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The impact of Proposition 209 and access-oriented UC admissions policies on underrepresented UC applications, enrollment, and long-run student outcomes

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EXECUTIVE SUMMARY

Many universities implement admissions policies that target and broaden access for disadvantaged applicants in order to promote socioeconomic mobility and offset unequal K-12 educational opportunities. Twenty-five years ago, Proposition 209 mandated that the University of California end its use of race-based affirmative action, one such policy. Prop 209 led to admissions declines for applicants from underrepresented groups (URG) at every UC campus, especially Berkeley and UCLA.

This brief asks two questions. First, how have other UC admissions policies targeting disadvantaged students impacted URG and lower-income enrollment relative to the impact of affirmative action? Second, what are the long-run ramifications of UC enrollment for students impacted by these policies?

The brief analyzes two of UC's largest-scale 21st-century admissions policies: Eligibility in the Local Context (ELC) and holistic review. It uses rigorous statistical tools to isolate each policy's effects from the effects of UC's persistently-rising selectivity and of other admissions policies. It begins by showing that **Prop 209 caused a decline in systemwide URG enrollment by at least twelve percent**. Lower-income enrollment – among students from families below the state median income – also declined.

Between 2001 and 2011, ELC *de facto* guaranteed admission to most UC campuses for applicants with grades in the top four percent of their high school class. While ELC's impact on new applications appears small, **ELC increased UC's URG enrollment by about four percent until 2011, largely at San Diego, Davis, and Irvine. In recent years its impact has been far smaller, even at still-participating UC Merced**.

Holistic review has been adopted by six UC campuses. Though holistic review does not directly target URG applicants, URG applicants may nevertheless benefit from additional consideration of their limited prior opportunities and contextualized challenges. **Holistic review increases URG enrollment at each implementing campus by about seven percent**, though the aggregate UC effect is somewhat smaller.

The second question is answered by linking all 1996-1999 resident freshman UC applicants (two years before and after Prop 209 took effect) to UC grades, US degree attainment, and annual California wages 6-16 years after UC application. A comparison of URG and non-URG UC applicants with similar academic backgrounds shows that **Prop 209 led URG applicants to cascade out of UC into measurably less-advantageous universities**, **which combined with declines in degree attainment and STEM persistence to lower each URG applicant's wages by about five percent between ages 23 and 35**. Given UC's importance in California's labor market, **this caused a decline in the *total* number of high-earning (>$100,000) early-30s African American and Hispanic/Latinx Californians by at least three percent**. Prop 209 also caused an annual decline in the number of URG students who applied to UC by more than 1,000. It did not cause measurable changes in White or Asian applicants' average long-run outcomes.

This topic brief sheds light on two important lessons from Prop 209. **First, race-blind access-oriented admissions policies can significantly increase UC's URG population, but to a lesser extent than race-based affirmative action. Second, university admissions policies targeting disadvantaged applicants are highly effective, in the sense that their termination is very costly to their previous beneficiaries.**

HISTORY AND BACKGROUND

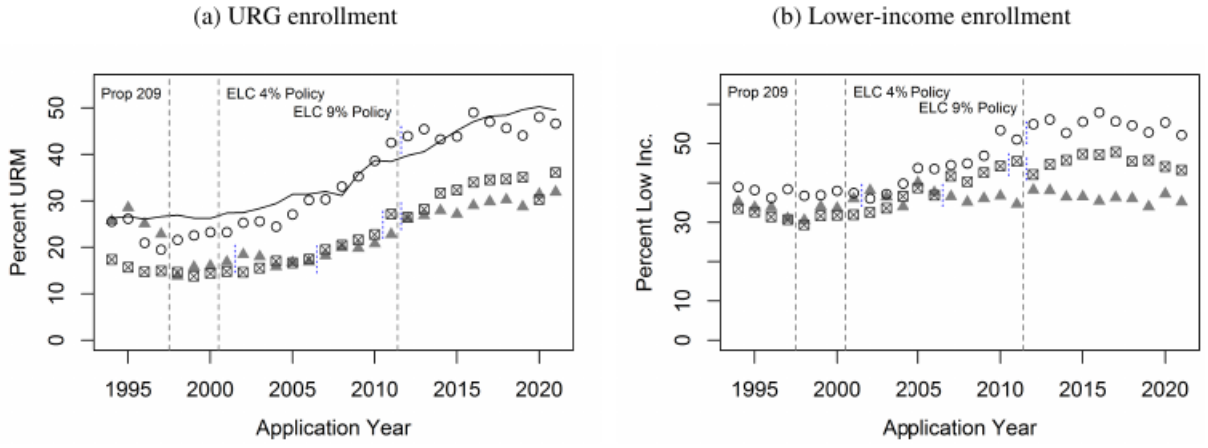
Race-based affirmative action began at UC in the mid-1960s, when UC Berkeley became the first UC campus to implement selective admissions – receiving more UC-eligible applications than available seats for the first time – and its Educational Opportunity Program began targeting underrepresented applicants. Increasing controversy around affirmative action came to a head in mid-1990s, when it was prohibited first by the UC Regents in July 1995 and then by a voter referendum in November 1996. While the original Regents policy was rescinded in 2001, Prop 209 has prohibited UC and other public institutions from "discriminat[ing] against, or grant[ing] preferential treatment to, any individual or group on the basis of race, sex, color, ethnicity, or national origin" – in admissions, financial aid provision, and other areas – since Fall 1998.

In the years following Prop 209, a number of admissions policies have been implemented with the intention of increasing UC's socioeconomic diversity and widening its pipeline to economic mobility.[2] While these policies do not explicitly aim to increase UC enrollment among underrepresented ethnic groups (URG, including Hispanic/Latinx, African American, and Native American students), at least two of them – the 2001-2011 Eligibility in the Local Context policy and holistic review – have had the partial consequence of substantially increasing UC URG enrollment. Other such policies, like 2012's "Entitled to Review", are presently omitted from this brief.

UC introduced the 2001 Eligibility in the Local Context policy as a partial affirmative action replacement. Modeled on a similar program operating at the University of Texas system, ELC guaranteed UC admission to the top 4 percent of students (ranked by second- and third-year grades) graduating most CA high schools each year. ELC-eligible students were informed of their ELC eligibility in the Fall of their senior year, and until 2011 most UC campuses generally *de facto* guaranteed admission to ELC-eligible applicants. Advocates for the ELC program argued that it would improve UC access for students at lower-performing and rural high schools, making them "locally-eligible" for UC admission despite their comparatively-low average SAT scores.

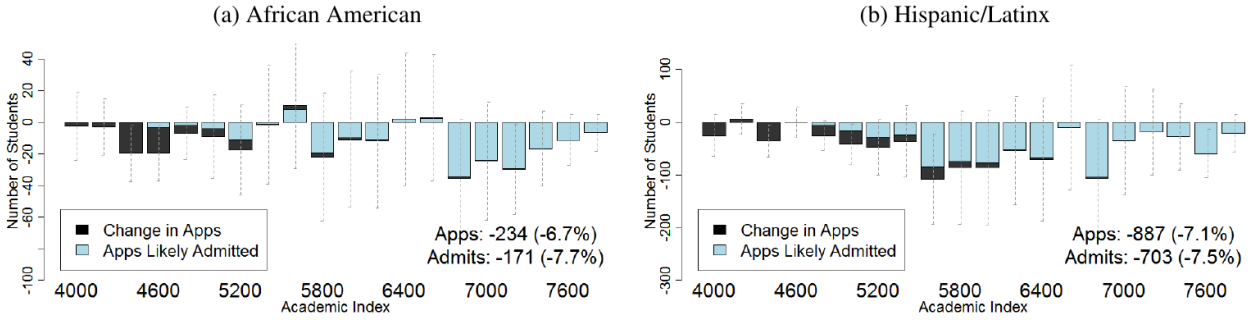
In 2002, all UC campuses switched their admissions process from a two-tiered system – in which at least half of students were admitted strictly on the basis of test scores and grades – to "Comprehensive Review", in which campuses "eva luate students' academic achievements in light of the opportunities available to them". UC Berkeley went a step further, implementing a novel "holistic review" policy in which evaluators "craft a single score for the applicant based upon a combination of the criteria" and "no single factor plays a deciding role in how an applicant is evaluated ".[3] By contextualizing applicants' strengths using their available opportunities and the challenges they'd faced, holistic review could change the ethnic composition of admitted students despite being

Figure 1: URG and lower-income enrollment at UC



Note: This figure shows the percent of annual percent of California-resident freshman fall students at the Berkeley and UCLA campuses (triangles); Davis, Irvine, San Diego, and Santa Barbara campuses (crossed squares); and Merced, Riverside, and Santa Cruz campuses (circles) who were URG or who were from lower-income families (with reported family incomes below the state median in that year), equally weighting each campus. The solid line on the left shows the annual percent of UC-eligible CA public high school graduates who were URG. See Technical Appendix for details.

Figure 2: The impact of Prop 209 on URG applications to UC



Note: Estimates of the change in the number of UC applicants and admits in '98-99 by ethnicity and 200-point Academic Index bin, relative to '94-95. Each black bar shows the change in number of applications in each bin; the blue vars show the proportion of those students likely to be admitted to at least one campus. The statistics in the bottom-right sum over the bars for each ethnicity. Dotted bars show 95-percent confidence intervals. See Technical Appendix for estimation details.

race-blind. UCLA implemented holistic review in 2007, with UCSD and Irvine joining in 2011 and Davis and UCSC in 2012.

This brief proceeds by estimating the degree to which each admissions policy – race-based affirmative action and the race-blind ELC and holistic review policies – promotes URG enrollment at the University of California. Figure 1 provides a summary of those effects, showing that Prop 209 was far more impactful on URG enrollment – especially at Berkeley and UCLA – than any other policy (and than any policy was in impacting lower-income enrollment). The brief then directly estimates how these policies impact the long-run livelihoods of targeted URG students. Each section describes the respective statistical techniques used to isolate the effects of the three analyzed admissions policies from the many other demographic trends and policy changes occurring throughout the period; additional statistical details are presented in the Technical and Results Appendices.

URG ENROLLMENT FROM AFFIRMATIVE ACTION

Prop 209 caused large immediate changes to URG UC applicants' likelihood of UC admission and enrollment. Each URG UC applicant became substantially less likely to earn admission at every UC campus in 1998, with average declines as high as 25 percent at UC Berkeley and down to 4 percent at UC Riverside, which admitted all UC-eligible applicants. In general, URG applicants became 8 percent less likely to earn admission at *any* UC campus after 1998.

As a result, URG applicants cascaded into less-selective universities that tended to lead their students to lower degree attainment and earnings (see the Results Appendix). In general, **every URG UC applicant was dramatically impacted by Prop 209, leading applicants across the Academic Index spectrum to enroll at less-selective schools**, with similar effects for African American and Hispanic/Latinx applicants**.** Figure 1 shows that net URG enrollment declined at Berkeley and UCLA but was relatively unchanged at the other campuses (which both gained and lost students following Prop 209), while lower-income enrollment slightly declined across the UC system.

Prop 209 also discouraged many highly-qualified URG students from applying to any UC campuses, likely because those students believed that they would be unlikely to earn admission to their preferred campus after the end of AA. Figure 2 presents estimates from statistical models measuring the change in the proportion of UC-eligible California high school graduates who applied to at least one UC campus by 200-point Academic Index bins. It shows that **more than 200 African American and 800 Hispanic/Latinx students – 7 percent of all URG applicants – were discouraged from applying in 1998**, relative to a '94-95 baseline. Most of these students would have been admitted to at least one UC campus, and many had sufficiently-high AI's to be admitted to *any* UC campus.

How many total URG students did not enroll at UC annually because of Prop 209? A simple estimate differences the proportion of first-year URG students at each UC campus before and after Prop 209, multiplied by average post-209 enrollment. Summed across campuses, this suggests that **at least 700 URG students per year exited UC as a result of Prop 209 in 1998-2000**, implying that **affirmative action increased the UC URG student population**

by at least 12 percent, with larger effects at Berkeley and UCLA. In fact, the true effect is likely slightly higher; an alternative estimation technique described in the Technical Appendix provides evidence favoring a 14 percent decline in UC's URG enrollment. Because URG UC students tend to have below-average family incomes, Prop 209 also led to a substantial shift toward higher-income UC student enrollment, especially at UC Berkeley and UCLA.

URG ENROLLMENT FROM ELIGIBILITY IN THE LOCAL CONTEXT

The 2001-2011 Eligibility in the Local Context (ELC) policy guaranteed admission to students who had high school GPAs in the top 4% of their class. It was expected to increase disadvantaged students' UC enrollment in two ways: (1) by encouraging new applications, and (2) by guaranteeing admission to applicants who would otherwise be rejected by many campuses. This brief considers each channel in turn.

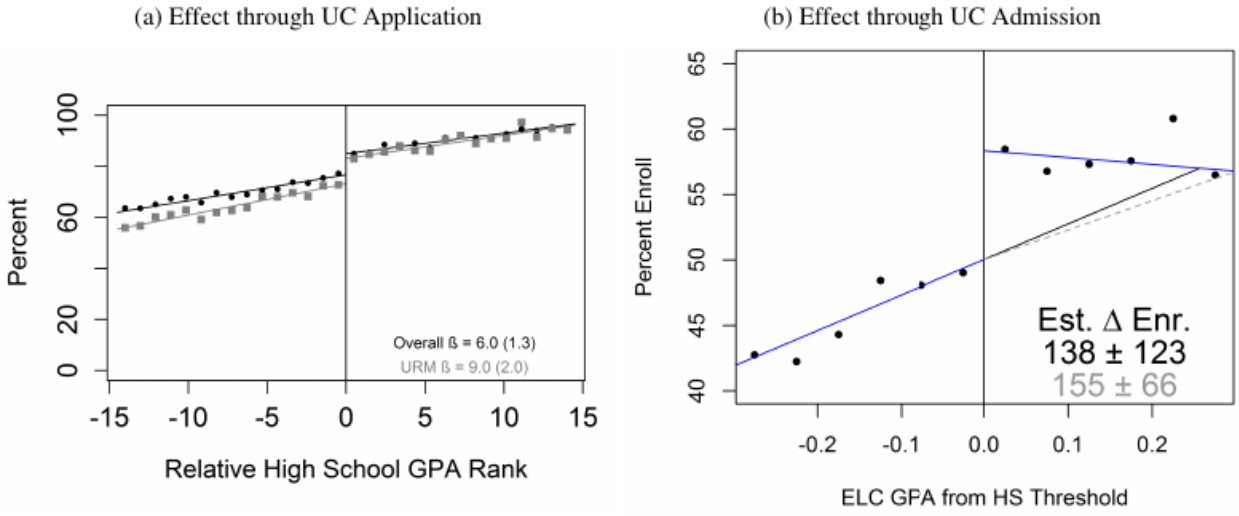
First, consider Panel (a) of Figure 3. This shows the percent of students who apply to a UC campus by how close they were to their high school's ELC eligibility threshold, where above-threshold students were all ELC-eligible. It shows that URG students just above the eligibility threshold were about 9 percentage points more likely to apply to UC than just below-threshold URG students. Assuming that this increase is constant for above-threshold students, this implies that these new applications increased UC enrollment by about 170 URG students per year.

To estimate how many URG students enrolled at UC because of ELC *but would not have done so without the program*, this brief takes the strategy of tracking what proportion of ELC-ineligible students *below* each high school's fourth percentile threshold enrolled at UC and using that to predict what proportion of students *above* the threshold would have enrolled if ELC hadn't guaranteed their admission.

Take a look at the panel. The black dot just below the threshold, for example, shows that about 47 percent of ELC-*ineligible* URG applicants with GPAs just below their high school's threshold enrolled at UC, while about 56 percent of barely-*eligible* URG applicants enrolled at UC. This suggests that URG UC applicants very near their high school's ELC threshold became about 9 percent more likely to enroll at UC if they were ELC-eligible.

The thin blue lines in Figure 3 estimate trends in UC enrollment across URG UC applicants, and the thick line extrapolates the below-threshold line to above-threshold applicants. The difference between the two lines can be

Figure 3: Estimated URG enrollment effect of the 2001-2011 ELC policy



Note: The x-axis shows the distance between each student and their high school's fourth percentile ELC threshold (by GPA rank or GPA); students below 0 are ineligible for ELC, while those above are eligible. The left includes all high school seniors; the right includes only UC applicants. The y-axis shows the proportion of students who apply to (left) or enroll at (right) UC. Each dot is the binned average proportion of students who apply to or enrolled at UC with that GPA; on the left, estimates are shown overall and for URG students. The lines are linear best fit lines to the data on either side of the threshold. The estimated impact is measured at the threshold (left) or is the number of students between the two lines, plus or minus a bootstrapped 95% confidence interval. See the Technical Appendix for details.

interpreted as an estimate of the number of applicants who only enrolled at UC as a result of ELC; if not for ELC, then UC enrollment would probably have looked more like the thick line than the thin.

The two plots in Figure 3 show two different fit lines linear and point-to-point, providing reasonable upper and lower bounds on **the gross impact of ELC on UC enrollment between 138 and 155 additional URG students per year**. Most of these students enrolled at the Davis, Irvine, and San Diego campuses, each of which gave admissions advantages to ELC-eligible students in the period. Over 90 percent of these students were Hispanic/Latinx.

In combination, this evidence suggests that **the 2001-2011 ELC policy increased UC URG enrollment by as much as 4 percent**, a non-negligible increase that nevertheless was far smaller than UC's previous affirmative action policy.[4] ELC also increased UC enrollment from lower-income families, though the effect is somewhat smaller.

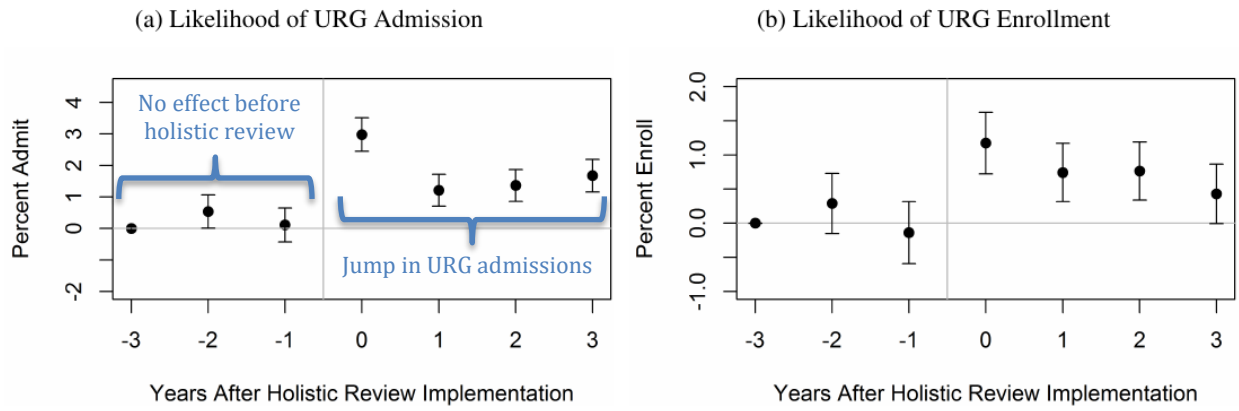
The ELC program was "expanded" in 2012 from 4% to 9% of graduates from each high school, but **changing campus-specific admissions policies appear to have largely nullified ELC's impact on UC URG enrollment**, with only UC Merced providing substantial admissions advantages to ELC-eligible applicants.[5] Rather than continuing their strong participation in ELC, four UC campuses simultaneously switched to implementing holistic review, which is discussed in the following section.

