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IRPE Research Brief

Predicting Graduation for First-Time Full-Time Freshmen at CSU Channel Islands

Kristin Jordan (IRPE & Sociology) & Jared Barton (Economics)

Fast Fact #1: Achievement gaps in graduation rates across race/ethnicity (URM vs. non-URM) and income (Pell recipient vs. not Pell eligible) are reduced by approximately half when controlling for other student characteristics at admissions, including college preparation.

Fast Fact #2: The gap between first generation students and students whose parents are college graduates is not significant after adding controls.

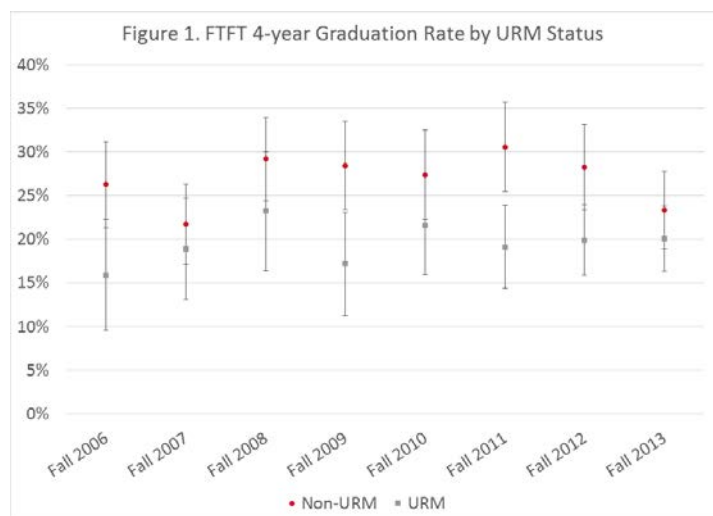
Executive Summary

We examine predictors of graduation among first-time, full-time (FTFT) freshman students admitted to CSUCI between 2006 and 2013 using logistic regression on data available at admission, with a focus on achievement gaps by race/ethnicity, income, and parents' education. FTFT freshman achievement gaps are sizable, but adding additional controls—all three characteristics together, preparedness measures (SAT/ACT scores and high school GPA), and other factors—diminishes the size of all three gaps by 40 percent or more. The gap between underrepresented minority (URM) students and non-URM students is halved after adding controls, but remains significant. The gap between URM and non-URM students is complicated by the intersection of race/ethnicity with income and parents' education as well as differences in college preparation. The gap between first generation students (parents with a high school degree or less) and the children of college graduates is no longer significant after adding controls. The income gap (between Pell recipients and Pell ineligible students) is roughly halved, but remains the most intact.

Introduction

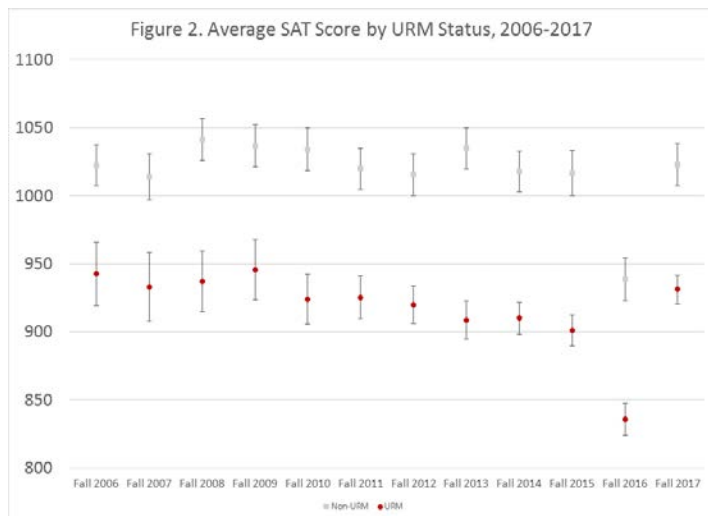
CSUCI has a dual mandate to raise graduation rates and remove differences in graduation rates between students of different racial/ethnic, income, and parental education backgrounds.¹ We have not, however, examined the predictors of success within our own student population to date, nor decomposed these gaps into explained (e.g., preparedness) and unexplained factors.

