Top Percent Policies and the Return to Postsecondary Selectivity *

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Abstract

I study the efficacy of test-based meritocracy in college admissions by evaluating the impact of a grade-based "top percent" policy implemented by the University of California. Eligibility in the Local Context (ELC) provided large admission advantages to the top four percent of 2001-2011 graduates from each California high school. Estimates from a regression discontinuity design show that ELC led over 10 percent of barely-eligible applicants from low-opportunity high schools to enroll at selective UC campuses instead of less-selective public colleges and universities. Half of those participants came from lower-income families, and their average SAT scores were at the 14^{th} percentile of their UC peers. Despite this mismatch, ELC participants overperformed in their college grades, and more-selective enrollment led participants to graduate earlier and earn higher late-20s wages by over $1,000 per percentage point change in their enrollment institution's graduation rate. These returns appear to exceed the average return to university selectivity among higher-testing students in this setting, implying that university admission policies targeting low-testing students can promote economic mobility without efficiency losses.

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The more capable high school students should have the greater freedom of choice of collegiate institution, and selection procedures should give preference to the more able ... [to] predict success in the state colleges.

∼Report of the California Master Plan for Higher Education Technical Committee, 1961

1 Introduction

Since the 1960s, selective public universities in the U.S. have admitted students mostly on the basis of test scores and other measures of academic preparation.[1] The California Master Plan for Higher Education provides the traditional justification for such policies: high-performing students are believed to best take advantage – from the perspective of the public interest, economic and otherwise – of the educational resources offered at public universities. Many universities give admissions advantages to certain disadvantaged applicants in order to rectify unequal K-12 learning opportunities and promote socioeconomic mobility, but these 'access-oriented' admission policies are controversial on efficiency grounds: students with lower test scores are generally thought to derive smaller (or no) benefits from more-elite education when compared to the better-'matched' students admitted by test-based meritocracy (Arcidiacono and Lovenheim, 2016). This study investigates the equity and efficiency of test-based meritocracy in the allocation of U.S. higher education.

I analyze an access-oriented admission policy implemented by the University of California (UC) between 2001 and 2011. Eligibility in the Local Context (ELC) was a 'top percent' policy, guaranteeing selective university admission to Californians whose grades ranked in the top four percent of their high school class. I construct a new administrative dataset combining California high school, standardized test, and UC applicant records and use a regression discontinuity design to both estimate ELC's effect on barely-eligible applicants' likelihood of admission and enrollment at each UC campus and characterize the students whose enrollments are shifted at the eligibility threshold. I then link each applicant to grades, national educational attainment, and late-20s California wages and employ an instrumental variable strategy to estimate the medium-run effects of more-selective university enrollment for ELC participants. Finally, I combine the quasi-experimental research design with estimates from institutional value-added models to investigate the relationship between students' meritocratic standing and their wage return to enrolling at a

[1] Public universities offered low-cost higher education to any student who satisfactorily completed high school until surging demand exceeded state-funded supply in the late 1950s (Douglass, 2007; Goldin and Katz, 2008).

more-selective university.

I show that the admission advantages conferred by ELC eligibility caused over 10 percent of barely-eligible applicants to enroll at selective UC campuses instead of enrolling at other less-selective public colleges and universities. These barely-eligible ELC 'participants' were drawn from low-performing high schools and fell below UC's traditional admission margin, with much lower test scores and family incomes than most of their UC peers. Despite their relatively poor academic preparation, these students substantially outperformed their test scores in terms of college grades and became as much as 20 percentage points more likely to earn a college degree within five years, almost matching the increase in five-year graduation rates of the institutions they attended. In the longer run, more-selective university enrollment led these low-'merit' students to substantially higher annual wages in their late 20s. The estimated wage gains are substantially larger than the rise in average wage value-added of the institutions where they enrolled, suggesting that the ELC participants appear to have gained substantially *more* from access to selective universities than the higher-testing students traditionally admitted to those schools.