URG ENROLLMENT FROM HOLISTIC REVIEW

Six UC campuses have implemented holistic review (HR) admissions policies since 2002. Four campuses implemented HR between 2011 and 2012, at the same time that ELC transitioned from 4% to 9%. While Prop 209 continues to prohibit the specific use of race in UC admissions, HR is designed in part to contextualize applicants using other aspects of disadvantage they have faced, which may disproportionately effect URG applicants. The increased number of URG enrollees that result from HR implementation can be estimated by comparing URG applicants' admission and enrollment rates in the years before and after each implementation, conditional on applicants' other academic characteristics. Details on the estimation strategy are in the Technical Appendix.

Figure 4 visualizes estimates of HR's impact on URG admission and enrollment. Each estimate shows the differential likelihood of URG applicants' admission to HR campuses some number of years before or after implementation, compared to their differential likelihood of admission 3-4 years prior to HR implementation. For example, one year before HR, URG applicants are exactly as likely to be admitted to the campus as they had been a few years earlier, as would be expected; after all, HR had not yet taken effect. The year that HR is implemented (Year 0), however, their differential likelihood of admission shoots up, becoming almost three percent more likely to earn admission. **Over the following years, URG applicants' likelihood of admission persistently stays 1-2 percentage points above its pre-HR level compared to academically-similar non-URG applicants.** URG applicants' increase in admission likelihood translates into an increased likelihood that they actually enroll at the HR-

Figure 4: Estimated impact of the adoption of holistic review on URG applicants

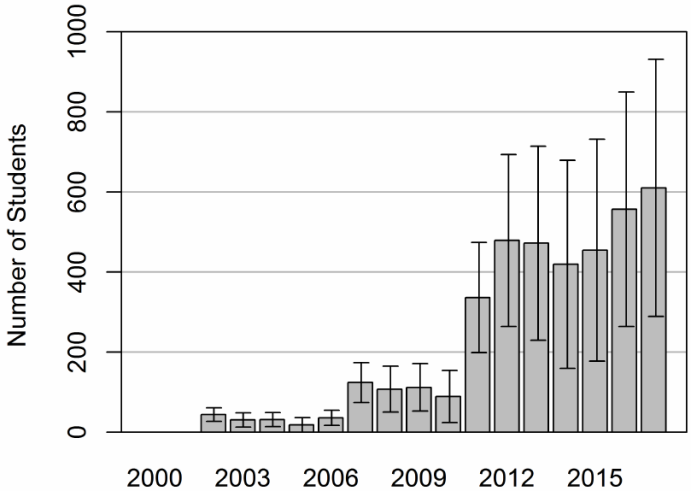


Note: Estimates of the annual impact of Holistic Review implementation on the likelihood of URG applicants' admission and enrollment at implementing campuses, relative to non-URG applicants and compared to three years prior to HR implementation. Bars show 95% confidence intervals. See the Technical Appendix for estimation details.

implementing campus; Panel (b) of Figure 4 shows that about one percent more URG applicants enroll at HR-implementing than would have enrolled without holistic review.

How does HR's impact translate into increased aggregate URG enrollment? Figure 5 visualizes the total annual increase of URG students at HR-implementing campuses as a result of holistic review. The estimates jump in 2007 and 2011-2012 when new campuses implemented HR, and the figure's slow growth over time results from UC's persistent growth with California's population. In 2017, more than 600 first-year URG students at six UC campuses were unlikely to have enrolled at that campus if not for HR, implying that **holistic review is responsible for an increase in UC URG enrollment of up to 7 percent**. However, many of those students would otherwise have enrolled at other UC campuses, implying that even if every campuses implemented HR, the total increase in URG enrollment would likely be smaller than 7 percent.

Figure 5: Estimated total increase in URG campus enrollment from holistic review



Note: Estimates of annual URG enrollment resulting from UC campuses' holistic review policies. Bars show 95% confidence intervals. These estimates include students pulled from other UC campuses into HR campuses, and increase in 2007, 2011, and 2012 as more campuses begin using HR. See the Technical Appendix for estimation details.

THE IMPACT OF UC ADMISSIONS ON URG STUDENT OUTCOMES

What is the benefit of UC enrollment for the students who enroll under its access-oriented admissions policies? This brief answers that question by directly analyzing the opposite event: what happened to URG UC applicants after Prop 209 ended UC's long-standing affirmative action policy? A "difference-in-difference" design is employed, comparing average outcomes of URG applicants before and after 1998 to the changed average outcomes of non-URG applicants, conditional on applicants' high school and Academic Index (AI). Comparing academically-similar students permits estimation of affirmative action's impact abstracted away from other changes in UC application and admissions in the 1990s. See the Technical Appendix for estimation details.

A frequent concern among UC faculty, especially in the sciences, is that because URG students were admitted to UC under affirmative action (AA) with lower academic preparedness than their non-URG peers, they may perform poorly in STEM courses and have a difficult time completing STEM majors. This concern is tested by isolating students' performance and persistence in introductory STEM course series in chemistry, biology, physics, and mathematics, and computer science. URG students *did* earn lower grades and 'drop out' of the course sequences with greater frequency under AA, a fact wholly explained by their lower Academic Indices, but **ending AA actually led to even worse STEM grades among URG students across the UC campuses, and URG students' STEM persistence at UC Berkeley – one of the campuses most impacted by Prop 209 – substantially deteriorated.** In general, ending AA did not improve URG students' grades or persistence in difficult courses.[6]

What was the impact of the decline in URG UC enrollment on the long-run outcomes of those URG applicants? To answer this question, UC applicant data are individually linked to the National Student Clearinghouse (NSC), a

Table 1: The impact of Prop 209 on the degree attainment of URG UC applicants

Change (%)	Earn Bachelor's within 6 years	Earn any grad. degree	Earn STEM grad. degree
Overall	-0.71	-1.31	-0.58
(standard error)	(0.50)	(0.53)	(0.27)
Bottom AI Quartile	-4.25	-2.77	-0.86
(s.e.)	(1.44)	(1.25)	(0.33)

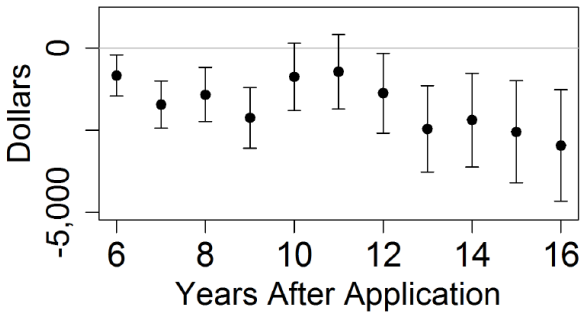
Note: This table shows estimated changes in the likelihood of earning an undergraduate or graduate degree for URG UC applicants after Prop 209, compared to academically comparable non-URG applicants. Statistics are estimated by linear regression across 1996-1999 UC applicants; see Technical Appendix for details. Robust standard errors in parentheses.

comprehensive database that includes information about nearly all Bachelor's and graduate degrees awarded in the United States. Table 1 compares URG and non-URG applicants who have similar measurable academic preparedness in the two years before and after UC's affirmative action ban to estimate the impact of Prop 209 on URG applicants' six-year degree attainment and their likelihood of ever earning a graduate degree. Prop 209 caused a **0.7 percentage point decline in every URG UC applicant's likelihood of earning a Bachelor's degree within six years**. **They also become less likely to earn graduate degrees (by 1.3 percentage points), especially STEM-oriented graduate degrees**, which are encouraged by the UC campuses and tend to correspond to higher postgraduate earnings. **The effects are strongest for applicants from the bottom AI quartile, who were the most likely to no longer be able to enroll at UC campuses following Prop 209**.

The applicant database is also linked to wage data from the CA Employment Development Department to measure UC applicants' annual wages. Figure 6 shows Prop 209's relative impact on URG applicants' average CA wages 6 to 16 years after they applied to UC, when most are 24 to 34 years old. URG applicants were substantially negatively affected by Prop 209, with average wage declines of **$1,800 per year – and $2,400 per year in their early 30s – across all URG UC applicants** compared to similar-AI non-URG applicants. Importantly, this 4-5 percent wage decline is the average across *all* URG applicants, not just those whose admissions decisions were altered by Prop 209; URG applicants excluded from UC likely faced larger declines in long-run wages. Additional declines may have been faced by URG students discouraged from applying to UC altogether.

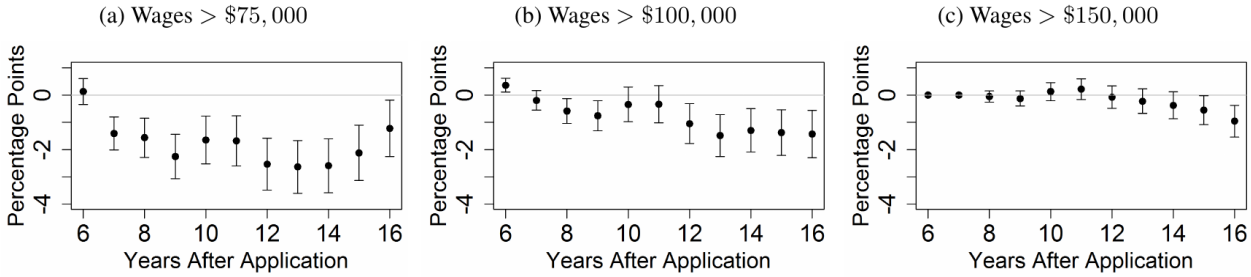
Another way to quantify the employment effects of Prop 209 is to estimate the number of URG UC applicants who would have had high annual wages – of at least $75,000 (average CA family income), $100,000, or $150,000 – if not for Prop 209. These relatively high wages are earned by many early-career UC graduates, but URG applicants become much less likely to earn them after Prop 209 decreased their likelihood of selective UC enrollment. Figure 6 shows that **between ages 25 and 34, each URG UC applicant was 1-3 percent less likely to earn a $75,000 CA wage as a result of Prop 209**. By 12-15 years out, many UC graduates earn over $100,000 or $150,000, but significantly fewer URG UC applicants were able to achieve those wages after 1998. For context, UC had 56,300 URG applicants between 1998 and 2002, most of whom were in their early 30s in 2014. Depending on specification, 700-1,700 of them would have earned

Figure 6: The impact of Prop 209 on URG UC applicants' early-career wages



Note: Each point represents the estimated change in average URG UC applicants' CA wages (relative to non-URG wages) in the years after UC application. The bars show 95% confidence intervals. See Technical Appendix for estimation details.

Figure 7: The impact of Prop 209 on URG applicants' wages by income thresholds



Note: Each point represents the change in average URG UC applicants' likelihood of earning the respective threshold ($75,000, $100,000, or $150,000) in California (relative to non-URG earnings) a given number of years after UC application. The bars show 95% confidence intervals. See Technical Appendix for estimation details.

$100,000 that year if not for Prop 209. Given that California had about 27,000 URG workers in 2014 earning over $100,000, this implies that **Prop 209 caused a decline in the number of high-earning early-career African American and Hispanic/Latinx Californians by at least 3-6 percent**.[7]

The Results Appendix presents additional details on the impact of Prop 209 on UC applicants. It show that wage declines were most concentrated among lower-AI URG applicants, and that the presented results are highly robust to alternative statistical specifications. It also shows that URG applicants' observed wage deterioration substantially exceeds what would be expected given their changed enrollment, suggesting that **the personal return to a UC degree was substantially above-average for the URG students impacted by Prop 209**. It presents evidence that the non-URG students who enrolled at UC's more-selective campuses after Prop 209 would have enrolled at similar-quality universities and earned high wages even absent UC admission, with observably-similar unchanged outcomes for both White and Asian applicants. Finally, it shows that while Prop 209 caused similar enrollment and educational outcomes for African American and Hispanic/Latinx applicants, the wage deterioration caused by Prop 209 was largely driven by the latter group, with smaller effects for African American applicants.

In sum, these results suggest that race-based affirmative action was very successful in providing economic opportunity to hundreds of annual URG applicants to the University of California, and that those applicants suffered after the passage of Prop 209. The large returns to UC admission among the disadvantaged students targeted by affirmative action are likely shared by the students provided access to UC by ELC and holistic review.

CONCLUSION

Proposition 209 instigated a dramatic change in UC admissions policy, with URG enrollment at the Berkeley and UCLA campuses immediately falling by more than 60 percent and systemwide URG enrollment falling by at least 12 percent. Young URG Californians faced substantial long-run declines in educational and employment outcomes as a result of these changes. Among California URG high school graduates who applied to the University of California, the end of affirmative action led to substantial declines in STEM persistence, degree attainment, and average wages and the likelihood of earning high wages by California standards.

In the 20 years since the end of its affirmative action program, UC has implemented a number of race-neutral admissions policies that have increased disadvantaged applicants' likelihood of being admitted to various UC campuses. At least two of those policies—the 2001-2011 Eligibility in the Local Context policy and holistic review—have differentially increased URG enrollment, though to a considerably lesser extent than race-based affirmative action. ELC increased URG enrollment by about 250 students per year until 2012 (and also provided substantial educational and employment benefits to participants, as discussed in a previous brief), while holistic review continues to increase UC URG enrollment by up to 600 students per year (though some of those would have otherwise attended other UC campuses). For comparison, affirmative action increased net URG enrollment by at least 700 students per year in the mid-1990s, though total UC enrollment has since nearly doubled. Twenty years later, the legacy of Prop 209 remains strong at the University of California and across the state.

DATA APPENDIX

All UC application data are derived from the UC Corporate Student Warehouse.

National Student Clearinghouse

The national education data used in this brief come from from the National Student Clearinghouse's StudentTracker database, which contains enrollment and graduation information across nearly all US two- and four-year colleges and universities. In particular, it contains semesterly enrollment records (including institution name and location) and graduation records (including institution name and location, degrees and majors earned, and year of graduation) for all postsecondary degree-granting institutions that accept federal Title IV funding, a near-universal set. NSC records are linked to UC applications by first and last name, middle initial, and birth date (allowing for common nicknames and typos). About 4 percent of records are censored due to student- or institution-requested blocks for privacy concerns (NSCRC, 2017), and that the only CA public university with censorship over 10 percent is UC Berkeley.

Employment Development Department

Quarterly earnings data are from the California Employment Development Department. The earnings data were linked by reported social security numbers, and are unavailable for workers outside California and federal government employees. Annual wages are measured as the sum of quarterly wages in that year. Earnings are available through the last quarter of 2015.

TECHNICAL APPENDIX

This technical appendix discusses five estimation methods used in the report above: (1) difference-in-difference estimation of the effect of Proposition 209 on URG outcomes among UC applicants; (2) estimates of institutional "value-added" used to compare URG students' enrollment returns to those of 'average' university enrollees; (3) the estimation technique adopted to estimate the degree to which URG application discouragement leads to an underestimate of the impact of affirmative action on URG enrollment declines at UC; (4) the regression methods used to estimate the effects of ELC; and (5) the event study model used to estimate the impact of Holistic Review on URG admissions/enrollment, along with the summed UC enrollment estimate.

Difference-in-Difference Estimation of Proposition 209

In order to estimate the impact of the end of affirmative action on URG outcomes, this brief estimates simple difference-in-difference linear regression models of outcomes on applicants' URG status before and after Prop 209:

$$Y_{iy} = \alpha_{h_i} + \beta_1 NoAA_y + \beta_2 URM_i + \beta_3 NoAA_y * URM_i + \gamma X_{iy} + \epsilon_{iy}$$

where Y_{iy} indicates is an outcome for i after applying to UC in year y. The sample is restricted to 1996-1999, two years before and after the 1998 end of AA; no UC campus implemented any other large-scale change in their admissions processes in this period. Models are estimated by OLS over the full population of UC freshman California-resident applicants. The coefficients of interest are β_2, the degree to which URG students have higher Y_{iyc} under the AA regime, and β_3, the change in the outcome after AA ended (indicated by $NoAA_y$). The model includes high school fixed effects α_{h_i} and each of the components used to construct UC's 1990s academic index (X_{iy}): SAT score, high school GPA, SAT II Writing score, SAT II Math score (and indicator for submitting a Math 2 SAT II score), and a third SAT II score (along with indicators for which score was submitted). Standard errors are robust.

Estimation of Change in UC Application

The brief matches the applicant data to a database of the annual number of 1994-2001 graduates from each public CA high school by gender and ethnicity – restricted to graduates CDE reports 'eligible' for UC admission – and estimate models of the form:

$$\frac{A_{syea}}{UC_{sye}} = \sum_{e' \in \{A,B,H\}} \sum_{y' \in \{96,98,00\}} \beta_{e'y'a} \mathbf{1}_{e=e', y \in \{y', y'+1\}} + \zeta_{sea} + \eta_{sya} + \epsilon_{syea}$$

where A_{syea} is the number of UC-eligible UC applicants from school s in years $\{y', y'+1\}$ of ethnicity e with AI in range a, and UC_{sye} is the number of UC-eligible high school graduates in those years. ζ_{sea} and η_{sya} are fixed effects. Years are grouped into four pairs, from '94-95 to '00-01; ethnicities are estimated relative to White; and AI bins are defined as 200-point bins from 4000 to 8000. The model is estimated by weighted least squares (using UC_{sye} as weights) separately for each a, and interpret β_{e98a} as the average change in the proportion of UC-eligible e high school graduates who applied to UC following Prop 209.

Estimation of Institutional Value-Added Coefficients

The Results Appendix discusses "value-added" statistics summarizing students' average enrollment return by institution in terms of degree attainment and wages. VA is estimated across 1995-1997 CA-resident freshman fall UC applicants:

$$Y_{it} = \zeta_t + \alpha_{U_i} + X_i + \epsilon_{it}$$

where U_i is the first institution where applicant i enrolled after applying to enroll in t. Value-added coefficients α_{U_i} are estimated using three sets of X_i covariates, which are intended to absorb the sample selection bias that arises from applicants' non-random enrollment across postsecondary institutions. First, following Mountjoy and Hickman (2020) ("MH"), I define X_i to include indicators for every combination of UC campuses to which the applicant applied and UC campuses to which they were admitted. Second, I augment this approach by estimating a much higher-dimension version of this model including indicators for every combination of postsecondary institutions to which the applicant applies, proxying application by SAT sends by matching the applicant pool to College Board's SAT database by name and birth date ("MH+"). This approach limits the sample size to public high school graduates matched in the available College Board data. Third, following Chetty *et al* (2020) (``CFSTY''), I define X_i to include (15) ethnicity indicators and quintics in both SAT score and family income. The resulting coefficients summarize the average degree to which enrollment at each institution U_i changes applicants' likelihood of degree attainment within 6 years or 12-to-16-year-out California wage (estimated omitting 0's), compared to similar enrollees at other institutions, relative to CSU Long Beach as the chosen baseline. The description of VA statistics is provided in further detail in the Results Appendix below.