For example, for cohorts admitted between 2006 and 2013, FTFT URM freshmen are 7 percentage points less likely to graduate in four years than their non-URM peers (Figure 1).² URM and non-URM students differ in Pell and first-generation status—URM students are both more likely to be Pell recipients and first-generation college students. Looking at any one gap in isolation “double counts” these other gaps.



¹ Technically, the mandate only applies to the first two of these groups, but we also examine the third given the large concentration of first-generation students at CI and its relationship with race/ethnicity and income.

² Figure 1 shows the average 4-year graduation rate by URM status for the cohorts that started from Fall 2006 through Fall 2013, with 95-percent confidence interval. The average gap is 7 percent, though it varies considerably by year.



Additionally, part of the gap is explained by different levels of preparedness or ability at the time of admission: URM and non-URM freshmen have similar high school GPAs, but dramatically different SAT/ACT scores (Figure 2). Thus, part of the 7 percentage point difference is due to other achievement gap factors (income and family education), another part to preparedness at admission, and a final part to issues captured specifically by URM status. As we would not expect two non-URM, non-Pell receiving, non-first generation students with very different levels of preparedness to have the same graduation rate, we control for these factors to determine what fraction

of the “raw” gaps are not for reasons that we would reasonably expect to result in differences in student success.

Methodology

We examine predictors of graduation among first-time, full-time (FTFT) freshman students admitted to CSUCI between 2006 and 2013 using logistic regression on data available at admission. In particular, we focus on the three achievement gaps—under-represented minority (URM), low income (Pell recipient), and first generation college student—and demonstrate how estimates of these gaps change with the inclusion of standard predictors of student success from the literature on college success.

Specifically, we estimate eight models each for the three achievement gaps:

- Model 1. Graduation rate as a function of the characteristic (URM, Pell, or first-generation status)
- Model 2. Graduation rate as a function of all three characteristics (URM, Pell, *and* first-generation status)
- Model 3. Model 2 with high school GPA and standardized test score (SAT/ACT, on one scale)³
- Model 4. Model 2 with college readiness measures (English non-proficient, Math non-proficient, both, neither)
- Model 5. Model 2 with high school GPA, standardized test score, and college readiness measures
- Model 6. Model 3 with additional demographic and college preparatory controls⁴
- Model 7. Model 4 with additional demographic and college preparatory controls
- Model 8. Model 5 with additional demographic and college preparatory controls.

Results

We present the results for 4-year graduation rates in Figures 3 through 5.⁵ Each numbered bar corresponds to the size of the gap (with 95 percent confidence interval) for that group from the respective model mentioned above.

³ Specifically, we control both for whether the student turned in SAT or ACT scores, and then, for students with scores, the score itself.

⁴ We control for sex, veteran status, county of origin, whether the student is an immigrant, citizenship status, whether the student is part of the EOP program, the number of college preparatory courses by discipline, and whether the student’s major is undeclared on the application.

⁵ We estimate these same regressions for 5- and 6-year graduation rates, but only report the 4-year rates due to the loss of sample size, as the largest cohorts are also the most recent. These additional results are available upon request. To summarize: no gaps are statistically significant after the first bivariate regression, as the standard errors are quite large. Qualitatively, the pattern of results is similar to that presented in the 4-year graduation rates.