I begin below by providing background on the ten-campus University of California and its 2001 Eligibility in the Local Context policy, which was implemented three years after UC's race-based affirmative action policy was prohibited by a state ballot proposition. ELC targeted such low-testing students for admission into California's public research universities that even prominent scholars who favored the expansion of university access protested: "top students in many high-poverty schools are woefully unprepared for college ... many of the new students will simply flunk out and the policy will be discredited" (Orfield, 1998). To study this policy, I construct a novel dataset of detailed records covering the top 12.5 percent of 2002-2011 seniors from nearly all California high schools – including the GPA rank used to determine ELC eligibility – linked to statewide College Board testing data and comprehensive freshman applications to each UC campus. Each UC applicant is then linked to UC grade point averages (among UC enrollees), university enrollment and degree attainment records from the National Student Clearinghouse, and annual California wages from the state's Employment Development Department.

I next introduce the stacked regression discontinuity research design that I employ to study the reduced-form effects of ELC eligibility on applicant behavior and outcomes. The University of California implemented design features that prohibited students from even knowing their relevant

ELC GPA, let alone their rank distance to the high school's threshold: UC annually solicited high school transcripts, calculated special GPAs using specific sophomore- and junior-year courses, and determined the top four percent of each school's students internally. The research design's key identification assumption – that UC *applicants*' potential outcomes are smooth across their high schools' ELC eligibility thresholds – is primarily threatened by the fact that high school seniors were informed of their ELC eligibility prior to choosing whether to apply to UC, increasing the UC application rates of a negatively-selected group of eligible students. I provide evidence that this compositional change is small and, if anything, would slightly downward-bias the estimated returns to more-selective university enrollment for targeted students.

Employing this regression discontinuity design, I show that ELC eligibility did not substantially affect admissions decisions at UC's most- and least-selective campuses, the former because they chose against providing sizable admissions advantages to eligible students and the latter because they were already admitting nearly all high-GPA applicants. However, the UC campuses at San Diego, Davis, Irvine, and Santa Barbara all provided large admissions advantages to ELC-eligible applicants: barely-eligible applicants from the bottom half of California high schools (ranked by SAT scores) became 10 to 35 percentage points more likely to be admitted to each campus as a result of their ELC eligibility. Over 10 percent of those applicants switched into enrolling at one of the four 'Absorbing' UC campuses instead of enrolling at a teaching-oriented California State University, a less-selective UC campus, or a local community college, with no observed enrollment changes at private or out-of-state universities.

Because top graduates from higher-performing high schools had little need for ELC eligibility to gain UC admission, 80 percent of barely-eligible ELC participants were from the bottom half of California high schools by SAT; I focus on these 'B50' students for most of my analysis. 56 percent of those participants came from families with below-median household incomes and about half were underrepresented minorities (URM). Barely-eligible B50 participants' average SAT scores were at the 14^{th} percentile of their Absorbing UC peers, altogether suggesting a negatively selected group of students.

Next, I turn to estimation of how ELC eligibility impacted near-threshold ELC participants' educational and labor market outcomes. B50 students earned first-year grades at the 23rd percentile, outperforming their place in the test score distribution but falling below most of their peers. Despite their relatively poor academic preparation and performance relative to their more-advantaged peers, however, ELC participants substantially sped up their time to undergraduate degree attainment, becoming about 0.8 percentage points more likely to earn a college degree within five years per 1 percentage point increase in the graduation rate of their enrollment institution (which rose by about 22 points overall). I observe no measurable change in students' ever earning an undergraduate degree, nor any change in their STEM degree attainment. B50 applicants' reduced-form annual wages increased by about \$2,700 at the eligibility threshold, suggesting that these students derived large positive wage gains from more-selective university enrollment. Even B25 applicants – those from the bottom quarter of California high schools, whose average test scores were so low that they were essentially off the SAT distribution at Absorbing UC campuses – saw noisily-estimated wage gains from UC enrollment. These findings reject the hypothesis that all lower-testing students would be better-served enrolling at less-selective universities (e.g. Sander and Taylor, 2012).

