cal Poly San Luis Obispo, the state's most selective CSU campus. Patterns are similar but less extreme for other underrepresented groups—including Latinos, African Americans, and first-generation students—with lower shares at the state's most selective colleges.

To fully realize the potential of higher education in promoting economic mobility, these gaps must be addressed. Some of these differences emerge well before college. For example, college readiness among high school graduates varies along many of the same dimensions noted here. Similarly, some of the largest equity gaps in STEM pathways emerge in high school (or earlier). College recruitment practices, admissions policies, and retention efforts also play a role.

Improvements in Access and Completion Are Possible

The pandemic and its economic impact have highlighted inequities in our society: low-income and less-educated workers are bearing the brunt of both the virus and the downturn. Now more than ever, policymakers and higher education leaders must find avenues for low-income and underrepresented students to access the benefits of a college degree.

California has a multitude of programs that boost student access to and success in college. Even so, too few low-income, Latino, and African American students are a part of the higher education success story. Identifying and removing structural barriers is key. Programs designed to improve access and outcomes need to be properly

[15] Similarly, Dale and Krueger find that "the payoff to attending an elite college appears to be greater for students from more disadvantaged family backgrounds." See Dale and Krueger, "Estimating the Payoff to Attending a More Selective College: An Application of Selection on Observables and Unobservables" (*The Quarterly Journal of Economics* 2002).

[16] According to data from the IPEDS for full-time first-time freshmen in fall 2017.

[17] Selectivity is based on admission rate. High school GPA and standardized test scores of admitted applicants show the same pattern of selectivity across campuses, with UC Merced students having lower GPAs and test scores than students at other campuses.

evaluated and expanded if working. Barriers to access must be evaluated and reconsidered if they have discriminatory effects.

We have looked at four critical areas in which large racial/ethnic and income disparities lead to gaps in college completion and concomitant economic gains: direct enrollment in four-year colleges from high school, transfer from community college to four-year colleges, persistence and completion at four-year colleges, and enrollment in highly selective colleges and majors.

Eliminating disparities in direct access to four-year colleges would do the most to narrow gaps in completion. One key starting point is to reimagine the college admission process to make it aggressively inclusive of low-income and underrepresented students. At the time of this writing, Californians were poised to vote on Proposition 16. If it passes, the proposition will rescind a ban (enacted 24 years ago by Proposition 209) on the consideration of race and ethnicity as a factor in admissions at UC and CSU. Passage could lead to a reinstatement of affirmative action and an increase in the number of underrepresented students (primarily Latino and African American, but also Native American and Pacific Islander), especially at UC. If the proposition does not pass, UC and CSU will need to find other ways to fully reflect the diversity of the state's population. One way to do so would be to ensure that more low-income students are admitted and able to attend four-year colleges directly out of high school. An immediate step would be to place more emphasis in the admissions process on disadvantaged economic backgrounds. Currently, UC folds family income into 1 of its 14 admissions criteria.[18] Instead, low-income status should be identified as a separate criteria and admissions officers instructed to elevate its importance. Both UC and CSU should report more clearly how low-income status is prioritized in admission decisions.

Another approach would be for UC and CSU (with prodding and support from the state) to offer admission to all low-income high school seniors who meet minimum eligibility criteria. This could be seen as a variation of UC's local guarantee program (known as the Eligibility in the Local Context—or ELC—program), which guarantees admission to a UC campus to students in the top 9 percent of their high school graduating class.[19] In this version, all UC and CSU eligible low-income high school seniors would be offered admission based on their high school courses and grades (even before completing an application). A similar strategy has been implemented in Idaho, in an effort (reportedly successful) to increase that state's very low college-going rates. Idaho now offers direct admission to any high school senior who meets certain thresholds for grade point averages and test scores to its public colleges.[20] California's version of direct admission would focus on low-income students. Because the vast majority of low-income students in California are from groups underrepresented in higher education, this approach would also lead to greater racial and ethnic diversity at UC and CSU.[21] It would require development of a robust data system that would allow UC and CSU to identify students (by fall of their senior year) who are candidates for the program.

To increase transfers, it is important to build on the success of the Associate Degree for Transfer (ADT) program, which allows students to earn an associate degree in two years at a community college and then enter the CSU system as juniors if they meet academic and course requirements for the majors they want to pursue. One way to

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[18] Specifically, the 13th criteria is: "Academic accomplishments in light of your life experiences and special circumstances, including but not limited to: disabilities, low family income, first generation to attend college, need to work, disadvantaged social or educational environment, difficult personal and family situations or circumstances, refugee status or veteran status."

[19] For a UCOP evaluation of the ELC program, see Zachary Bleemer, "What Is the Value of a UC Degree for On-the-Fence Students? An Evaluation of the 2001–2011 UC Eligibility in the Local Context Program." For a more general analysis of admissions-based approaches in California, Florida, and Texas, see Catherine L. Horn and Stella M. Flores, "Percent Plans in College Admissions: A Comparative Analysis of Three States' Experiences" (Civil Rights Project at Harvard University, 2003).

[20] See Charlotte West, "Congratulations! You Got into College Without Even Trying!" *Washington Post,* March 14, 2020.

[21] According to the California Department of Education, 75 percent of "socioeconomically disadvantaged" high school graduates in 2016–17 who had completed the college preparatory courses required by UC and CSU were from underrepresented groups (68% were Latino, 6% were African American, and fewer than 1 percent were Native American or Pacific Islander).

do so would be to offer admission to UC and CSU with the stipulation that students complete their first two years at a community college. Rather than being admitted to a CSU campus at the end of the ADT process, students would be admitted when they start at a community college, pending the completion of the requirements of the ADT. Expanding the ADT to include more majors (especially engineering) and more campuses (UC currently does not participate), and unifying the course requirements across campuses, would also help make the program more attractive and effective. In order to maximize educational mobility, it would be important to limit the program's focus to students who are not UC- or CSU-eligible when they finish high school.

Colleges and universities must expand and improve outreach programs. For example, many of UC's SAPEP (Student Academic Preparation and Educational Partnerships) programs show promise, but they are relatively small and serve relatively few students in the face of massive need. Dual enrollment programs and early college high schools (in which students take community college courses while enrolled in high school) can help make up for insufficient course offerings at high schools and provide students with a head start in college (Fink at al. 2017; Atchison et al. 2019).

To lower the cost barriers to attending college, the state and federal government should provide more financial aid for low-income students at four-year and community colleges, including support for living costs. Implementing a funding formula that provides additional funding to colleges that enroll low-income students would help incentive those campuses to reprioritize their admission decisions (and provide financial support for low-income students). Tying additional funding explicitly to additional enrollment in order to increase the number of students admitted by UC and CSU would lead to a more diverse student body. The goal should be to ensure that low-income students are able to graduate from college with very little or no debt.

These and other policies and programs should be part of a new "master plan" that improves the odds that underrepresented students complete college and participate fully in the promise of economic mobility made possible through higher education. PPIC has long argued that the Master Plan for Higher Education (1960) needs to be updated for the 21st century to expand access to the state's public universities and improve the pathway from community college to four-year colleges.

The onset of the pandemic-induced recession may require creative strategies, but this is a critical time to safeguard access to higher education. Higher education can serve as an economic engine for the state as a whole and for individual Californians, but only if it is affordable and accessible.

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