Estimate of URG enrollment changes given URG high school students' application behavior

This brief uses the following primary method to estimate the change in URG enrollment as a result of AA. First, it presents:

$$\left(\%URM_{c,1995-1997} - \%URM_{c,1998-2000}\right) * \frac{ENR_{c,1998-2000}}{3}$$

the difference in the percent of 1995-1997 enrolling students at campus c who were URG and that same percent in 1998-2000, scaled by the average number of enrolling students at that campus in 1998-2000 $ENR_{c,1998-2000}$.

Regression discontinuity models of ELC policy

This brief conducts three sets of analysis studying the ELC policy. First, it constructs a dataset of 2002-2011 high-GPA CA high school seniors linked (by address, phone number, and high school) to ethnicity information from College Board and UC applicant indicators by unique identifier.[8] Figure 3(a) uses these data in a standard regression discontinuity design to show the change in UC application rates across the eligibility threshold. Figure 3(b) restricts to UC applicants and uses the same design to show the change in UC enrollment across the eligibility threshold. Finally, appendix figures use the same design in UC applicant records from 2012-2017 to show the URG admission and enrollment effects of the post-2011 9% ELC policy. Stanfard errors for the extrapolations are defined by block-bootstrap, defining blocks by high-school-years.

Event study model of Holistic Review

Six UC campuses have implemented holistic review (HR): Berkeley in 2002, UCLA in 2007, San Diego and Irvine in 2011, and Davis and Santa Cruz in 2012. The brief estimates the effect of HR implementation on the likelihood of URG applicants' admission and enrollment using a difference-in-difference event study design, comparing outcomes for URG applicants relative to non-URG applicants:

$$Y_{iyc} = \alpha_{h_i c} + \sum_{i \in [-5,4]} \beta_i \mathbf{1}_{HR_c = y+i} + \gamma_c \overrightarrow{SAT_i HSGPA_i} + \delta_{yce_i} + \zeta_{cu_i g_i e_i} + \eta_{yu_i g_i e_i} + \theta_{Abs_c E_y u_i g_i e_i} + \epsilon_{iyc}$$

with coefficient of interest β_i measuring URG students' differential outcome $y+i$ years after c implemented HR in HR_c. The sample is restricted to 1997-2017 California-resident freshman Fall applicants. The fixed effects $\zeta_{cu_i g_i e_i}$, $\eta_{yu_i g_i e_i}$, $\theta_{Abs_c E_y u_i g_i e_i}$ capture variation by gender g_i, URG status u_i, and whether the applicant is in the top four percent of her high school class (and thus ELC-eligible) e_i, with the last of the fixed effects capturing variation by gender, ethnicity, and whether the applicant is in the top four percent of her HS class for applicants to Absorbing UC campuses between 2001 and 2011 E_y. Note that the UC campuses' all simultaneously switching to a "Comprehensive Review" policy from a more algorithmic admissions policy in 2002 is absorbed by the $\zeta_{cu_i g_i e_i}$ fixed effect. Four and three years prior to HR implementation are omitted as the comparison period, and the β_{-5} and β_4 effects are defined to absorb all prior and subsequent years, respectively, and are not presented. Standard errors are clustered by applicant.

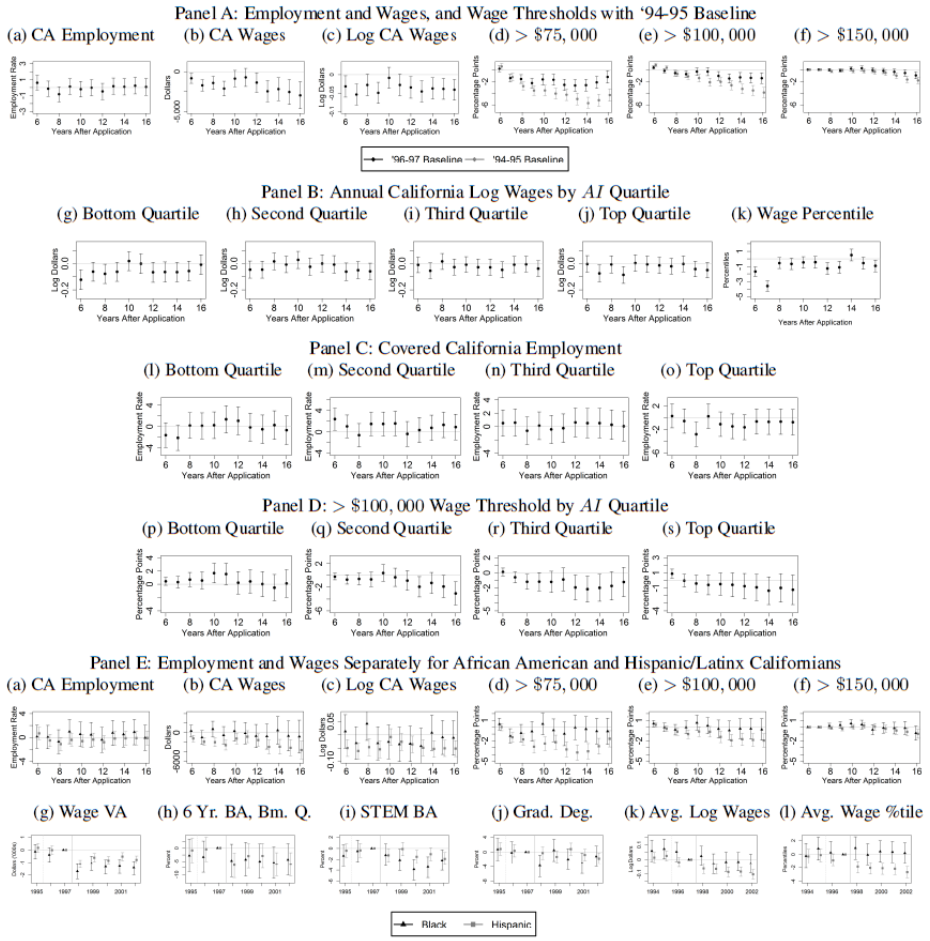
To estimate the total increased URG enrollment resulting from HR implementation, it is important to account for the direct crowd-out effect of HR on non-URG enrollment; a one percentage point increase in the likelihood of a URG applicant's enrollment relative to a non-URG applicant's likelihood of enrollment corresponds mechanically to a $nURM_{cy}$ percent increase in the non-relative likelihood of a URG applicant's enrollment as a result of HR implementation, where $nURM_{cy}$ is the percent of applicants to c in y who were not URG, or 67.1 percent at HR-implemented campuses in the sample period. I also assume that the effect of HR had stabilized two years after implementation. Standard errors are estimated by block-bootstrap, defining blocks by applicants.

RESULTS APPENDIX: PROPOSITION 209

This section includes additional estimates of the impact of Prop 209 on URG UC applicants. Figure 7 shows that CA employment was unchanged for URG UC applicants after 1998, overall and for each AI quartile (Panel C). The wage effects are largest for lower-

AI URG applicants (Panel B), and the decline in high wages was even larger than discussed above when estimated relative to '94-95 (Panel A), before any campuses began phasing out AA. Panel D shows that the decline in $100,000 earners most impacts the middle-AI cohorts, since the lowest-AI applicants are unlikely to achieve such high earnings even after UC enrollment. Panel E shows that the URG wage declines after Prop 209 were largely driven by Hispanic/Latinx UC applicants.

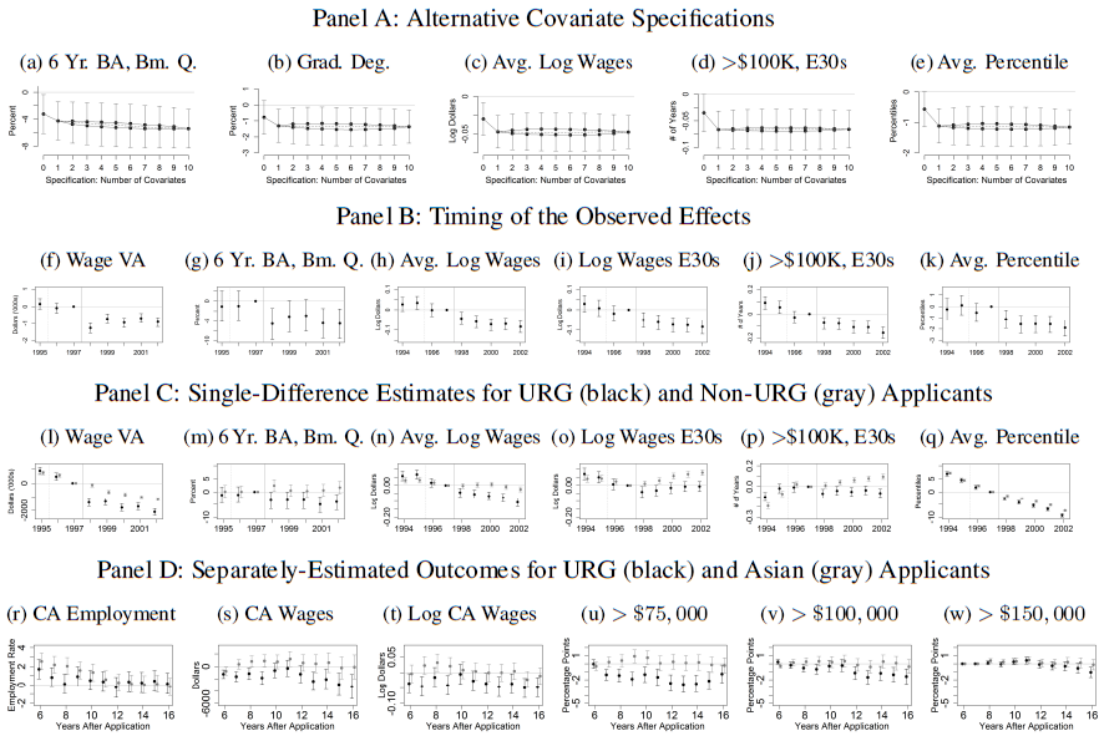
Figure 7: Difference-in-Difference Estimates of URG UC Applicants' Post-1998 Labor Market Outcomes



Note: This figure shows that URG applicants' California employment was largely unchanged overall and among all four *AI* quartiles, but that all but the bottom quartile became less likely to earn at least $100,000 annual California wages, with larger estimated declines for low-*AI* applicants and relative to the '94-95 baseline. Wage deterioration was larger for Hispanic UC applicants than for Black UC applicants. Estimates from an OLS difference-in-difference model of 1996-1999 URG UC freshman California-resident applicants' educational outcomes compared to non-URG outcomes after the 1998 end of UC's affirmative action program. Outcomes defined as non-zero California wages ("CA Employment"), California wages in dollars and log-dollars (omitting 0's unless uncondit.) or ethnicity- and education-specific percentile, and unconditional indicators for having wages above specified wage thresholds ($75,00, $100,000, and $150,000) by CA EDD. Coefficients in each year after high school graduation are estimated independently. Models include high school fixed effects and the components of UC's Academic Index. Academic Index (*AI*) is defined in the Technical Appendix; models by *AI* quartile are estimated independently, with quartiles defined by the *AI* distribution of 96-97 URG UC applicants. Robust 95-percent confidence intervals shown. Source: UC Corporate Student System and the California Employment Development Department.

Figure 8 presents a series of robustness checks focused on the main Prop 209 outcomes estimated in the brief. Panel A shows that the estimates are remarkably insensitive to the addition of highly-detailed control variables, though the controls absorb substantial addditional variation from specifications 0 to 1 to 9: in (a) the R^2 increases from 8.8 to 12.9 to 15.3, whereas in (c) they increase from 3.0 to 5.8 to 6.9. Panel B shows that outcomes were stable leading up to Prop 209 before deteriorating in 1998 and 1999. Panel C shows the separate single-difference effects for URG and non-URG UC applicants, showing that the labor market effects were clearly driven by deteriration among URG students, with generally null effects among non-URG applicants. Panel D separates effects for Asian UC applicants as well as URG applicants, showing that URG applicants' outcomes substantially deteriorate while Asian UC applicants' outcomes end up unchanged after Prop 209.

Figure 8: Robustness Checks on Difference-in-Diff. Estimates of URG UC Applicants' Post-98 Outcomes



Note: This figure presents robustness checks on the main Prop 209 estimates, showing: (A) that the estimates are insensitive to alternative control variables; (B) that the estimates are largely driven by changes in URG UC applicant outcomes between 1997 and 1998; (C) that the estimates (at least with employment) are clearly driven by declines among URG UC applicants; and (D) that the estimated effects on URG students are large relative to the long-run null effects observed for Asian UC applicants, with non-URG non-Asian applicants as the comparison group. Estimates of β_3 from OLS difference-in-difference models of the change in four URG UC applicant outcomes after the end of UC's affirmative action policy relative to non-URG applicants, with outcomes defined in the main text. **Panel A:** Specification 0 includes only high school fixed effects (null X_{it}), while Specification 1 includes the baseline AI covariates. Specifications 2-10 add additional sets of covariates progressively, presenting the highest and lowest β_3 estimates from models including 1-9 additional sets of covariates, respectively: gender indicator, log family income, (7) highest parental education indicators, (289) parents' occupation indicators, high school GPA rank, number of 12th grade honors courses, UC eligibility indicator, and two cross-high-school Heckit control functions constructed using two estimates of p: the leave-one-out percent of UC-eligible graduates who applied to UC that year in i's school, gender, and ethnicity and that percent restricting the numerator to students in the same 200-point AI bin. **Panel B:** Annual estimates using baseline specification relative to the 1997 baseline. **Panel C:** Annual single-difference estimates using baseline specification for URG and non-URG students. **Panel D:** Annual estimates using baseline specification with additional interactions for Asian students. **All Panels:** Bars show 95-percent confidence intervals from robust standard errors. Wage percentiles are contemporaneous and ethnicity-specific relative to 1972-1976 CA BA-completing birth cohorts. Source: UC Corporate Student System, NSC, CA EDD, and ACS.

Table 2 describes changes in the enrollment institutions of URG students after Prop 209. Panel A shows that Prop 209 caused URG students to enroll at less-selective universities, with higher admissions rates and lower average SAT scores and graduation rates. The middle columns show that URG students also ended up enrolling at schools with substantially lower "value-added" after Prop 209, an estimate of the universities' effect on their students' outcomes. **Importantly, the declines in wage value-added (estimated using two different procedures) are substantially smaller than the actual wage declines faced by URG applicants, implying that the value of high-quality universities was higher than average for the URG applicants impacted by Prop 209**. The final two columns show that URG students also enrolled at institutions with higher shares of URG students.

Panel B of Table 2 shows that the lower *AI* quartiles of URG UC applicants were most impacted in terms of institutional quality, as suggested by the main results presented in the topic brief. Panel C shows that the gaps are somewhat larger when compared to a 1995 baseline, since some UC campuses had begun phasing out AA as early as 1996.

Table 2: Difference-in-Difference Estimates of URG UC Applicants' Post-1998 University Characteristics

	First Four-Year Institution			First Institution of Enrollment					
	Adm. Rate	Avg. SAT	6 Yr. BA Rate	"MH" VA[1] BA 6	"MH" VA[1] Earn 15	"CFSTY" VA[1] BA 6	"CFSTY" VA[1] Earn 15	URG Share Contemp.	URG Share Fixed '95
Panel A: Diff-in-Diff Coefficients Overall									
URG	-5.5	43.2	3.1	2.0	1,890	2.9	2,853	1.2	1.5
	(0.2)	(1.6)	(0.1)	(0.1)	(75)	(0.1)	(84)	(0.1)	(0.1)
URG × Prop. 209	2.9	-23.4	-1.9	-0.5	-384	-0.9	-924	0.8	0.2
	(0.2)	(2.0)	(0.2)	(0.2)	(93)	(0.2)	(105)	(0.2)	(0.2)
$\bar{Y}$	48.8	1772	74.6					19.3	21.7
Obs.	151,655	149,241	151,899	176,976	173,844	175,624	173,557	184,497	184,311
Panel B: Freshman Undergraduates by AI Quartile									
Bottom Quartile	1.8	-38.2	-3.7	-1.5	-632	-1.7	-785	1.5	1.6
	(0.6)	(5.5)	(0.5)	(0.5)	(214)	(0.5)	(246)	(0.5)	(0.5)
Second Quartile	4.2	-34.6	-3.0	-0.4	-608	-1.2	-1,535	0.4	0.7
	(0.5)	(4.3)	(0.4)	(0.4)	(197)	(0.4)	(238)	(0.4)	(0.4)
Third Quartile	4.7	-22.0	-1.3	0.1	-381	-0.4	-1,280	-1.5	-1.1
	(0.5)	(3.9)	(0.3)	(0.3)	(182)	(0.3)	(218)	(0.3)	(0.3)
Top Quartile	1.6	-6.4	-0.5	-0.5	-172	-0.6	-499	0.3	-0.3
	(0.5)	(4.0)	(0.3)	(0.3)	(224)	(0.3)	(234)	(0.2)	(0.2)
Panel C: Diff-in-Diff Coefficients Overall (versus '95)									
URG	-5.4	48.1	3.7	1.8	1,915	2.9	2,930	0.9	1.5
	(0.3)	(2.2)	(0.2)	(0.2)	(101)	(0.2)	(115)	(0.2)	(0.2)
URG × Prop. 209	3.0	-30.2	-2.8	-0.5	-470	-1.0	-1,096	0.9	0.3
	(0.3)	(2.5)	(0.2)	(0.2)	(114)	(0.2)	(130)	(0.2)	(0.2)
$\bar{Y}$	48.7	1,773.5	74.7					19.3	21.6
Obs.	112,477	110,659	112,660	130,981	128,618	129,979	128,407	136,789	136,669
Panel D: Diff-in-Diff with Separate Coefficients for Black and Hispanic Applicants									
Black	-8.3	55.7	4.0	3.5	3,148	5.3	4,811	4.3	4.9
	(0.4)	(3.3)	(0.3)	(0.2)	(142)	(0.2)	(154)	(0.3)	(0.3)
Hispanic	-4.7	38.8	2.7	1.6	1,554	2.2	2,295	0.2	0.4
	(0.2)	(1.8)	(0.2)	(0.1)	(85)	(0.1)	(96)	(0.1)	(0.1)
Black × Prop 209	3.2	-24.1	-2.2	-0.6	-455	-1.4	-1,133	0.6	0.2
	(0.5)	(4.5)	(0.4)	(0.3)	(197)	(0.3)	(214)	(0.5)	(0.5)
Hispanic × Prop 209	2.9	-22.9	-1.8	-0.4	-326	-0.7	-810	0.9	0.3
	(0.3)	(2.2)	(0.2)	(0.2)	(104)	(0.2)	(117)	(0.2)	(0.2)
$\bar{Y}$	48.8	1,772.6	74.7					19.3	21.7
Obs.	150,512	148,121	150,748	175,642	172,536	174,306	172,255	183,089	182,907

Note: This table shows that after Prop 209, URG students enrolled at universities with higher admissions rates, lower average SAT scores and graduation rates, lower "value-added" in terms of degree attainment and earnings (that is, schools that tend to lead their students to poorer educational and labor market outcomes), and lower shares of URG peers, with similar effects for African American and Hispanic/Latinx applicants. Estimates of β_2 and β_3 from a difference-in-difference model of 1996-1999 URG UC freshman California-resident applicants' outcomes compared to non-URG outcomes after the 1998 end of UC's affirmative action program. Outcomes defined as characteristics of the first four-year university or the first two- or four-year institution at which the applicant enrolled within six years of high school graduation as measured in the NSC. Models include high school fixed effects and the components of UC's Academic Index. URG share is measured as the leave-one-out percentage of first-time first-year students who are URG, either in the year of high school graduation or in 1995. Models by Academic Index (AI) quartile are estimated independently. IPEDS data (first three and last two columns) linked by OPE ID and year to NSC enrollment. Four-year institution characteristics are fixed by institution in the first year in which they are available in IPEDS: admissions rate (2006), sticker price (2000), and graduation rate (2008). Robust standard errors in parentheses. [1]Value-added measures are estimated by regressing six-year BA attainment (in NSC) or 12-to-16-year conditional wages (in EDD) on college indicators, year FEs, and either indicators for each applicant's set of UC campus applications and admissions (following Mountjoy and Hickman 2020, "MH") or ethnicity indicators and quintics in SAT score and family income (following Chetty *et al* 2020, "CFSTY") using the 1995-1997 UC applicant pool. Source: UC Corporate Student System, NSC, the CA EDD, and IPEDS.