I conclude with a discussion of the allocation objectives of public higher education. The instructional expenditures and estimated value-added of California's public universities vary widely – measuring institutional value-added following either Chetty et al. (2020) or Mountjoy and Hickman (2020) – and higher-value universities are typically allocated to higher-testing students. California's Master Plan for Higher Education suggests that this allocation is at least partially justified on efficiency grounds. However, the wage returns to university selectivity received by ELC participants are substantially larger (at least in point estimate) than the difference in institutional value-added relative to their counterfactual enrollment institutions, suggesting that the relatively low-testing ELC participants actually derived *above*-average returns to more-selective university enrollment.

This study contributes transparent long-run quasi-experimental evidence to a large literature on Sowell (1972)'s "mismatch hypothesis" in higher education, which is the central justification for systems of highly stratified and academically selective public universities. There is a growing consensus that admission to more-selective universities provides substantial labor market returns to students on the admission margin (Hoekstra, 2009; Anelli, 2020; Zimmerman, 2019; Chetty et al., 2023), but a series of observational and structural studies have suggested that lower-testing students – that is, students below selective universities' admission margin – may benefit from enrolling instead at colleges that better match their academic capabilities (Loury and Garman, 1993, 1995; Arcidiacono et al., 2016; Dillon and Smith, 2020).[2] Two recent quasi-experimental studies obliquely challenge this conclusion, but each has limitations. Bleemer (2022) finds that race-based affirmative action provides outsized labor market gains to targeted low-testing Hispanic students, but cannot distinguish between the partial-equilibrium effects of more-selective university enrollment and the general-equilibrium effects of widespread race-based preferences, which dramatically changed enrollment compositions at implementing universities. Black et al. (2023) find that Texas's "Top Ten" top percent policy provided outsized labor market gains to targeted students, but documents that the students targeted by Texas's policy were not unusually low-testing or otherwise academically negatively-selected, suggesting that the effects may have been driven by relatively more-prepared students.[3] This study isolates a small group of low-testing students and sharply rejects negative labor market effects of their more-selective university enrollment. In fact, those low-testing students appear to receive larger labor market returns than the *average* – not marginal – student enrolled at those institutions.

These evidence could be interpreted as rejecting the mismatch hypothesis outright, or could be interpreted as rejecting both the SAT and UC's traditional 'merit'-based admission process – both measures on which ELC participants fare poorly relative to most UC enrollees – as effective proxies for a latent student 'ability' characteristic thought to determine efficient match quality. As a result, this study also contributes to a literature on the role of standardized testing in the allocation of higher education in the US and around the world (Grodsky et al., 2008; Black et al., 2016). Since at least 1960, when California enshrined standardized tests in its Master Plan to identify "applicants whose educational purposes are properly met by the college and whose abilities and training indicate probable success," public universities in the US have used evidence of tests' "predictive validity" for college grades and retention to justify their rejection of lower-testing applicants (Westrick et al., 2019; Rothstein, 2004). I show that low-SAT high-GPA students earn lower college grades but receive labor market returns at least as large (and likely larger) than the high-SAT students typically admitted to selective public universities. ELC participants' low test

[2]Dale and Krueger (2002) and Mountjoy and Hickman (2020) notably find evidence of null returns to selectivity for enrolled students, though Dale and Krueger (2014) find observational evidence that URM students derive positive (and thus above-average) returns to selectivity. Many prior studies (e.g. Fryer et al., 2008) simply define higher education 'efficiency' by the match between well-resourced universities and high-testing students.