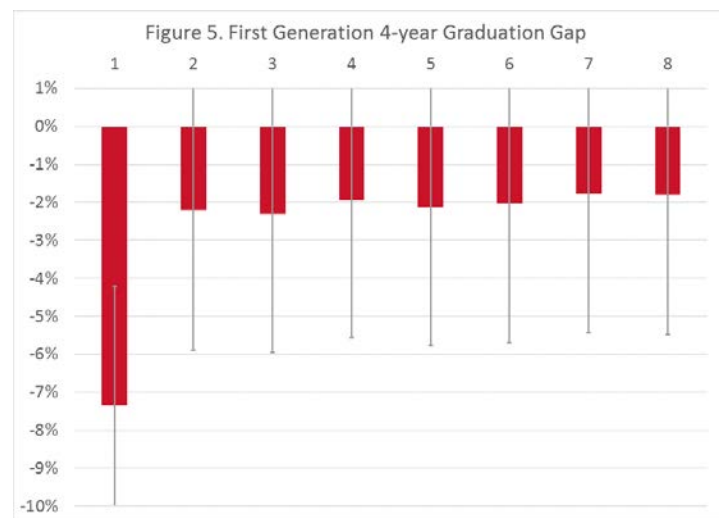
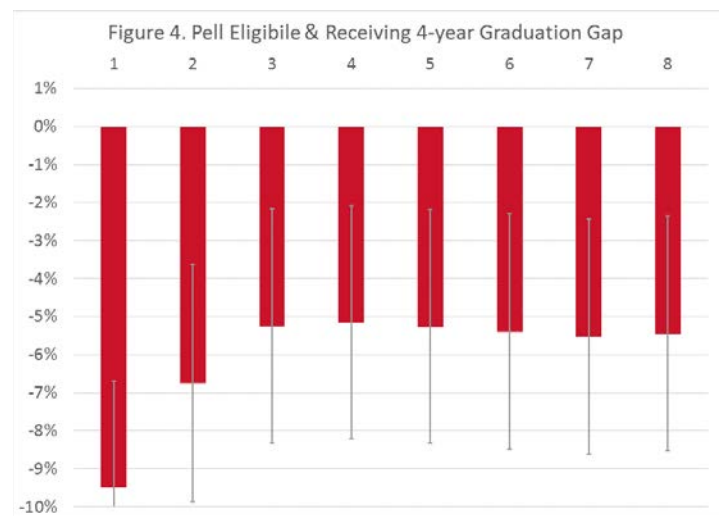
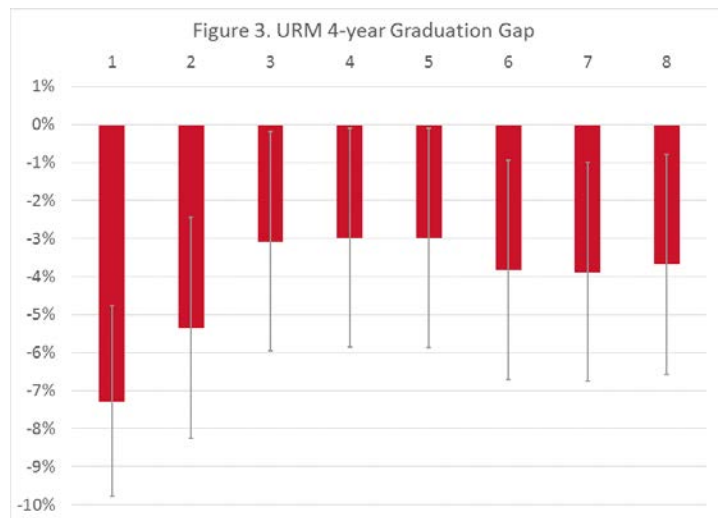
The first bars of each figure represent the “raw” achievement gaps for URM, Pell receiving, and first-generation students, respectively. URM students are roughly 7 percentage points less likely to graduate than non-URM students; Pell recipients are nearly 10 percentage points less likely to graduate than Pell ineligible students; and first-generation students are about 7 percentage points less likely to graduate than the children of college graduates.⁶ Given a base graduation rate of roughly 25 percent, these represent sizable differences in 4-year graduation across groups.

All gaps diminish when controlled for together (column 2 of each figure), as the three factors are all correlated. Most notably, merely controlling for all three of these characteristics together renders the first-generation gap (Figure 5) statistically insignificant.

One interpretation of this is that the first-generation gap is really a URM/Pell gap in disguise, and not directly related to first-generation status.

Columns 3 through 5 in all figures show the magnitude of the gaps when controlling for measures of preparedness or ability at arrival to CI. Both the URM and Pell gaps diminish (the URM gap more than the Pell gap) after controlling for high school GPA and standardized test scores or controlling for CSU college readiness designations. Controlling for the other gaps and preparedness reduces the URM gap by more than half (Figure 3), and decreases the Pell gap by 45 percent (Figure 4).