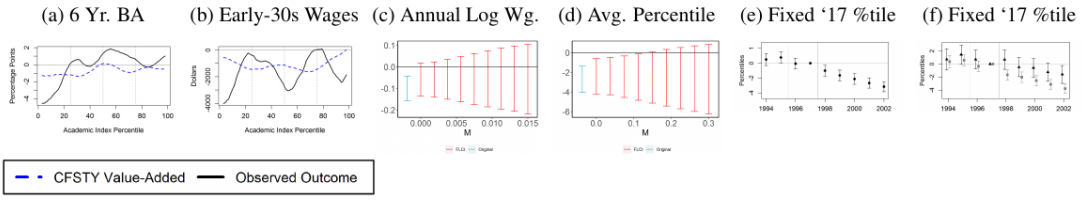
Table 3 carefully compares the expected changes in URG UC students' degree attainment and early-30s wages on the basis of "value-added", or the difference in average returns to enrolling at the universities they enrolled at before and after Prop 209, with their actual changes in outcomes. The Technical Appendix defines the estimation strategy used to produce institution-specific "value-added" statistics. Table 3 uses four different definitions of "value-added" pulled from the academic literature, differing in how they 'control for' differences in the characteristics of students who enroll at each university and whether they university is allowed to have different "value-added" estimates by students' gender and ethnicity. The comparisons show that some value-added estimates do a passable job at predicting changes in URG students' degree attainment, but all four substantially underestimate URG students' changes in early-30s wages. Panel B shows that this underestimation holds for nearly all AI quartiles for each of the VA estimates. This implies that the effect of Prop 209 on URG UC applicants substantially exceeds what would be expected if the average student switched enrollments along the same pattern as experienced by URG UC applicants, which in turn implies that the URG students impacted by Prop 209 appear to benefit substantially more from the more-selective UC enrollment made available to them under Prop 209 than the average student enrolling at those universities. This provides further evidence to the similar finding presented in Table 2. **Thus, Table 3 (along with Table 2 above and Figure 9 below) presents additional evidence that university quality alone fails to explain Prop 209's impact of URG UC applicants; it appears that those students differentially benefit from UC enrollment.** Panel D shows that African American and Hispanic/Latinx students faced similar-magnitude declines in these proxies of their enrollment institutions' quality.

Table 3: Comparison Between Various Value-Added Estimates and Student Outcomes for Matched Samples

	"MH" VA[1]				"MH+" VA[1]				"CFSTY" VA[1]				Eth.-Specific "CFSTY" VA[1]			
	Six-Year Deg.		Early-30s Wage		Six-Year Deg.		Early-30s Wage		Six-Year Deg.		Early-30s Wage		Six-Year Deg.		Early-30s Wage	
	VA	Obs.	VA	Obs.	VA	Obs.	VA	Obs.	VA	Obs.	VA	Obs.	VA	Obs.	VA	Obs.
Panel A: Diff-in-Diff Coefficients Overall																
URG	2.0	-2.6	2,335	-796	3.0	-3.2	3,318	-1,114	2.9	-2.7	3,273	-771	1.5	-2.0	4,748	-817
	(0.1)	(0.4)	(102)	(573)	(0.1)	(0.5)	(105)	(638)	(0.1)	(0.4)	(107)	(576)	(0.1)	(0.4)	(138)	(628)
URG × Prop 209	-0.5	-0.4	-572	-2,287	-1.2	0.1	-1,462	-2,059	-0.9	-0.4	-1,091	-2,243	-0.2	-0.0	-153	-2,405
	(0.2)	(0.5)	(125)	(691)	(0.2)	(0.6)	(130)	(771)	(0.2)	(0.5)	(131)	(696)	(0.2)	(0.6)	(167)	(756)
Obs.	176,976	176,976	135,616	135,616	145,539	145,539	110,274	110,274	175,624	175,624	135,022	135,022	160,405	160,405	120,662	120,662
Panel B: Estimates of URG × Prop 209 (β_3) by AI Quartile																
Bottom Quartile	-1.5	-3.6	-839	-2,303	-2.3	-3.7	-1,040	-1,561	-1.7	-3.6	-848	-2,212	-1.1	-2.8	-579	-1,990
	(0.5)	(1.6)	(274)	(1,578)	(0.5)	(1.8)	(328)	(1,824)	(0.5)	(1.6)	(296)	(1,593)	(0.6)	(1.8)	(427)	(1,789)
Second Quartile	-0.4	-0.3	-606	-1,496	-1.4	-0.1	-2,340	-16	-1.2	-0.2	-1,444	-1,455	-0.2	0.2	91	-1,175
	(0.4)	(1.3)	(258)	(1,453)	(0.4)	(1.4)	(283)	(1,601)	(0.4)	(1.3)	(293)	(1,464)	(0.4)	(1.4)	(370)	(1,562)
Third Quartile	0.1	1.8	-569	-2,291	-0.6	2.1	-2,060	-2,679	-0.4	1.9	-1,625	-2,301	0.8	2.4	143	-2,129
	(0.3)	(1.1)	(243)	(1,452)	(0.3)	(1.2)	(255)	(1,605)	(0.3)	(1.1)	(273)	(1,457)	(0.3)	(1.1)	(329)	(1,546)
Top Quartile	-0.5	0.1	-461	-2,616	-0.5	0.4	-1,170	-2,633	-0.6	-0.1	-802	-2,625	-0.1	-0.3	571	-2,349
	(0.3)	(0.9)	(317)	(1,647)	(0.2)	(1.0)	(296)	(1,795)	(0.3)	(0.9)	(306)	(1,649)	(0.3)	(0.9)	(349)	(1,744)

Note: This figure tests the performance of several institution and institution-gender-ethnicity value-added estimates against actual changes in student outcomes after Prop 209, with some measures performing relatively-well in measuring degree attainment but all measures generally underestimating (and poorly explaining the patterns in) declines in early-30s wages. Estimates of β_2 and β_3 from a difference-in-difference model of 1996-1999 URG UC freshman California-resident applicants' outcomes compared to non-URG outcomes after the 1998 end of UC's affirmative action program. Outcomes defined as estimated value-added of the first two- or four-year institution at which the applicant enrolled within six years of UC application as measured in the NSC, or actual student outcomes matching the value-added measures: six-year Bachelor's degree attainment or average conditional California wages between 12 and 16 years after UC application. Outcome samples are restricted to observations with observed VA (implying that the student first enrolled at an institution with sufficient sample size to estimate VA), and wage VA samples restricted to observations with observed early-30s wages (omitting observations with no California employment in that period). Models include high school fixed effects and the components of UC's Academic Index. Robust standard errors in parentheses. [1]Value-added measures are estimated by regressing six-year BA attainment (in NSC) or 12-to-16-year conditional wages (in EDD) on college indicators, year FEs, and either indicators for each applicant's set of UC campus applications and admissions (following Mountjoy and Hickman 2020, "MH"), indicators for each applicant's complete set of institutions to which they sent their SAT scores (using matched College Board testing data; an extension of MH, "MH+") or ethnicity indicators and quintics in SAT score and family income (following Chetty *et al* 2020, "CFSTY") using the 1995-1997 UC applicant pool. Ethnicity-specific coefficients estimated by interacting institution with five ethnicity buckets: White, Black, Hispanic, Asian, and Other. Source: UC Corporate Student System, NSC, and CA EDD.

Figure 9: Robustness Checks: Changes in Inst. Value-Added and Outcomes by AI Quantile and Year



Note: This figure shows that value-added generally poorly proxies students' outcomes (a-b); the avg. ethnicity-specific wage estimates (but not annual wages) are insensitive to violations of the standard parallel trends assumption; and that this is because of time-varying ethnicity-specific wage dynamics, not the percentile transformation. **Panels a/b**: Raw difference-in-difference statistics of average six-year degree attainment, early-30s wages, and corresponding "CFSTY" institutional value-added measures, differenced among UC freshman applicants between 1998-1999 and 1996-1997 and by URG status for each URM AI percentile and smoothed with a bandwidth-15 triangular kernel. See text for value-added definition. Average wages measured as mean observed wages between 12 and 16 years after UC application; VA wages are averaged 12-to-16 years after high school graduation. Six-year degree attainment measured in the union of UC and NSC degree attainment. **Panels c/d** Estimates of β_3 from the OLS difference-in-difference model of 1996-1999 URM UC freshman California-resident applicants' wage outcomes compared to non-URM outcomes after Prop 209, by varying assumptions over the maximal annual degree to which the parallel trends assumption may be violated (following Rambachan and Roth, 2020). The blue bars show the baseline estimates; the black bars present C.I.'s permitting $\Delta^{SD}(M)$ (the x-axis) deviations from the parallel trends assumption. Generated using the $HonestDiD$ package, 0.1.0. Wages 6-16 years after UC application; the last panel's outcome is defined as the average annual ethnicity-specific wage percentile (omitting zero-wage years) defined relative to the empirical distribution of wages earned in that year by same-ethnicity (URM, Asian, or White/Other) college-educated California ACS respondents born between 1974 and 1978. **Panels e/f** Replicates Figures 8(k) and 7(l) respectively fixing the ACS wage percentiles in 2017. Source: UC Corporate Student System, NSC, and CA EDD.

Panels (a) and (b) of Figure 9 visualizes the change in URG UC applicants' actual change in degree attainment and early-30s wages by their percentile in academic index. The blue lines show the changes that would be expected for these students if the effects were wholly explained by institutional value-added. The figure shows that movements in the two lines do not nearly line up, providing yet more evidence that the marginal return to university quality is above-average for impacted URG applicants. Panels (c) and (d) investigate whether secular trends in California's URM and non-URM wage distributions can explain URM UC applicants' wage decline after Prop 209, showing that accounting for those trends using wage percentiles produces difference-in-difference estimates that are robust to sizable violations of the 'parallel trends' assumption *so long as the percentiles vary over time* (as shown in (e) and (f)), as estimated following the methodology of Rambachan and Roth (2020).

Tables 4-7 present the VA statistics for all available institutions; namely, which have at least 50 enrollees among in-sample 1995-1997 CA-resident freshman UC applicants. See the Technical Appendix for definition of VA. These tables show that UC (and especially its more-selective campuses) have generally-higher value-added estimates than most of the outside options where URG UC applicants enrolled after Prop 209, explaining the average decline in value-added for URG UC applicants after 1998.

Table 4: 1995-1997 Value-Added Estimates for California Community Colleges

	6-Yr. Grad.			15-Yr. Wages ($000s)				HS GPA						6-Yr. Grad.			15-Yr. Wages ($000s)				HS GPA				
		All			All		Hisp.		All		# Obs.				All			All		Hisp.		All		# Obs.	
Inst.	MH	C-Y	Raw	MH	C-Y	Raw	C-Y	MH	C-Y	Raw	Grad.	Wg.	Inst.	MH	C-Y	Raw	MH	C-Y	Raw	C-Y	MH	C-Y	Raw	Grad.	Wg.
Allan H.	-17.6	-13.6	-11.2	-6.1	-3.3	-2.7		0.00	0.13	0.15	78	61	LA Valley	-20.0	-17.0	-18.0	-0.3	-1.5	2.0		-0.04	0.04	-0.00	56	51
Am. River	-17.1	-16.9	-12.7	-7.3	-5.0	-0.5		-0.04	0.06	0.15	108	85	MiraCosta	-2.7	-1.8	2.3	5.1	0.5	6.9		0.04	0.07	0.15	117	86
Cabrillo	-25.6	-29.1	-22.7	7.7	9.1	6.3		0.01	-0.02	0.06	91	63	Moorpark	-5.7	-8.3	-1.4	6.3	4.8	7.6		-0.00	-0.01	0.02	225	168
Canada	5.9	-0.0	11.2					0.01	0.01	0.11	51		Mt SA	-14.5	-13.9	-12.7	-2.0	-3.9	-0.8	-7.5	-0.04	-0.02	-0.01	554	451
Cerritos	-21.1	-15.6	-19.3	-4.2	-2.3	-2.3	-10.1	-0.06	0.03	0.03	227	185	Mt SJ	-15.6	-13.4	-10.7	1.6	2.5	2.3		0.06	0.19	0.22	84	69
Chabot	-1.8	-1.1	1.6	7.9	8.8	14.2	2.6	-0.04	0.08	0.14	203	174	Ohlone	-9.0	-12.3	-5.1	16.6	13.5	21.0		0.02	0.10	0.18	113	94
Chaffey	-20.3	-17.3	-17.0	-12.1	-9.0	-11.2	-4.8	-0.04	0.09	0.03	99	81	Or. Coast	-31.2	-34.1	-31.5	-12.2	-16.9	-10.4		-0.01	-0.11	-0.02	83	65
SF	2.8	-0.6	6.3	6.9	4.3	12.5	-9.2	-0.04	0.01	0.13	500	405	Palomar	-11.1	-13.9	-8.8	-4.1	-7.7	-3.6		0.00	-0.02	0.09	143	105
San Mat.	1.7	-2.7	5.8	17.3	15.2	23.2		-0.02	-0.01	0.09	315	259	Pasadena	-14.6	-15.0	-14.0	-3.1	-6.1	-2.3	-13.2	-0.08	-0.10	-0.07	459	369
C. of Des.	-18.5	-9.4	-17.1	-1.1	6.3	-1.0	6.4	0.01	0.19	0.06	85	67	Riverside	-11.6	-5.1	-6.3	1.5	3.1	2.6	-0.8	-0.02	0.09	0.10	738	583
Crafton H.	-15.2	-12.6	-8.9					0.03		0.25	50		Sac.	-15.4	-10.0	-7.7	-0.2	2.8	7.2		-0.02	0.16	0.18	196	174
Cuesta	-14.4	-18.2	-9.6	0.4	-1.5	1.9		0.00	-0.03	0.06	158	129	Saddleback	-7.0	-11.6	-4.7	5.5	2.6	6.8		-0.11	-0.12	-0.07	264	213
Cypress	-14.5	-14.5	-14.0	-2.7	-7.2	-2.3		-0.01	-0.02	0.03	141	112	SB Valley	-2.8	6.7	2.0	2.3	6.0	4.1	0.7	0.01	0.18	0.13	102	77
De Anza	-0.6	-2.4	3.2	15.0	12.7	20.0	13.7	0.03	0.06	0.16	803	651	SD	-26.0	-26.3	-23.3	-18.4	-17.1	-15.5		-0.06	0.08	0.08	75	56
Diab. Vall.	0.5	-3.3	3.4	9.3	8.8	13.5	1.5	-0.06	-0.05	0.05	578	478	SD Mesa	-13.0	-12.5	-9.6	-1.1	-2.4	1.2	-8.0	-0.00	0.07	0.12	360	295
East LA	-32.5	-23.3	-33.9	-9.8	-6.3	-11.4	-12.5	-0.06	-0.05	-0.12	58	50	SD Mir.	-11.2	-10.8	-6.9	3.0	1.6	7.4		0.05	0.12	0.21	98	75
El Camino	-18.1	-16.4	-16.2	-6.0	-5.4	-4.2	-7.7	-0.04	0.00	-0.01	386	308	SJ Delta	-20.3	-22.0	-18.3	-3.5		1.2		0.03	0.13	0.17	57	
Foothill	-3.6	-5.1	1.9	10.0	9.5	15.8		-0.01	0.05	0.16	343	258	Santa Ana	-18.8	-17.9	-17.2	-5.2	-3.1	-3.9	-7.7	-0.03	-0.00	0.01	183	156
Fresno	-23.4	-23.3	-21.2	-13.5	-14.9	-10.5		-0.03	0.06	0.10	105	87	S. Barb.	-28.9	-33.8	-25.5	-8.1	-10.7	-6.9		-0.05	-0.19	-0.14	85	72
Fullerton	-12.0	-11.7	-9.1	-5.8	-7.8	-4.3	-11.2	-0.08	-0.02	-0.01	201	154	S. Monica	-12.7	-12.9	-11.1	-1.0	0.6	1.2	-9.1	-0.07	-0.05	-0.03	869	671
Hartnell	-14.4	-7.6	-12.2	4.4	5.6	5.9	6.5	0.04	0.19	0.14	66	56	S. Rosa	-6.5	-8.9	-1.9	-5.0	-4.2	-2.2		0.05	0.08	0.16	109	91
Irv. Vall.	-11.6	-17.2	-11.7	1.2	-1.9	0.9		-0.02	-0.12	-0.04	264	213	Sierra	-14.8	-15.7	-10.2	-2.9	-2.6	1.6		0.05	0.18	0.21	134	108
Laney	-4.2	-3.8	-0.7	4.5	4.0	8.0		-0.11	0.08	0.09	97	86	Skyline	4.0	2.0	9.9	17.9	18.0	24.5		-0.01	0.06	0.17	175	141
Las Positas	-10.8	-14.2	-2.6	6.6	7.9	13.6		0.01	0.12	0.25	72	55	Solano	-4.4	0.2	0.3	28.1	31.4	34.5		-0.00	0.19	0.20	64	52
L. Beach	-20.4	-19.0	-18.2	-2.9	-1.9	-0.7	-7.6	-0.03	0.03	0.07	220	184	Ventura	-15.0	-9.6	-10.3	-3.5	-2.5	-2.6	-2.1	0.02	0.01	0.06	120	101

Note: This table shows value-added estimates for estimable California Community Colleges. Value-added estimates using 1995-1997 UC CA-resident freshman fall applications. See text for covariate definitions "MH" (following Mountjoy and Hickman (2020)) and "C-Y" or "CFSTY" (following Chetty et al. (2020)); "Raw" are without covariates. Ethnicity-specific coefficients estimated by interacting institution with five ethnicity buckets: White, Black, Hispanic, Asian, and Other. Sample size for "CFSTY" value-added coefficients. Estimates are not shrunk or otherwise adjusted for noise. Source: UC CSS, NSC, and CA EDD.

Table 5: 1995-1997 Value-Added Estimates for Private and Out-of-State Universities

	6-Yr. Grad.			15-Yr. Wages ($000s)				HS GPA						6-Yr. Grad.			15-Yr. Wages ($000s)				HS GPA				
		All			All		Hisp.		All		# Obs.				All			All		Hisp.		All		# Obs.	
Inst.	MH	C-Y	Raw	MH	C-Y	Raw	C-Y	MH	C-Y	Raw	Grad.	Wg.	Inst.	MH	C-Y	Raw	MH	C-Y	Raw	C-Y	MH	C-Y	Raw	Grad.	Wg.
American	32.4	27.5	40.2	27.5	22.6	32.7		0.02	0.07	0.28	81	52	Pomona	28.9	32.9	44.4	13.4	14.3	30.9	6.2	0.16	0.44	0.81	392	299
Arizona	6.7	-0.1	10.0	7.9	3.7	8.7		-0.06	-0.16	-0.10	133	101	Port. St.	1.2	-0.6	9.5					-0.01	0.08	0.33	50	
AZ State	22.3	21.0	27.6					0.06	-0.02	0.06	81		Princeton	32.3	35.9	46.5	36.7	35.8	54.9		0.23	0.48	0.89	250	166
Azusa Pac.	25.6	25.8	31.5	-2.3	-0.6	0.8		0.11	0.26	0.29	110	84	Rice	10.3	12.5	25.8					0.18	0.44	0.85	75	
Biola	24.2	23.3	30.6	-14.5	-15.3	-9.8		0.07	0.16	0.31	132	101	St. Mary's	26.4	25.3	33.0	11.7	12.7	16.8	4.3	0.00	0.12	0.20	403	333
Boston C.	-20.8	-20.0	-7.9	12.5	13.0	25.9		0.03	0.27	0.52	201	127	Santa Clara	32.2	31.7	42.0	31.0	31.4	38.7	27.7	0.08	0.25	0.41	629	545
Boston U.	23.2	21.0	31.8	3.2	0.4	11.9		0.04	0.15	0.35	404	245	Scripps	28.4	28.3	39.4	3.7	-2.3	10.7		0.05	0.25	0.45	121	92
Brandeis	26.8	28.2	40.2	8.5	7.8	18.4		0.07	0.29	0.57	89	59	Smith	33.0	32.4	44.1	-3.4	-8.1	4.7		0.10	0.24	0.54	112	69
BYU	-10.3	-11.1	0.4	0.4	2.3	9.8		0.10	0.29	0.51	364	159	S. Meth.	26.3	23.2	35.4					-0.08	-0.00	0.11	69	
Bryn Mawr	27.8	30.3	41.4					0.07	0.29	0.61	61		Spelman	34.2	46.0	43.6				-7.3†	-0.22	0.34	0.22	57	
CA Luth.	24.3	23.0	31.1	12.4	7.5	14.6		0.08	0.14	0.22	124	87	Stanford	28.2	32.0	42.9	37.1	36.8	55.6	23.3	0.27	0.54	0.94	1,473	1,116
Carleton	28.4	29.1	40.1					-0.01	0.18	0.48	60		Swarthmore	33.1	35.7	46.5					0.19	0.39	0.80	64	
CMU	19.7	18.8	30.6					-0.02	0.20	0.46	63		Syracuse	30.5	30.0	39.6	19.3	20.6	26.5		0.05	0.20	0.34	156	113
Clar. Mc.	28.3	30.4	42.3	27.7	25.9	41.2	11.8	0.09	0.33	0.63	316	239	Tufts	28.9	29.9	43.1	4.9	0.5	18.8		0.03	0.28	0.59	126	80
Col. St. U.	24.8	21.3	31.3	6.7	4.4	9.5		-0.01	0.08	0.20	89	50	Tulane	28.9	27.6	40.1	20.0	17.5	28.2		-0.05	0.14	0.37	143	80
Columbia	23.9	27.6	37.9	12.0	12.6	29.7		0.06	0.33	0.69	299	189	Colorado	24.9	20.3	32.7	17.7	14.9	22.2		-0.02	-0.00	0.14	714	472
Cornell	26.3	28.8	40.9	18.3	19.2	34.6		0.10	0.38	0.71	506	320	Illinois	27.4	24.0	38.7					0.08	0.25	0.50	52	
Creighton	26.7	24.0	37.2	26.8	22.5	35.3		0.11	0.25	0.44	79	59	Michigan	30.2	30.9	42.3	29.5	31.8	43.2		0.02	0.25	0.49	150	99
Dartmouth	-57.8	-55.5	-43.5	26.5	24.6	44.8		0.21	0.47	0.87	199	119	Nevada	10.8	8.5	17.0					-0.04	0.08	0.14	67	
Duke	-21.2	-18.7	-5.8	40.3	42.9	60.5		0.17	0.46	0.84	269	167	Notre Dame	18.7	19.9	32.6					0.21	0.55	0.82	61	
Georgetown	29.3	33.3	43.8	37.4	40.2	55.2	18.1	0.08	0.42	0.70	278	169	Oregon	26.2	18.7	30.7	2.1	-6.3	3.9		-0.03	-0.11	0.03	387	253
Gonzaga	26.5	25.8	36.2					0.04	0.16	0.34	51		U. Penn.	28.0	30.7	42.9	38.2	39.7	57.8		0.10	0.39	0.75	421	271
Grinnell	32.1	31.4	43.2					0.15	0.34	0.68	51		Puget Sound	24.6	22.0	34.9	0.7	-5.6	6.6		0.03	0.17	0.40	164	90
H. Mudd	24.5	26.7	39.1	27.5	27.1	44.9		0.21	0.44	0.86	156	109	Redlands	28.6	29.2	35.7	-0.7	-2.7	2.9	1.9	0.09	0.18	0.31	203	157
J. Hopkins	22.1	25.3	37.7	25.5	26.1	44.6		0.10	0.37	0.75	201	121	USF	27.2	24.3	32.3	12.1	12.6	17.0	9.5	0.06	0.12	0.23	551	460
La Sierra	4.9	8.0	10.3	-0.1	-4.5	2.2		0.12	0.24	0.30	90	75	USC	20.8	21.7	30.8	17.4	18.1	26.4	5.8	0.04	0.22	0.39	3,947	3,192
Lew&Clk	30.7	25.6	38.4	-2.4	-12.2	-0.5		0.11	0.15	0.37	107	62	U. Pacific	24.2	25.5	32.5	26.1	26.3	33.1	7.0	0.10	0.26	0.39	508	421
Loyola M.	22.0	21.6	28.4	11.7	12.7	16.4	9.7	-0.02	0.09	0.19	1,019	853	Virginia	32.6	33.2	46.1					0.12	0.40	0.70	62	
Mills	29.3	27.6	36.7	-9.2	-10.3	-6.6		0.00	0.15	0.32	98	72	Washington	24.9	25.7	36.7					0.04	0.30	0.48	90	
Mt. St. M.	23.8	28.1	27.6	4.3	6.8	7.5	1.9	0.02	0.16	0.19	155	129	Wisconsin	24.0	23.3	34.5	5.8	3.4	13.5		-0.01	0.13	0.28	151	106
NYU	23.2	21.8	33.8	-7.7	-10.4	0.7		-0.01	0.15	0.39	432	242	Vanderbilt	28.4	29.7	41.5	16.8	19.3	30.9		0.01	0.22	0.48	147	101
N. Arizona	24.7	17.1	28.7	4.5		5.7		0.03	0.02	0.09	75		Wash. in SL	21.8	24.7	36.2					0.08	0.37	0.61	73	
Northwest.	24.4	27.6	40.0	20.1	20.9	38.3		0.14	0.45	0.81	349	210	Wellesley	30.0	33.9	44.9	9.1	11.9	24.6		0.16	0.49	0.80	156	88
Oberlin	0.9	-0.1	11.8					0.00	0.17	0.46	75		Wesleyan	34.7	34.3	46.4					0.13	0.33	0.65	70	
Occidental	33.6	34.4	42.8	1.8	3.8	9.7	-4.2	0.03	0.22	0.39	246	194	Whitman	32.7	33.1	43.9					0.06	0.19	0.50	70	
Penn. St.	21.8	17.5	29.9					0.04	0.19	0.32	57		Whittier	26.2	29.3	30.6	6.9	9.6	8.9	5.6	0.00	0.15	0.19	177	147
Pepperdine	29.3	27.2	37.4	4.7	5.9	10.5	3.2	0.10	0.24	0.37	431	316	Williams	33.0	35.1	46.5					0.14	0.39	0.78	73	
Pitzer	30.6	31.2	40.3	-0.8	-2.2	3.3	-3.4	0.07	0.20	0.37	141	113	Woodbury	-41.6	-36.8	-38.3					-0.04	0.11	0.04	54	
P. L. Naz.	20.9	16.6	26.7	-6.9	-9.3	-3.5		0.14	0.25	0.37	114	87	Yale	29.0	33.7	43.3	39.1	39.2	59.0	13.4	0.23	0.49	0.93	415	260

Note: This table shows value-added estimates for all estimable private and non-California colleges and universities. Value-added estimates using 1995-1997 UC CA-resident freshman fall applications. See text for covariate definitions "MH" (following Mountjoy and Hickman (2020)) and "C-Y" or "CFSTY" (following Chetty et al. (2020)); "Raw" are without covariates. Ethnicity-specific coefficients estimated by interacting institution with five ethnicity buckets: White, Black, Hispanic, Asian, and Other. Sample size for "CFSTY" value-added coefficients. Estimates are not shrunk or otherwise adjusted for noise. † Spelman is a historically Black college; this estimate is for Black students. Source: UC CSS, NSC, and CA EDD.

Table 6: 1995-1997 Value-Added Estimates for the University of California

	6-Yr. Grad.			15-Yr. Wages				HS GPA						6-Yr. Grad.			15-Yr. Wages				HS GPA				
		All			All		Hisp.		All		Sample				All			All		Hisp.		All		Sample	
Inst.	MH	C-Y	Raw	MH	C-Y	Raw	C-Y	MH	C-Y	Raw	Grad.	Wg.	Inst.	MH	C-Y	Raw	MH	C-Y	Raw	C-Y	MH	C-Y	Raw	Grad.	Wg.
UCB	19.8	24.0	34.5	12,900	16,800	30,100	4,400	0.04	0.37	0.66	11,692	9,078	UCR	25.1	28.1	33.2	6,400	4,700	9,000	1,000	0.01	0.12	0.21	1,389	1,204
UCD	18.7	22.2	31.7	10,100	12,400	20,800	9,500	0.02	0.28	0.45	8,961	5,927	UCSD	20.4	25.4	36.3	8,400	11,100	21,800	4,800	0.03	0.38	0.62	8,717	5,648
UCI	18.0	20.6	29.1	7,200	7,000	14,900	1,300	0.01	0.22	0.37	8,723	5,730	UCSB	19.2	19.6	29.1	7,600	6,900	12,800	-1,400	-0.00	0.11	0.24	9,989	8,104
UCLA	20.1	25.7	35.7	8,900	14,900	24,900	4,200	0.01	0.39	0.61	11,853	8,271	UCSC	14.6	12.8	21.7	-1,900	-9,000	-2,600	-10,500	-0.02	0.04	0.19	5,082	3,976

Note: This table shows value-added estimates for the University of California system. Value-added estimates using 1995-1997 UC CA-resident freshman fall applications. See text for covariate definitions "MH" (following Mountjoy and Hickman (2020)) and "C-Y" or "CFSTY" (following Chetty et al. (2020)); "Raw" are without covariates. Ethnicity-specific coefficients estimated by interacting institution with five ethnicity buckets: White, Black, Hispanic, Asian, and Other. Sample size for "CFSTY" value-added coefficients. Estimates are not shrunk or otherwise adjusted for noise. Source: UC Corporate Student System, National Student Clearinghouse, and the CA Employment Development Department.

Table 7: 1995-1997 Value-Added Estimates for Public California Universities

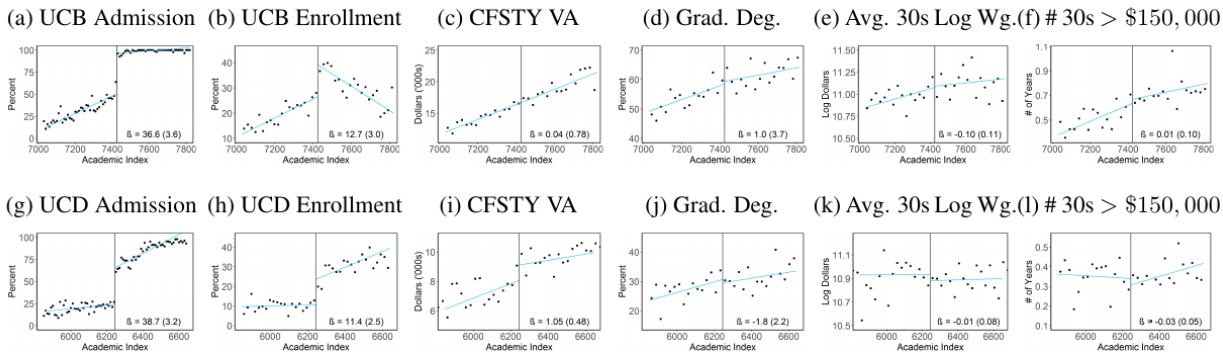
	6-Yr. Grad.			15-Yr. Wages ($000s)				HS GPA				
		All			All		Hisp.		All		# Obs.	
Inst.	MH	C-Y	Raw	MH	C-Y	Raw	C-Y	MH	C-Y	Raw	Grad.	Wg.
Cal Poly	12.8	12.3	21.8	19.1	19.6	25.6	10.6	0.06	0.20	0.34	3,216	2,626
Cal Poly Pom.	0.3	-2.8	0.5	6.5	3.8	7.1	-1.2	0.00	-0.03	0.02	1,199	1,031
CSU Chico	17.8	12.9	21.3	7.2	2.9	7.8	0.2	0.03	-0.04	0.01	451	372
CSU DH	-8.6	0.2	-8.1	-6.4	3.7	-5.4	-1.3	-0.15	0.03	-0.10	154	137
CSU EB	2.9	4.8	5.6	1.1	5.2	5.7		-0.06	0.07	0.07	248	216
CSU Fr.	4.8	9.3	9.5	2.6	5.0	6.7	2.5	0.03	0.21	0.19	379	311
CSU Fu.	5.2	3.7	4.2	1.8	0.9	1.4	-1.1	-0.02	-0.06	-0.05	996	835
CSU LB	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	1,493	1,286
CSU MB	10.8	8.6	10.1	-2.8	-6.1	-6.7		-0.04	-0.09	-0.10	77	60
CSU N	-4.1	-2.4	-3.8	-0.7	-0.7	-0.9	-3.4	-0.05	-0.05	-0.09	1,169	995

	6-Yr. Grad.			15-Yr. Wages ($000s)				HS GPA				
		All			All		Hisp.		All		# Obs.	
Inst.	MH	C-Y	Raw	MH	C-Y	Raw	C-Y	MH	C-Y	Raw	Grad.	Wg.
CSU Sac.	2.1	2.4	5.3	8.8	10.2	13.0	9.2	-0.00	0.06	0.11	531	453
CSU SB	-1.0	1.8	-0.8	1.9	3.9	0.1	0.0	0.00	0.03	-0.01	321	270
CSU SM	0.4	-0.4	2.4	-4.1	-6.4	-3.8	-3.9	0.00	0.07	0.08	136	112
CSU Stan.	2.9	2.8	8.1	3.5	5.9	7.8		0.01	0.13	0.20	80	69
HSU	-1.2	-5.0	2.3	-10.9	-15.3	-11.3		0.02	-0.02	0.10	279	204
SDSU	2.2	1.4	3.4	-0.3	0.5	0.4	-3.8	-0.01	-0.04	-0.02	2,035	1,677
SFSU	-0.3	-3.9	-0.1	1.3	0.3	3.0	-2.3	-0.05	-0.07	-0.03	1,124	918
SJSU	-1.0	-3.1	-0.5	14.7	13.8	16.8	14.6	-0.04	-0.05	-0.03	838	728
SSU	7.8	0.4	11.4	-7.4	-8.6	-5.1		-0.01	-0.03	0.06	111	88

Note: This table shows value-added estimates for the California State University system. Value-added estimates using 1995-1997 UC CA-resident freshman fall applications. See text for covariate definitions "MH" (following Mountjoy and Hickman (2020)) and "C-Y" or "CFSTY" (following Chetty et al. (2020)); "Raw" are without covariates. Ethnicity-specific coefficients estimated by interacting institution with five ethnicity buckets: White, Black, Hispanic, Asian, and Other. Sample size for "CFSTY" value-added coefficients. Estimates are not shrunk or otherwise adjusted for noise. Source: UC CSS, NSC, and CA EDD.

Figure 10 presents evidence on the return to selective UC enrollment for the non-URG students who enroll at UC Berkeley and UCLA only because Prop 209 makes additional seats available to them. It focuses on students who were *barely* rejected from UC those campuses in 1996-1997, under AA, and measures their outcomes relative to applicants who were barely admitted in those years. It shows that while many of the barely-admitted students do enroll at those campuses, their long-run outcomes (in terms of attainment and wages) remain essentially unchanged. This suggests that the URG students closed out of UC after Prop 209 may have benefited more from that enrollment than the non-URG students who replaced them. One limitation is that UC Davis's thresholds – at 6,000 and 6,250 in 1996 and 1997 – fail the McCrary (2008) test at both thresholds (with p-values of 0.016 and 0.025) as a result of a 13 percent increase in application-sending above the threshold, and there is weak evidence of negative selection above the threshold, with lower predicted wages by 0.025 log points (s.e. 0.020) immediately above the threshold (where predicted wages are a function of applicants' demographic and socioeconomic characteristics).

Figure 10: Estimated Return to UC Berkeley and Davis Enrollment for On-the-Margin Non-URG Applicants



Note: This figure shows that the URG students *barely* rejected from UC Berkeley (a-f) and Davis (g-l) prior to Prop 209 – likely the students who 'crowded into' those campuses after Prop 209 – instead enrolled at universities of equivalent (lesser) 'quality' to UC Berkeley (Davis) but ended up with highly-similar long-run outcomes, suggesting that UC enrollment was generally less valuable to them than it would have been for many URG applicants. Regression discontinuity plots and estimates around the 1996-1997 UC Berkeley (a-f) and Davis (g-l) guaranteed admission AI threshold among non-URG applicants, estimated by local linear regression following Calonico, Cattaneo, and Titiunik (2014). See the notes to Table 2 and Figure 7 for description of the outcome variables; CFSTY Inst. VA (15 yr. wages) measured relative to UC Davis, and average annual log wages and number of years with over $150,000 wages are 12-16 years after UC application. Reduced form coefficients from local linear regressions (conditional on year), with bias-corrected robust standard errors in parentheses. Running variable defined as AI plus 70 (250) in 1997 at Berkeley (Davis) to align thresholds over years. Source: UC Corporate Student System, NSC, and CA EDD.

Table 8 summarizes the wage impacts of Prop 209 on URG UC applicants, averaging across 6-16 or 12-16 years after UC application. It shows that average wages fell by 0.05 log points (about 5 percent), and average early-30s wages fell $2,400 per year. The wage declines were similar across Academic Index quartiles, and even larger if estimated relative to '94-95. The last panel of Table 8 shows that the wage deterioration faced by URG UC applicants after Prop 209 is largely explained by wage deterioration among Hispanic/Latinx applicants, with smaller effects on the outcomes of African American UC applicants.