The final three columns of each figure add other controls available from admissions data to check the robustness of the above findings. Some characteristics that are positively related to graduation are also positively correlated with achievement gap characteristics (e.g., females are more likely to graduate, and are slightly more likely to be among each achievement gap group), which is why controlling for these factors increases the gap somewhat. However, our qualitative result remains:



⁶ The Pell gap is much larger in Figure 4 than the overall Pell gap of 2 percentage points reported on the CI 2025 page because most of our successful Pell students are transfer students. Pell recipients at community college who do not get to CI are not included in our calculations of success.

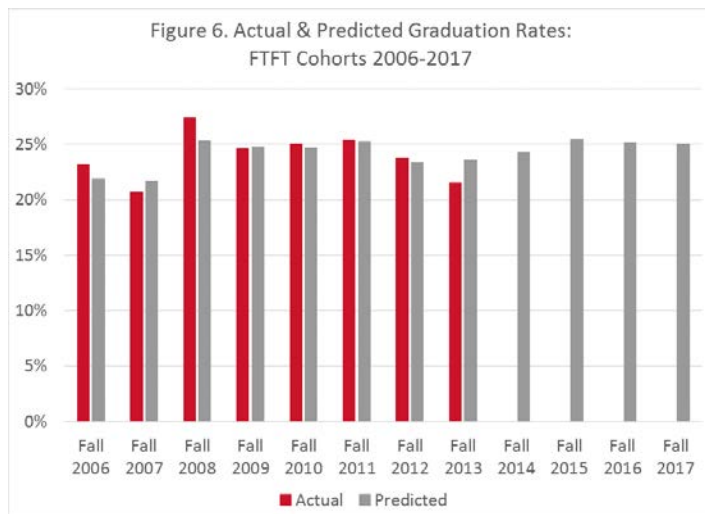
nearly all of the (statistically significant) first-generation gap, and much of the URM and Pell gap, are really preparedness and the correlation among the three gap characteristics.

Most importantly, contrary to the overall Pell gap of 2 percent reported on the CI 2025 webpage, the Pell gap among FTFT freshman is much larger—5 percentage points—and robust to the inclusion of controls. *Among our native students, Pell recipients are nearly a fifth less likely to graduate for reasons that are wholly unrelated to preparedness or ability measures.*

Other Uses

Estimating the likelihood of success conditional on student characteristics observable at admission (or during application) has several uses:

1. To understand which characteristics drive differences between groups of interest.
2. To forecast our own graduation rates for recently admitted cohorts.
3. To create synthetic control groups for past non-random interventions to measure efficacy.
4. To predict students who are particularly in need of intervention and identify those students early – possibly even before they begin their first semester at CI.



We demonstrate the first use above, and the second one here. We apply the estimated coefficients from our last model (regression 8 above) to the characteristics of cohorts that have yet to graduate, as well as those that have, and estimate the probability that each FTFT freshman graduates in four years. Figure 6 shows the result.

Our predicted rates are not far from the actual values. According to our model, we should expect roughly 25 percent of student to graduate in four years in each of our as-yet ungraduated cohorts.

Conclusion

This report examines 4-year graduation for FTFT freshman at CI. We find that there is not a statistically significant first-generation gap, and that the “raw” URM and Pell gaps significantly overstate the gap in graduation rates for these groups. In particular, it is the Pell gap that is least reduced by controls for preparedness and other factors. This is consistent with national data indicating that high ability, low income students are much less likely to graduate than moderate ability, high income peers. Our results suggest that, at the margin, we should put more focus on challenges specific to low income students, relative to URM or first-generation students (these factors are correlated, but not perfectly correlated).

Additionally, we use our model to forecast our graduation rates. Our recently admitted cohorts are not much more likely to graduate, nor much less likely to graduate, than past groups. Additional, evidence-based intervention is necessary to improve graduation rates for these cohorts in order to move us closer to the graduation initiative’s goals.