Table 8: Difference-in-Difference Estimates of URG UC Applicants' Post-1998 CA Wage Outcomes

	Average 6-16 Years after UC App.				Average 12-16 Years after UC App.			
	# Years CA Emp.	Total Wages	Log Wages	# > $100K Wages	# Years CA Emp.	Total Wages	Log Wages	# > $100 Wages
Panel A: Diff-in-Diff Coefficients Overall								
URG	0.09	-163	0.01	-0.06	0.05	-812	-0.00	-0.03
	(0.04)	(359)	(0.01)	(0.02)	(0.02)	(531)	(0.01)	(0.01)
URG × Prop. 209	-0.00	-1,821	-0.05	-0.08	0.00	-2,381	-0.04	-0.07
	(0.04)	(438)	(0.01)	(0.03)	(0.02)	(639)	(0.01)	(0.02)
$\bar{Y}$	7.55	60,885	10.69	1.48	3.30	79,057	10.89	1.01
Obs.	199,321	178,156	178,156	199,321	199,321	152,977	152,977	199,321
Panel B: Estimates of URG × Prop 209 by *AI* Quartile								
Bottom Quartile	-0.02	-1,099	-0.06	0.06	0.00	-1,975	-0.09	0.00
	(0.11)	(995)	(0.03)	(0.06)	(0.06)	(1,430)	(0.03)	(0.04)
Second Quartile	0.11	-1,823	-0.05	-0.11	0.03	-1,937	-0.04	-0.09
	(0.10)	(935)	(0.02)	(0.06)	(0.05)	(1,361)	(0.03)	(0.04)
Third Quartile	0.02	-1,591	-0.03	-0.14	0.02	-2,068	-0.02	-0.09
	(0.09)	(935)	(0.02)	(0.06)	(0.05)	(1,373)	(0.03)	(0.04)
Top Quartile	-0.10	-1,467	-0.02	-0.06	-0.04	-2,024	-0.03	-0.05
	(0.09)	(1,040)	(0.02)	(0.06)	(0.05)	(1,552)	(0.03)	(0.04)
Panel C: Diff-in-Diff Coefficients Overall (versus 1995)								
URG	0.19	340	0.04	-0.00	0.11	-390	0.01	0.02
	(0.04)	(390)	(0.01)	(0.02)	(0.02)	(580)	(0.01)	(0.01)
URG × Prop. 209	-0.22	-2,556	-0.08	-0.19	-0.11	-3,185	-0.07	-0.15
	(0.05)	(462)	(0.01)	(0.03)	(0.02)	(676)	(0.01)	(0.02)
$\bar{Y}$	7.05	61,104	10.69	1.39	3.07	79,324	10.90	0.95
Obs.	190,540	158,989	158,989	190,540	190,540	136,341	136,341	190,540
Panel D: Diff-in-Diff with Separate Coefficients for Black and Hispanic Applicants								
Black	-0.60	-2,009	-0.078	-0.16	-0.27	-1,908	-0.088	-0.09
	(0.07)	(645)	(0.017)	(0.03)	(0.04)	(948)	(0.022)	(0.02)
Hispanic	0.38	592	0.049	-0.02	0.19	-306	0.034	-0.01
	(0.04)	(403)	(0.010)	(0.02)	(0.02)	(594)	(0.012)	(0.02)
Black × Prop 209	0.03	-478	-0.032	-0.01	0.02	-583	-0.025	-0.02
	(0.09)	(855)	(0.024)	(0.05)	(0.05)	(1,258)	(0.030)	(0.03)
Hispanic × Prop 209	-0.04	-2,298	-0.054	-0.12	-0.01	-2,998	-0.053	-0.09
	(0.05)	(482)	(0.012)	(0.03)	(0.03)	(699)	(0.015)	(0.02)
$\bar{Y}$	7.56	60,936	10.690	1.48	3.30	79,129	10.894	1.01
Obs.	197,804	176,825	176,825	197,804	197,804	151,854	151,854	197,804

Note: This table summarizes the wage outcomes described in the brief, showing that URG UC applicants' wages declined following Prop 209 without changes in CA employment, overall or by *AI* quartile; the estimates are somewhat larger using '94-95 as a baseline; and the estimates are larger for Hispanic/Latinx than African American UC applicants. Estimates of β_2 and β_3 from a difference-in-difference model of 1996-1999 (or, in Panel C, 1994-1995 and 1998-1999) URG UC freshman California-resident applicants' wage outcomes compared to non-URG outcomes after the 1998 end of UC's affirmative action program. Outcomes are defined as number of years of non-zero California wages, average wages and log wages across years with non-zero wages, and number of years with wages above $100,000, among the years 6-16 or 12-16 years after initial UC application. Models include high school fixed effects and the components of UC's Academic Index. Models by *AI* quartile are estimated independently, with quartiles defined by the *AI* distribution of 96-97 URG UC applicants. The years 1996-1997 are omitted in Panel C because some universities preemptively curtailed their AA programs in those years. Robust standard errors in parentheses. Source: UC Corporate Student System and the CA EDD.

Table 9: The Impact of Proposition 209 on URM UC Admission and Enrollment

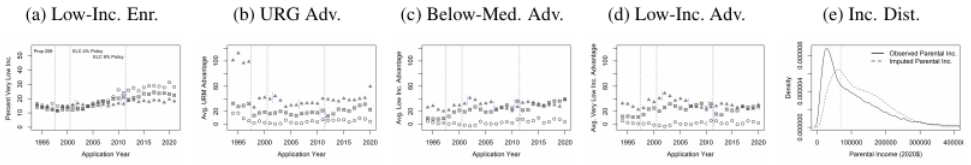
Campus:	UCB	UCLA	UCSD	UCSB	UCI	UCD	UCSC	UCR	Total
Panel A: Application conditional on any UC application (%)									
URM	11.2	9.0	-3.5	-6.0	-9.4	-4.6	-2.8	-7.1	
	(0.3)	(0.3)	(0.3)	(0.3)	(0.3)	(0.3)	(0.3)	(0.3)	
URM × Prop. 209	-1.9	-3.8	1.1	0.7	0.0	1.2	0.2	4.7	
	(0.4)	(0.4)	(0.4)	(0.4)	(0.4)	(0.4)	(0.4)	(0.4)	
$\bar{Y}$	45.0	54.8	50.2	42.5	36.2	38.5	24.2	24.6	
Number of Obs.	299,295	299,295	299,295	299,295	299,295	299,295	299,295	299,295	
Panel B: Admission conditional on application (%)									
URM	39.1	30.4	21.6	14.2	13.3	29.0	9.9	7.2	10.3
	(0.5)	(0.4)	(0.4)	(0.4)	(0.5)	(0.4)	(0.5)	(0.5)	(0.2)
URM × Prop. 209	-24.5	-19.2	-15.8	-3.9	-7.6	-20.7	-9.0	-6.5	-9.0
	(0.6)	(0.5)	(0.5)	(0.5)	(0.6)	(0.6)	(0.6)	(0.6)	(0.3)
$\bar{Y}$	32.8	35.4	50.4	63.6	65.3	69.6	83.1	85.5	82.6
Number of Obs.	134,808	164,054	150,098	127,053	108,300	115,198	72,464	73,605	299,295
Panel C: Enrollment conditional on application (%)									
URM	14.1	9.8	0.8	-0.1	-4.1	1.4	-3.5	-2.3	4.8
	(0.4)	(0.4)	(0.4)	(0.5)	(0.5)	(0.5)	(0.6)	(0.6)	(0.3)
URM × Prop. 209	-9.7	-7.4	-1.8	1.7	1.1	-1.5	0.9	0.5	-7.0
	(0.5)	(0.4)	(0.4)	(0.5)	(0.6)	(0.6)	(0.7)	(0.7)	(0.4)
$\bar{Y}$	16.5	13.9	12.0	15.9	17.5	18.7	17.0	17.7	49.9
Number of Obs.	134,808	164,054	150,098	127,053	108,300	115,198	72,464	73,605	299,295
Panel D: Estimated annual effect of Prop 209 on URM UC enrollment									
Change in URM Enr.[a]	-398	-381	-58	3	20	-65	-36	51	-865
Implied URM Enr. Effect of Aff. Action	+75.2%	+59.0%	+17.2%	-0.5%	-4.2%	+12.6%	+9.2%	-7.1%	+20.3%
Panel E: Change in URM enrollment explained by Panel C estimates (conditional on applications)									
Estimated Change in URM Enrollment[b]	-297	-301	-59	54	28	-34	17	12	-581
Residual[b]	-101	-80	1	-51	-8	-31	-53	40	-284
Panel F: Estimated annual effect of Prop 209 on URM UC enrollment, relative to '94-95									
Change in URM Enr.	-455	-506	-79	30	-83	-181	-121	-62	-1,456
Implied URM Enr. Effect of Aff. Action	+85.9%	+78.4%	+23.2%	-4.7%	+17.6%	+35.0%	+30.5%	+8.6%	+34.1%

Note: OLS coefficient estimates from independent campus-specific difference-in-difference regressions of likelihood of application, admission, or enrollment on URM status interacted with a post-1998 indicator (after Prop 209 was implemented), across 1995-2000 California-resident freshman UC applicants and including high school fixed effects and academic covariates (SAT I and II scores and high school GPA). Robust standard errors in parentheses. The 'Total' column indicates admission or enrollment to at least one UC campus (A-C) or sums across campuses (D-E). [a] The difference between the average proportion of URM students at each campus in 1998-2000 and in 1995-1997 (or, in Panel F, 1994-1995), multiplied by the school's average incoming class size in 1998-2000 (see the Technical Appendix). [b] The predicted change in URM enrollment among applicants to that campus from β_{3c} in Panel C, and the residual enrollment change unexplained by the change in URM enrollment likelihood conditional on application.

Source: UC Corporate Student System.

Finally, Tables 9, 10, and 11 follow a variation of the methodology presented in the first paragraph of the Technical Appendix – including three years of applicants on either side Prop 209 – to show Prop 209's effects on URG, below-median, and very low-income enrollment, respectively. **Below-median and very low-income enrollment are defined (here and below) as having reported family income below that year's median (or half of that year's median) California household income.**[9] When family income is not reported on the application (14 percent of applications), it is predicted by linear regression using local (Zip code) average income, ethnicity, parental occupation and education, high school, and SAT score and high school GPA. The tables show that Prop 209's effect on URG enrollment was much larger than its effect on lower-income enrollment, and that the latter was largely driven by changes in applicant behavior (as opposed to changes in admissions advantages or yield rates).

Figure 11: Aggregate Effects of UC Admissions Policies on Enrollment Composition



Note: This figure augments Figure 1 by showing that only Prop 209 meaningfully impacted only URG admissions advantages across the studied policies, with little impact on below-median and lower-income enrollment, and visualizes the imputed family income measure used to measure family income compositional effects of admissions policies. Average URM, below-median, and low-income enrollment share (a) and average respective relative admission advantage (b-d) at Berkeley and UCLA (triangle); San Diego, Irvine, Davis, and Santa Barbara (square), and Santa Cruz, Riverside, and Merced (circle) UC campuses among California-resident freshman applicants. Panel (e) shows the CA-CPI-deflated distribution of parental incomes among applicants with observed parental incomes and applicants whose parental incomes are predicted; the dotted line shows the applicant-year-weighted CA median household income. Admission advantage reflects the increased percent likelihood with which each disadvantaged applicant is admitted to a UC campus (conditional on application) compared to an academically-similar non-URM applicant; it is estimated by campus conditional on annual SAT-by-GPA interactions and application portfolios, normalized to percent units by the overall campus admission rate that year, and then averaged across campuses within group. Short dotted lines indicate when campuses adopted holistic review: Berkeley (2002), UCLA (2007), San Diego (2011), Irvine (2011), Davis (2012), and Santa Cruz (2012). Source: UC Corporate Student System.

Table 10: The Impact of Proposition 209 on Lower-Income UC Admission and Enrollment

Campus:	UCB	UCLA	UCSD	UCSB	UCI	UCD	UCSC	UCR	Total
Panel A: Application conditional on any UC application (%)									
Low Inc.	5.6	5.1	-2.5	-6.7	2.0	-1.8	-1.4	0.4	
	(0.3)	(0.3)	(0.3)	(0.3)	(0.3)	(0.3)	(0.2)	(0.2)	
Low Inc. × Prop. 209	-0.2	-2.4	0.2	-1.9	0.9	0.6	-0.3	1.5	
	(0.3)	(0.4)	(0.4)	(0.4)	(0.3)	(0.3)	(0.3)	(0.3)	
$\bar{Y}$	45.0	54.8	50.2	42.5	36.2	38.5	24.2	24.6	
Number of Obs.	299,230	299,230	299,230	299,230	299,230	299,230	299,230	299,230	
Panel B: Admission conditional on application (%)									
Low Inc.	5.6	4.4	5.5	5.5	1.5	4.0	1.4	2.2	1.9
	(0.4)	(0.3)	(0.3)	(0.3)	(0.4)	(0.4)	(0.4)	(0.4)	(0.2)
Low Inc. × Prop. 209	1.2	2.5	3.5	3.2	-3.0	3.6	-1.5	-3.2	-0.3
	(0.5)	(0.4)	(0.4)	(0.5)	(0.4)	(0.5)	(0.5)	(0.5)	(0.3)
$\bar{Y}$	32.8	35.4	50.4	63.6	65.3	69.6	83.1	85.5	82.6
Number of Obs.	134,786	164,024	150,068	127,037	108,274	115,180	72,449	73,583	299,230
Panel C: Enrollment conditional on application (%)									
Low Inc.	4.0	1.2	1.2	0.5	0.7	1.1	-0.4	0.7	3.8
	(0.3)	(0.3)	(0.3)	(0.4)	(0.4)	(0.4)	(0.5)	(0.5)	(0.3)
Low Inc. × Prop. 209	0.2	0.9	0.8	0.2	-3.7	0.3	-1.4	0.3	0.1
	(0.4)	(0.4)	(0.4)	(0.5)	(0.5)	(0.5)	(0.6)	(0.6)	(0.4)
$\bar{Y}$	16.5	13.9	12.0	15.9	17.5	18.7	17.0	17.7	49.9
Number of Obs.	134,786	164,024	150,068	127,037	108,274	115,180	72,449	73,583	299,230
Panel D: Estimated annual effect of Prop 209 on below-median UC enrollment									
Change in URM Enr.[a]	-18	-6	54	-34	-164	23	-68	13	-199
Implied URM Enr. Effect of Aff. Action	+1.4%	+0.5%	-5.8%	+3.9%	+13.3%	-2.0%	+10.9%	-1.0%	+2.3%
Panel E: Change in below-median enrollment explained by Panel C estimates (conditional on applications)									
Estimated Change in URM Enrollment[b]	10	56	43	9	-166	12	-37	10	-65
Residual[b]	-28	-62	11	-42	2	12	-31	3	-135
Panel F: Estimated annual effect of Prop 209 on below-median UC enrollment, relative to '94-95									
Change in URM Enr.	5	-148	-22	-70	-150	-70	-117	12	-560
Implied URM Enr. Effect of Aff. Action	-0.4%	+11.1%	+2.3%	+8.1%	+12.1%	+5.9%	+18.7%	-1.0%	+6.5%

Note: OLS coefficient estimates from independent campus-specific difference-in-difference regressions of likelihood of application, admission, or enrollment on whether the student comes from a family with below-median income interacted with a post-1998 indicator (after Prop 209 was implemented), across 1995-2000 California-resident freshman UC applicants and including high school fixed effects and academic covariates (SAT I and II scores and high school GPA). 'Below-median' is defined as having family income below the California household median in the application year. Robust standard errors in parentheses. The 'Total' column indicates admission or enrollment to at least one UC campus (A-C) or sums across campuses (D-E). [a] The difference between the average proportion of URM students at each campus in 1998-2000 and in 1995-1997 (or, in Panel F, 1994-1995), multiplied by the school's average incoming class size in 1998-2000 (see the Technical Appendix). [b] The predicted change in URM enrollment among applicants to that campus from β_{3c} in Panel C, and the residual enrollment change unexplained by the change in URM enrollment likelihood conditional on application.

Source: UC Corporate Student System.

Table 11: The Impact of Proposition 209 on Very Low-Income UC Admission and Enrollment

Campus:	UCB	UCLA	UCSD	UCSB	UCI	UCD	UCSC	UCR	Total
Panel A: Application conditional on any UC application (%)									
V. Low Inc.	5.5	5.4	-1.6	-5.0	3.5	-0.8	-0.7	1.4	-0.0
	(0.4)	(0.4)	(0.4)	(0.4)	(0.4)	(0.3)	(0.3)	(0.3)	
V. Low Inc. × Prop. 209	0.5	-1.0	0.8	-2.6	0.6	0.6	-1.2	1.5	0.0
	(0.5)	(0.5)	(0.5)	(0.5)	(0.5)	(0.4)	(0.4)	(0.5)	
$\bar{Y}$	45.0	54.8	50.2	42.5	36.2	38.5	24.2	24.6	
Number of Obs.	299,230	299,230	299,230	299,230	299,230	299,230	299,230	299,230	
Panel B: Admission conditional on application (%)									
V. Low Inc.	5.7	4.9	9.4	4.3	1.8	5.0	1.2	1.4	2.7
	(0.5)	(0.4)	(0.5)	(0.5)	(0.5)	(0.5)	(0.6)	(0.5)	(0.3)
V. Low Inc. × Prop. 209	2.4	3.6	1.8	5.4	-3.6	5.0	-1.8	-3.0	-0.4
	(0.7)	(0.5)	(0.6)	(0.7)	(0.6)	(0.7)	(0.8)	(0.6)	(0.4)
$\bar{Y}$	32.8	35.4	50.4	63.6	65.3	69.6	83.1	85.5	82.6
Number of Obs.	134,786	164,024	150,068	127,037	108,274	115,180	72,449	73,583	299,230
Panel C: Enrollment conditional on application (%)									
V. Low Inc.	4.3	1.5	2.6	-0.4	-0.2	1.5	-0.6	-0.5	4.7
	(0.5)	(0.4)	(0.5)	(0.5)	(0.5)	(0.6)	(0.7)	(0.6)	(0.4)
V. Low Inc. × Prop. 209	0.1	1.2	-0.8	0.4	-3.1	1.1	-2.1	-0.1	-0.4
	(0.6)	(0.5)	(0.6)	(0.7)	(0.6)	(0.8)	(0.8)	(0.7)	(0.5)
$\bar{Y}$	16.5	13.9	12.0	15.9	17.5	18.7	17.0	17.7	49.9
Number of Obs.	134,786	164,024	150,068	127,037	108,274	115,180	72,449	73,583	299,230
Panel D: Estimated annual effect of Prop 209 on very low-income UC enrollment									
Change in URM Enr.[a]	-32	-6	-17	-28	-98	14	-50	-12	-228
Implied URM Enr. Effect of Aff. Action	+6.6%	+1.0%	+4.9%	+9.4%	+19.6%	-2.8%	+23.0%	+2.3%	+6.7%
Panel E: Change in very low-income enrollment explained by Panel C estimates (conditional on applications)									
Estimated Change in URM Enrollment[b]	2	38	-20	8	-78	20	-26	-2	-58
Residual[b]	-35	-44	3	-36	-19	-6	-24	-10	-170
Panel F: Estimated annual effect of Prop 209 on **very low-income** UC enrollment, relative to '94-95									
Change in URM Enr.	-6	-128	-38	-65	-85	-63	-54	-31	-469
Implied URM Enr. Effect of Aff. Action	+1.2%	+23.0%	+10.9%	+21.6%	+17.0%	+12.4%	+25.1%	+6.0%	+13.7%

Note: This table shows that affirmative action had similar ramifications for very low-income students as shown in Table 10, though the aggregate enrollment effects are proportionately larger among these very low-income students. OLS coefficient estimates from independent campus-specific difference-in-difference regressions of likelihood of application, admission, or enrollment on very low-income status interacted with a post-1998 indicator (after Prop 209 was implemented), across 1995-2000 California-resident freshman UC applicants and including high school fixed effects and academic covariates (SAT I and II scores and high school GPA). Low-income defined as having family income below **half** the California household median in the application year. Robust standard errors in parentheses. The 'Total' column indicates admission or enrollment to at least one UC campus (A-C) or sums across campuses (D-E). [a] The difference between the average proportion of URM students at each campus in 1998-2000 and in 1995-1997 (or, in Panel F, 1994-1995), multiplied by the school's average incoming class size in 1998-2000 (see the Technical Appendix). [b] The predicted change in URM enrollment among applicants to that campus from β_{3c} in Panel C, and the residual enrollment change unexplained by the change in URM enrollment likelihood conditional on application.

Source: UC Corporate Student System.

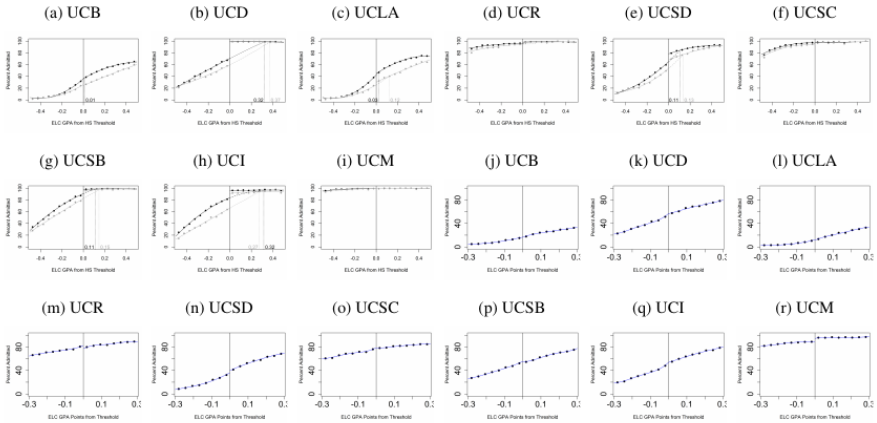
RESULTS APPENDIX: ELC AND HOLISTIC REVIEW

This section includes additional estimates of the impact of ELC and holistic review on URG and lower-income enrollment. Figure 11 augments Figure 1 by summarizing overall enrollment and admissions advantages for URG, below-median income, and very low-income applicants annually between 1994 and 2021.[10] It shows that Prop 209 was by far the largest shock to UC admissions since the early 1990s, with the other policies analyzed in this brief having only second-order top-line effects on UC's disadvantaged student composition. The 2020 rise in the more-selective UC campuses' URM admission advantage was driven by UC Berkeley and did not correspond to the implementation of a new admission policy.

Figure 12 implements the regression discontinuity designs discussed in the technical appendix to admission at each UC campus under each of the 4% (2010-2011) and 9% (2012-2017) ELC policies. See Bleemer (2022) for discussion of threshold selection. The figure shows that eligible students received large admissions advantages at Davis, Irvine, San Diego, and Santa Barbara under the 4% policy but only at UC Merced under the 9% policy, providing evidence for the claim in the text that the 9% ELC policy had little effect on URM admission (and, thus, on enrollment) at any UC campus other than perhaps Merced.[11]

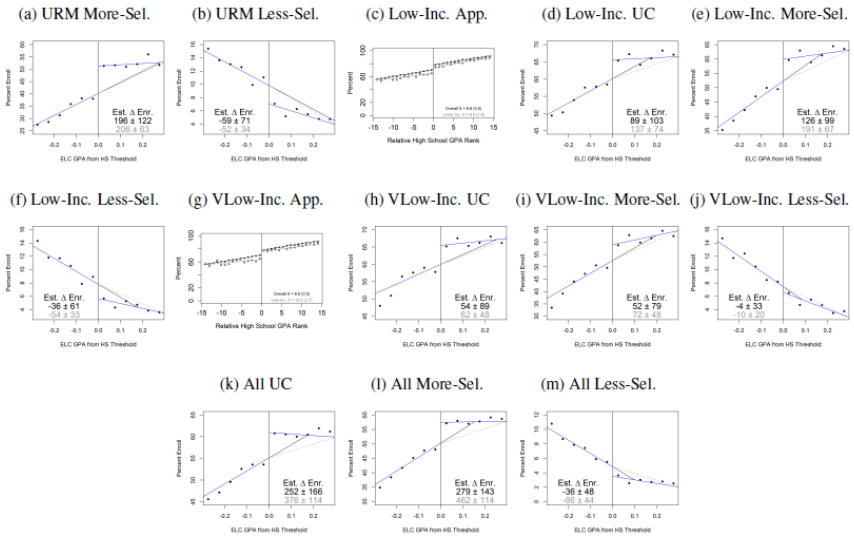
Figure 13 provides additional evidence on the 4% ELC policy. It shows that in addition to increasing aggregate UC enrollment, the 4% ELC policy pulled about 60 URM students from the less-selective Merced, Riverside, and Santa Cruz campuses into the more-selective campuses. This pattern is the same for below-median, lower-income, and all students. Estimated gross enrollment effects of the 4% ELC policy are smaller but non-neglible for lower-income students, and estimates overall suggest that URM students made up about half of the total number of students directly pulled into UC by the admissions advantages provided by campuses to eligible students.

Figure 12: On-the-Margin Effects of UC ELC Policies on Enrollment at Each Campus



Note: This figure shows how the 2001-2011 and 2012-2017 ELC policies impacted admission at each campus, with the Absorbing campuses providing large admissions advantages on the eligibility margin prior to 2012 but only Merced providing any advantage after that year. (a-i) Extrapolated quadratic best fit lines for the proportion of 2010-2011 UC applicants who are admitted the each selective UC campus by the distance between students' ELC GPA and their high school's ELC threshold, with best fit lines estimated separately on each side of the threshold. The below-threshold fit line is extrapolated to meet the above-threshold fit line (or, at UC Irvine, to its vertex); the location of that intercept is indicated on the x-axis. Data and best fit lines are presented overall (black) and among URM applicants (gray), which includes Black, Hispanic, and Native American applicants. (j-r): Binned averages of 2012-2017 applicants' likelihood of admission to each undergraduate UC campus by ELC GPA distance to their high school's ELC eligibility threshold. Thresholds are at the ninth percentile of ELC GPAs by high school and are approximated by a support vector machine algorithm described in the text. Each chart includes 20 evenly-spaced bins on either side of the ELC threshold; the fit lines are fifth-order polynomials. Source: UC Corporate Student System.

Figure 13: Effects of 4% ELC Policy on UC Application, Admission, and Enrollment



Note: This figure provides additional evidence on the effects of the 4% ELC policy, showing that the policy tended to pull some students from more- to less-selective UC campuses; disproportionately increased lower-income high school graduates' UC application likelihoods; increased lower-income UC enrollment through the admission channel; and increased gross overall UC enrollment through the admission channel by about twice as many students as the URM increase. All but panels (c) and (g): Extrapolated triangular-kernel local linear best fit lines (black) and end-to-end linear splines (gray) for the proportion of 2010-2011 URM, below-median, very low-income, or all UC applicants who enroll at any UC campus, a more-selective UC campus (Berkeley, UCLA, Davis, Irvine, Santa Barbara, or San Diego), or a less-selective UC campus (Merced, Riverside, or Santa Cruz) by the distance between students' ELC GPA and their high school's ELC threshold, with best fit lines estimated separately on each side of the threshold. The linear extrapolations extend to 0.3 GPA points above the threshold, and the positive gaps between the lines are integrated across the true distribution of applicants to estimate the change in the number of enrolled UC students as a result of the ELC program, conditional on application. Ninety-five percent confidence intervals for each procedure estimated from block-bootstraps by high-school-year and color-coded by estimation strategy: black for local linear, gray for end-to-end linear spline. URM is defined to include Black, Hispanic, and Native American applicants. Below-median (and very low) income is defined as having family income below (half) the California household median in the application year. Panels (c) and (g): Local linear regression discontinuity estimates of the share of all, below-median, and very low-income 2005-2006 California high school seniors who applied to at least one UC campus by their ELC GPA rank above or below their school's ELC eligibility threshold in that year, and estimates of the change in application likelihood at the threshold with conventional standard errors. Data are restricted to the 77 percent of students matched to College Board SAT records. Source: UC Office of the President and College Board (for family income data in the latter panels).

Finally, the panels of Figure 13 focused on the admissions channel show outsized increases in admissions responses from lower-income students, who became 8 to 12 percentage points more likely to send an application to at least one UC campus if they received a letter from UC notifying them of their ELC admissions guarantee. As in the main text, I make two assumptions to extrapolate from these on-the-margin estimates of application effects to estimate the number of additional UC enrollees who would not have otherwise applied to UC (and who were not already counted in the admissions estimates presented in the other panels of Figure 13). First, I assume that the share of UC applicants at the threshold who only applied as a result of their ELC eligibility (10.2 percent for URG students, reflecting the quotient between 9.0 and the 87.8 percent of ELC-eligible URM students who applied to UC in those years) is the same for all students within 0.3 ELC GPA points above their high school's threshold. I also assume that new UC applicants are similarly likely to enroll at UC as other UC applicants with the same relative ELC GPA. Under these assumptions, in 2010-2011 the ELC application channel may have increased gross URM UC enrollment by as much as 171±16 students per year (expressing a block-bootstrapped 95-percent confidence interval), suggesting that ELC's application channel may have been about as large as the admission channel in increasing URM UC enrollment.[12]

The findings related to the 9% ELC policy are investigated further in Tables 9-14. These tables estimate versions of the same regression discontinuity models at each GPA percentile threshold as determined through the ELC policy, where the models are estimated using local linear regression with bias-corrected cluster-robust standard errors over 2012-2017 applicants and control for year, gender-race, and high school fixed effects. For example, the top-right coefficient of Table 9 shows that URM students whose GPA was just high enough to be in their high school's first GPA percentile of students were about 1.8 percentage points less likely to be admitted to UC Merced than those whose GPAs were just lower and were thus in the second GPA percentile (though the difference is statistically insignificantly different from zero). Statistically-significant estimates are bolded.Table 10 shows the same results for enrollment. The tables show that no campus provided systematic and meaningful admissions advantages at any percentile threshold other than at the 9% eligibility threshold, and even Merced did not see a statistically-measurable enrollment increase at that threshold. Tables 11-12 use a different estimation methodology (estimating third-order polynomials on either side of the eligibility threshold and standard robust standard errors) but come to the same conclusion. Tables 13-14 include *all* students, not just URM students, but show that even with the resulting additional statistical precision, there is little evidence of any meaningful admissions advantages leading to increased gross enrollment from the ELC policy at any campus. Estimating the change in overall UC enrollment using the regression discontinuity model reveals that ELC-eligible URM students' overall UC enrollment likelihood increased by 1.4±4.8 percentage points at the ELC eligibility threshold (or 2.7±4.3 at the fourth percentile threshold), both far smaller than the 9.1±4.0 increase estimated from the 4% ELC policy.

Table 12: Estimated Impact of ELC Percentile on URM Admission by UC Campus

	UCB	UCLA	UCSB	UCD	UCSD	UCI	UCR	UCSC	UCM
First Centile	-2.78 (3.07)	2.75 (3.35)	-2.98 (2.49)	-2.34 (2.13)	4.08 (2.59)	1.00 (1.63)	-3.87 (2.16)	4.72 (3.01)	-1.79 (4.69)
Second Centile	-5.13 (3.95)	-2.04 (4.11)	-4.19 (3.44)	-2.67 (3.10)	1.59 (3.47)	0.73 (2.05)	-3.22 (2.51)	3.63 (2.53)	-1.38 (3.07)
Third Centile	4.85 (4.09)	3.27 (3.15)	1.72 (3.30)	**-5.26** (2.52)	2.05 (2.55)	-2.22 (2.00)	-1.14 (2.98)	4.62 (2.66)	1.35 (2.59)
Fourth Centile	-2.78 (3.08)	-2.05 (2.48)	-3.87 (3.24)	**7.56** (3.51)	-5.34 (3.62)	0.23 (2.51)	-0.51 (2.09)	3.06 (2.98)	-1.27 (3.55)
Fifth Centile	-1.77 (2.78)	0.08 (1.73)	-0.35 (2.64)	-4.74 (3.17)	-1.11 (3.51)	-1.09 (2.75)	-1.21 (2.31)	-0.83 (2.73)	1.99 (1.87)
Sixth Centile	-1.34 (2.69)	-2.78 (2.35)	-4.13 (2.98)	-1.74 (3.58)	4.51 (2.99)	-3.61 (2.17)	0.07 (2.72)	-0.03 (3.80)	-2.00 (2.65)
Seventh Centile	1.56 (1.98)	0.61 (1.51)	-2.55 (2.18)	-0.86 (2.52)	0.90 (2.53)	0.30 (2.32)	0.60 (2.83)	-0.55 (2.44)	4.03 (2.41)
Eighth Centile	0.47 (1.64)	0.10 (1.51)	0.39 (2.79)	1.91 (2.64)	0.82 (2.40)	-0.78 (2.71)	-3.81 (2.88)	1.96 (2.90)	1.06 (1.97)
Ninth Centile	-1.18 (1.91)	0.68 (1.37)	-2.95 (2.18)	**-5.64** (2.60)	0.96 (1.86)	-2.14 (2.74)	-2.72 (2.41)	3.96 (3.85)	**15.65** (3.43)

Table 13: Estimated Impact of ELC Percentile on URM Enrollment by UC Campus

	UCB	UCLA	UCSB	UCD	UCSD	UCI	UCR	UCSC	UCM
First Centile	2.22 (2.24)	-6.15 (3.73)	1.78 (1.30)	0.12 (1.85)	4.01 (2.15)	-0.08 (1.47)	1.00 (0.85)	-0.22 (0.84)	-0.13 (0.53)
Second Centile	-2.19 (1.96)	-0.44 (2.04)	1.58 (1.58)	**-4.79** (1.85)	1.15 (1.99)	1.43 (2.16)	0.65 (1.25)	0.78 (0.86)	-0.66 (0.58)
Third Centile	-1.32 (1.68)	2.45 (1.85)	1.83 (1.61)	**-3.60** (1.57)	0.08 (1.72)	-0.80 (1.95)	-0.88 (1.12)	-1.42 (1.02)	0.26 (0.76)
Fourth Centile	-1.60 (1.44)	-0.19 (1.20)	2.32 (1.93)	1.85 (1.49)	-2.14 (1.51)	**3.75** (1.71)	0.43 (1.14)	0.15 (0.72)	0.31 (0.76)
Fifth Centile	-0.33 (0.79)	-0.71 (0.92)	1.21 (1.18)	0.51 (1.21)	0.72 (1.05)	-0.23 (1.05)	1.07 (1.21)	0.07 (0.69)	0.83 (0.65)
Sixth Centile	0.30 (0.98)	0.03 (1.11)	1.80 (1.56)	-1.81 (1.05)	0.94 (1.10)	-1.22 (1.81)	0.40 (1.38)	-1.27 (1.03)	-0.01 (0.81)
Seventh Centile	1.06 (0.62)	0.50 (0.76)	1.15 (1.24)	-1.65 (0.93)	-0.19 (0.68)	-0.08 (1.01)	0.87 (1.03)	0.29 (0.67)	0.42 (0.81)
Eighth Centile	0.71 (0.78)	0.02 (0.80)	1.00 (0.97)	0.31 (1.07)	1.36 (0.90)	-0.62 (1.01)	-0.64 (1.21)	-0.70 (0.88)	-1.00 (0.77)
Ninth Centile	0.04 (0.67)	0.59 (0.80)	-0.66 (1.10)	0.55 (1.23)	-0.24 (0.70)	-0.28 (1.08)	0.35 (1.17)	0.65 (0.99)	0.63 (0.87)

Table 14: Estimated Impact of ELC Percentile on URM UC Admission using Poly. Spec.

	UCB	UCLA	UCSB	UCD	UCSD	UCI	UCR	UCSC	UCM
First Centile	-1.33 (3.11)	3.00 (2.75)	-0.79 (2.75)	-2.43 (2.33)	-0.87 (2.15)	1.90 (1.75)	-3.03 (1.87)	-1.99 (2.67)	-1.35 (3.75)
Second Centile	-1.80 (2.50)	-1.34 (2.30)	-1.11 (2.26)	2.97 (2.38)	3.97 (2.14)	1.48 (1.65)	0.19 (2.01)	3.31 (2.55)	4.71 (2.51)
Third Centile	-1.06 (2.13)	-1.23 (2.03)	0.53 (2.18)	-4.38 (2.44)	1.78 (2.26)	-2.82 (1.68)	1.97 (1.84)	**4.67** (2.37)	1.76 (2.08)
Fourth Centile	-0.43 (1.97)	0.96 (1.85)	-0.30 (2.07)	**6.29** (2.49)	-0.09 (2.19)	**4.34** (1.90)	0.78 (1.78)	-2.39 (2.41)	0.47 (2.07)
Fifth Centile	-0.04 (1.84)	0.61 (1.43)	0.40 (2.09)	-1.13 (2.48)	-2.28 (2.00)	-2.68 (1.98)	-0.13 (1.93)	0.59 (2.31)	1.32 (1.96)
Sixth Centile	-0.61 (1.63)	-1.40 (1.34)	0.95 (2.00)	0.94 (2.19)	2.14 (1.97)	-2.94 (1.89)	0.15 (2.04)	0.41 (2.48)	1.93 (1.98)
Seventh Centile	0.82 (1.62)	-0.95 (1.28)	-1.61 (1.85)	-0.45 (2.25)	-1.48 (1.82)	-0.03 (1.96)	0.96 (2.16)	1.04 (2.48)	**4.43** (1.86)
Eighth Centile	0.42 (1.56)	0.48 (1.24)	-1.22 (1.74)	1.82 (2.32)	1.02 (1.84)	-1.98 (1.90)	-1.14 (1.95)	0.17 (2.55)	-0.07 (2.06)
Ninth Centile	-0.27 (1.47)	1.80 (1.15)	-2.83 (1.75)	-0.44 (2.09)	2.53 (1.56)	3.05 (1.80)	0.91 (2.16)	4.37 (2.50)	**15.96** (2.47)

Table 15: Estimated Impact of ELC Percentile on URM UC Enrollment using Poly. Spec.

	UCB	UCLA	UCSB	UCD	UCSD	UCI	UCR	UCSC	UCM
First Centile	2.34 (1.49)	0.60 (1.97)	1.01 (1.07)	0.24 (1.34)	-1.26 (1.52)	0.28 (1.56)	0.86 (0.72)	0.04 (0.65)	-0.01 (0.42)
Second Centile	-0.52 (1.19)	-1.25 (1.48)	-0.49 (1.10)	**-2.88** (1.19)	1.89 (1.28)	-0.81 (1.18)	0.37 (0.72)	0.43 (0.59)	-0.01 (0.47)
Third Centile	-0.92 (0.91)	-0.76 (1.15)	-0.38 (1.05)	-0.86 (1.05)	-0.94 (1.09)	-1.14 (1.15)	0.23 (0.70)	-0.58 (0.63)	-0.10 (0.46)
Fourth Centile	0.15 (0.80)	0.30 (1.02)	-0.69 (0.99)	0.06 (0.95)	-0.94 (1.00)	**2.44** (1.12)	0.81 (0.68)	0.16 (0.58)	-0.40 (0.51)
Fifth Centile	0.23 (0.73)	-0.23 (0.75)	0.47 (0.99)	0.87 (0.89)	0.16 (0.80)	-0.32 (1.02)	-0.26 (0.84)	-0.06 (0.65)	0.54 (0.54)
Sixth Centile	0.04 (0.65)	-0.40 (0.72)	0.04 (0.95)	-1.12 (0.84)	0.34 (0.71)	-1.25 (0.98)	-0.29 (0.75)	-0.33 (0.64)	0.28 (0.57)
Seventh Centile	0.68 (0.57)	-0.62 (0.64)	-0.45 (0.87)	**-1.87** (0.81)	-0.06 (0.64)	-0.23 (0.93)	0.48 (0.71)	0.46 (0.63)	0.54 (0.53)
Eighth Centile	0.05 (0.52)	0.13 (0.58)	0.76 (0.81)	-0.11 (0.76)	0.78 (0.62)	-0.12 (0.86)	0.85 (0.72)	-0.85 (0.67)	-0.54 (0.53)
Ninth Centile	-0.33 (0.46)	1.05 (0.55)	-0.96 (0.78)	0.20 (0.67)	0.24 (0.48)	0.16 (0.76)	0.28 (0.78)	0.58 (0.67)	0.54 (0.54)

Table 16: Estimated Impact of ELC Percentile on *Overall* Admission by UC Campus

	UCB	UCLA	UCSB	UCD	UCSD	UCI	UCR	UCSC	UCM
First Centile	-1.94 (1.63)	0.86 (1.51)	-2.21 (1.33)	-0.61 (0.90)	1.14 (0.70)	0.26 (0.54)	-0.35 (1.20)	-2.43 (1.44)	
Second Centile	-0.85 (1.47)	1.33 (1.99)	-0.01 (1.02)	0.53 (1.04)	**3.32** (1.01)	0.71 (0.85)	-0.61 (1.03)	1.17 (1.28)	0.89 (1.56)
Third Centile	3.29 (1.90)	0.13 (1.70)	0.02 (1.53)	-1.32 (1.18)	1.53 (1.18)	-0.13 (0.80)	-0.72 (0.83)	1.78 (0.97)	1.05 (1.38)
Fourth Centile	1.92 (1.70)	0.92 (1.63)	-0.11 (1.45)	1.29 (1.23)	1.60 (1.20)	**2.58** (1.03)	1.81 (1.18)	-0.55 (1.10)	0.68 (1.46)
Fifth Centile	-0.65 (1.27)	0.84 (1.42)	0.48 (1.23)	0.95 (1.49)	-1.47 (1.18)	0.50 (1.05)	0.05 (1.35)	-0.36 (1.30)	0.64 (1.03)
Sixth Centile	1.52 (1.55)	0.25 (1.42)	0.12 (1.18)	-0.47 (1.43)	1.23 (1.45)	0.03 (1.40)	-0.77 (1.29)	1.43 (1.46)	-0.01 (1.34)
Seventh Centile	0.44 (1.48)	0.63 (1.27)	-0.33 (1.21)	-0.21 (1.25)	0.53 (1.38)	-0.09 (1.22)	0.64 (1.44)	-0.27 (1.06)	0.86 (1.42)
Eighth Centile	-0.42 (1.19)	1.78 (1.24)	-0.03 (1.36)	-0.21 (1.39)	**2.91** (1.32)	0.03 (1.25)	-0.21 (1.42)	-0.09 (1.50)	0.35 (1.13)
Ninth Centile	0.45 (1.25)	0.07 (1.16)	-0.74 (1.40)	-0.76 (1.75)	**3.79** (1.44)	1.39 (1.64)	-3.04 (1.75)	1.44 (1.73)	**10.77** (1.74)

Table 17: Estimated Impact of ELC Percentile on *Overall* Enrollment by UC Campus

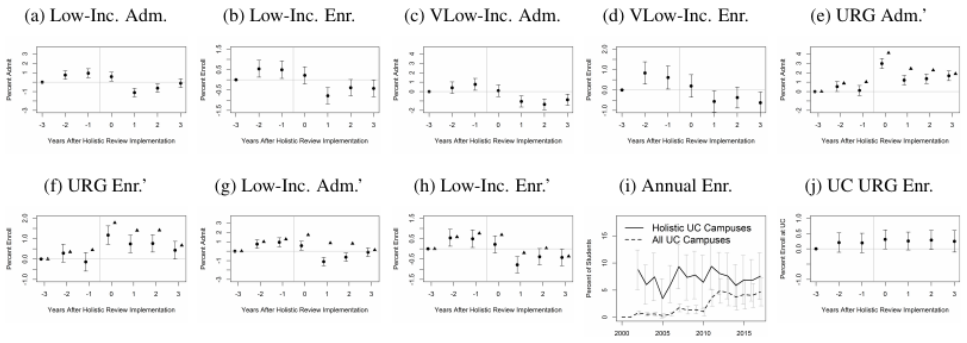
	UCB	UCLA	UCSB	UCD	UCSD	UCI	UCR	UCSC	UCM
First Centile	-0.40 (1.15)	-0.16 (1.41)	0.92 (0.54)	0.11 (0.74)	1.54 (0.91)	-1.07 (0.65)	0.55 (0.31)	-0.10 (0.26)	-0.02 (0.15)
Second Centile	-0.99 (0.96)	-0.29 (0.83)	0.79 (0.62)	-0.86 (0.78)	-0.09 (0.71)	0.09 (0.64)	0.19 (0.29)	0.30 (0.35)	-0.21 (0.16)
Third Centile	0.33 (0.86)	-0.76 (0.79)	0.69 (0.70)	**-2.42** (0.86)	0.57 (0.85)	0.54 (0.76)	-0.46 (0.42)	-0.08 (0.34)	0.14 (0.18)
Fourth Centile	0.63 (0.88)	0.54 (0.59)	-0.01 (0.71)	-0.00 (0.81)	-0.87 (0.99)	0.60 (0.67)	0.25 (0.42)	0.56 (0.35)	0.05 (0.20)
Fifth Centile	-0.25 (0.57)	-0.05 (0.62)	1.10 (0.63)	0.69 (0.77)	-0.73 (0.83)	0.98 (0.85)	0.19 (0.39)	0.06 (0.31)	0.05 (0.24)
Sixth Centile	0.91 (0.81)	0.50 (0.69)	0.49 (0.65)	-1.02 (0.90)	0.05 (0.76)	0.43 (0.69)	-0.19 (0.44)	0.32 (0.40)	0.15 (0.28)
Seventh Centile	0.34 (0.66)	0.28 (0.43)	0.72 (0.62)	-0.47 (0.81)	0.29 (0.72)	-0.53 (0.60)	0.23 (0.41)	-0.09 (0.39)	0.12 (0.33)
Eighth Centile	-0.24 (0.48)	0.89 (0.55)	0.22 (0.56)	-0.40 (0.69)	0.84 (0.62)	-0.01 (0.68)	-0.13 (0.49)	0.11 (0.36)	-0.32 (0.29)
Ninth Centile	-0.06 (0.64)	0.39 (0.63)	-0.53 (0.55)	0.28 (0.79)	0.76 (0.58)	0.35 (0.62)	-0.22 (0.69)	0.19 (0.46)	0.34 (0.41)

See text for details on tables 12-17.

Figure 14 provides additional details on the holistic review estimates presented in Figures 4 and 5 of the main text.[13] It shows that campuses that implemented holistic review did not appear to spur increased admission or enrollment among lower-income students; indeed, if anything lower-income enrollment declined in the years after implementation. While there has been substantial academic discussion about the statistical suitability of the staggered difference-in-difference design employed to study holistic review, panels (e) to (h) show that an alternative estimation strategy robust to those statistical concerns provides similar-magnitude year-over-year estimates of the impact of holistic review on both URG and lower-income enrollment. Finally, it provides evidence that while holistic review tends to increase campuses URG enrollment by about seven percent, many of those students would have otherwise enrolled at other UC campuses, suggesting that the policies' system-wide effects are smaller than the separate effects at each implementing campus. The average of the four post-implementation beta coefficients in Figure 4, used in this analysis, is 0.71; the coefficient on all post-3-years-after years is a bit larger, at 0.91.

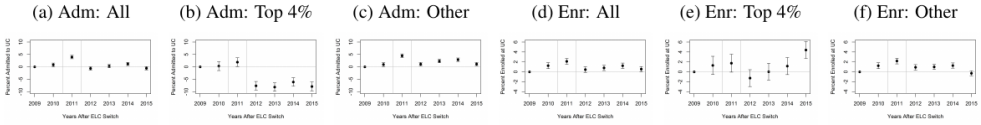
Finally, Figure 15 provides a complementary set of analyses comparing the campus-level enrollment effects of the 4% ELC policy with that of holistic review using a difference-in-difference design estimated around 2012, around which several UC campuses switched between implementing the two. See Appendix B of Bleemer (2022) for equations and estimation details. It shows that. The presented evidence suggest that switching from the 4% ELC policy to holistic review increased each URG applicants' relative enrollment likelihoods by about 0.3 percentage points. That would suggest that at the implementing campus level – among the UC campuses that implemented the two policies around those years – holistic review has around twice the impact as the admission channel of the 4% ELC policy. Figure 13 suggest that the 4% ELC policy caused about 200 new URM freshman students to enroll at San Diego, Davis, and Irvine through that policy's admission channel (corresponding to a five percent increase), but also likely crowded out other students (some of whom may have been URG). Given that holistic review increases URM enrollment by about 7 percent at implementing campuses, the present findings suggest that crowd-out appears to decrease the 4% ELC policy's *net* effect on URM enrollment by about one-third.

Figure 14: Effects of Holistic Review on UC Admission and Enrollment



Note: This figure provides additional evidence on the effects of UC's holistic review policies: the policies had no measurable positive effect on lower-income admission or enrollment (indeed, they may have led to small declines among lower-income students); using an alternative estimator following the 'new difference-in-difference' literature (to avoid negative weights across campuses) provides similar estimated year-over-year effects when holistic review is implemented; holistic review increases URG enrollment by about 7 percent, or potentially as much as 4 percent system-wide (if all pulled-in students are assumed to otherwise not enroll at UC); and evidence that UC-wide enrollment rises *much* less than campus-specific enrollment when holistic review is implemented, suggesting that many impacted students *would* have otherwise enrolled at other UC campuses. Panels (a)-(d): Difference-in-difference estimates of the impact of holistic review on below-median and low-income admission and enrollment at implementing UC campuses, differenced across time, campus, and lower-income status. Sample restricted to 1997-2017 freshman California residents and stacked across UC campuses; admission is conditional on application to that campus. OLS regressions control for campus-by-high-school fixed effects as well as campus-income, year-income, and campus-year fixed effects all interacted with gender and whether the student is in the top four percent of their class (post-2000), as well as an additional income-specific ELC indicator at selective UC campuses and SAT-score-by-GPA interactions by campus. Standard errors are clustered by applicant. The beta coefficient three years prior to HR implementation is set to 0. Panels (e)-(h): Same as in earlier panels, but adding the triangle estimates, which are estimated separately (for robustness) for each of the six treated campuses (omitting campuses that were treated before or during the estimation window; e.g. the UCLA regression omits Berkeley from the estimation sample) and averaged across the six sets of β coefficients. Non-implementing campuses are included and combined with indicator for more than four years prior to implementation. Panel (i): Estimated proportion of URM students who enroll at UC campuses as a result of those campuses' holistic review policies, among students at campuses with holistic review and among all UC campuses. Number of students estimated using the $\hat{\beta}_k$ coefficients from Figure 4 as described in the technical appendix. Ninety-five percent confidence intervals from block-bootstrapped standard errors, treating individual applicants as blocks. Panel (j): Same as in first panels, but replacing the outcome with URG enrollment at *any* UC campus, not just the implementing campus. All: URG is defined to include Black, Hispanic, and Native American applicants. Below-median (and very low) income defined as having family income below (half) the California household median in the application year. The campuses that implemented holistic review are Berkeley (starting 2002), UCLA (2007), San Diego (2011), Irvine (2011), Davis (2012), and Santa Cruz (2012); other campuses are included and combined with indicator for more than four years prior to implementation. Source: UC Corporate Student System.

Figure 15: Estimated Impact of Replacing ELC with Holistic Review on URG Admission and Enrollment



Note: This figure shows that the rise in URG admission and enrollment caused by the selective UC campuses' adopting holistic review slightly exceeded the decline caused by the end of the 4% ELC policy, with offsetting changes among ELC-eligible and -ineligible applicants. Triple- and quadruple-difference beta estimates of the impact of the 2011-2012 transition to the post-2011 ELC policy on URG applicants' admission (a-c) and enrollment (d-f) at selective UC campuses, differenced across time, campus (compared to the more-selective UC campuses), and URG status. Sample restricted to freshman California residents and, in the center and right columns, further differenced by whether the students were in the top four percent of their high school class by ELC GPA. OLS regressions control for campus-by-high-school fixed effects and campus-by-SAT-score-by-HSGPA; standard errors are clustered by applicant. Two of the four selective UC campuses implemented holistic review in 2011, and a third implemented in 2012; there were no changes in holistic review policies at the more-selective campuses in this period (since they had previously implemented the policy). Source: UC Corporate Student System.

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[2] See Atkinson and Pelfrey (2004) for a more complete account of the motivation behind these policies. To give a sense of scale, UC received xx California-resident freshman fall applications between 1994 and 2021. Out-of-state enrollment (another hot-button issue in this area) is not discussed in this brief, the University of California (and its most-selective Berkeley and UCLA campuses) only enrolled a small share of non-resident students in the sample period, rising from 5 (7) percent in 1994 to 16 (22) percent in 2021.

[3] A public-facing description of Comprehensive and Holistic Review is available from UC.

[4] This estimate may be upward-biased as a result of URG crowd-out from the ELC program, which is not estimated here. On the other hand, it could be downward-biased if ELC did in fact increase UC application rates among URG high school graduates. The URG share at UC averaged 16 percent between 1998 and 2000, and most URG applicants are Hispanic/Latinx, rising from 73 percent in 1994 to 84 percent in 2021.
[5] See Bleemer (2019).
[6] For details on estimation and the statistical results behind this paragraph, see Bleemer (2020).
[7] CA employment statistics from the American Community Survey. While Prop 209 caused a small number of mostly-Black URM UC applicants to enroll at out-of-state Ivy+ institutions, the impact of their exit from California on the presented wage statistics is small. Consider the number of years in which URM applicants earn at least $100,000 in the 6-16 years after UC application. URM Ivy+ enrollees are about 15 percentage points less likely than other top-AI-quartile applicants to work in CA annually, and almost one-third of URM Ivy+ enrollees who work in CA earn over $100,000 between 6 and 16 years after UC application. Given the 0.5 (1.0) percentage point increase in Ivy+ enrollment among URM (Black) UC applicants after Prop 209, this implies an expected decline in the number of years earning over $100,000 of about 0.003 (0.005), small changes relative to the 0.08 fewer high-earning years among URM applicants and the 0.11 year gap between the effects of Prop 209 on Black and Hispanic applicants.
[8] SAT records -- including both scores and test-takers' survey responses, including self-reported race -- are matched for 77% (81%) of high school students. Race is available in every year between 2001 and 2011 for 91 percent of test-takers, while family income is only available between 2001 and 2006.
[9] For context, annual below-median (very low-income) freshman California-resident enrollment across the UC system was about 14,300 (6,700), with 7,100 (3,300) at the selective UC campuses in 2010-2011. The correlation between URG and below-median (very low-income) indicators is 0.28 (0.20) among UC applicants and 0.27 (0.19) among UC students. The median family income of 1997 URG (non-URG) UC applicants was $36,000 ($64,000) and among enrollees was $38,000 ($62,000).
[10] For the 14 percent of freshman California-resident UC applicants who do not report parental incomes on their UC application, I approximate those incomes by estimating OLS models of parental income on year indicators interacted with SAT score (excluding 2021, where it is unavailable), high school GPA, the interactions between father's and mother's education (64 categories), the interactions between father's and mother's occupation (319 categories), and race (16 categories) as well as high school and Zip code fixed effects. Models are estimated separately by five-year period from 1994 to 2021; e.g. the 2003-2007 model has an (adjusted) R^2 of 46 (44) percent. Applicants who did not report parental incomes are imputed to have higher median incomes than those that did report by about 25 percent, but about 27 percent of non-reporters are estimated to be from below-median households, relative to 42 percent of reporters. For comparison, only about 3 percent of applicants do not report race.
[11] The relevant sample size (in 2012-2017 and within 0.3 GPA points of any estimated threshold) is 250,770 overall and 73,959 URG.
[12] These estimates results from taking 10.2 percent of the empirical integral under the local linear best-fit line between ELC GPAs 0 and 0.3 in Figure 3b, using the best-fit line to avoid double-counting new URM enrollees through the application and admission channels. The alternative assumption that the 10.2 percent of applicants who only applied because of ELC linearly declines to 0 at 0.3 GPA points above the eligibility threshold results in a conservative estimate of 100+/-8 students who enroll through the application channel. Confidence intervals for overall gross UC enrollment from the ELC application channel (and using the alternative assumption) is similarly estimated to increase by 468+/-23 (276+/-13) students on the basis of 7.7 percent of applicants coming from the policy, suggesting that URM students make up about a third of the application-channel enrollment effect of the 4\% ELC policy. Confidence intervals for below-median students are 285+/-20 (166+/-11) and are 180+/-18 (104+/-9) for very low-income students, given that 10.5 and 14.8 percent of ELC-eligible below-median and very low-income applicants from each respective group would not have applied to UC absent being informed of their ELC eligibility. The presented estimates abstract from the fact that the 4% ELC policy's admission advantages grew over time; e.g. at UC Davis (Santa Barbara), the at-the-margin admission advantage grew from 12 (0) to 31 (12) percentage points between 2003 and 2011.
[13] By 2017, these estimates suggest that holistic review was increasing URG enrollment by $7.6+/-5.1 percent (with 95-percent confidence intervals from the block-bootstrap discussed above), corresponding to a UC system-wide URM enrollment increase of up to (but less than) 4.7 ± 3.0 percent.