[3]The large literature on Texas Top Ten has otherwise focused on the policy's effects on college enrollment (Long et al., 2010; Niu and Tienda, 2010; Cortes and Lincove, 2019) and attainment (Alon and Tienda, 2007; Kapor, 2020).

scores under-predict their college performance, but not by as much as they under-predict the labor market value that ELC participants derive from more-selective university enrollment.[4] These findings suggest that expanding selective university access to low-SAT high-GPA applicants – as by top percent policies, test-optional admissions (Belasco et al., 2015; Bennett, 2022), or holistic review (Bleemer, 2023) – could promote economic mobility without decreasing universities' average economic value-added to their enrolled students.[5]

2 Background

California has three public higher education systems: the research-oriented University of California (UC), the teaching-oriented California State University (CSU), and the two-year California Community Colleges (CCC). UC's California-resident enrollment grows in proportion to the state's high school graduates, with about 45,000 earnings UC bachelor's degrees in 2011 from its nine campuses: the most-selective Berkeley and Los Angeles (UCLA) campuses, the middle-tier Davis, San Diego, Santa Barbara, and Irvine campuses, and the less-selective Riverside, Santa Cruz, and Merced (founded in 2005) campuses. Mirroring the rest of the United States, financial resources are sharply stratified across California's public universities by selectivity. Figure 1 shows that expenditures per student on instruction and student services (like tutoring and extracurriculars) at the middle tier of UC campuses were 50-400 percent higher than at CSUs or CCCs in the 2000s, and their instructional expenditures were double those at the less-selective UC campuses.[6]

UC employed race-based affirmative action in undergraduate admissions until 1997, after which the practice was banned by ballot proposition. Eligibility in the Local Context was introduced in 2001 to expand access to UC campuses in a race-neutral manner (Atkinson and Pelfrey, 2004).[7] Under ELC, graduates of participating California high schools – which by 2003 included 96 percent of public high schools and 80 percent of private high schools – were guaranteed admission

[4] As discussed below, near-threshold ELC participants' test scores are actually measured by the scores of below-threshold compliers, since ELC's admission guarantee may cause the participants to earn lower test scores themselves.

[5] Large-scale policy changes could have general-equilibrium value-added effects through changes in peer composition (e.g. Cai and Heathcote, 2022). Though there is little evidence of substantial peer effects in higher education (Angrist, 2014), the relatively small scale of the ELC policy leaves estimation of any such effects to future work.

[6] Figure A-1 shows even greater stratification across California's public institutions in terms of research expenditures, universities' other primary expense category.

[7] Top percent policies have been implemented by universities in Texas, Florida, and Georgia and at Thomas Jefferson High School in Virginia.

to at least one UC campus if their grades were in the top four percent of their class.[8] Class rank was determined centrally by UC: high schools submitted students' transcripts to the UC Office of the President, which calculated UC-specific 'ELC grade point averages (GPAs)' on a four-point scale using certain eligibility-relevant second- and third-year courses.[9] ELC GPAs were partially weighted – adding one GPA point for each junior-year honors-level course – and rounded to the nearest hundredth. The 96th percentile of ELC GPAs at each high school was selected as the school's 'ELC eligibility threshold' in that year, above which students were deemed 'ELC-eligible'.

ELC-eligible students received a letter in the fall of their senior year informing them of their eligibility, along with the guarantee of admission to at least one UC campus (but no guarantee to any specific campus). In order to maintain eligibility, ELC-eligible students had to pass their high school's college-level senior curriculum and take the SAT. Each UC campus was informed of their applicants' ELC eligibility but retained independence in their admissions decisions. Figure 2 presents an internal UC Davis chart showing how that campus implemented the ELC policy, providing ELC-eligible students with the same (very large) admission advantage provided to students with an extra 1,000 SAT points.

Due to implementation challenges in its first year (resulting in a high-profile settlement with the ACLU), 2001 California high school graduates were disproportionately assigned above-threshold GPAs and provided ELC eligibility (see Figure A-2); I omit that year from all analysis below.[10] There were no other substantial changes to the ELC policy until 2012, when ELC was expanded from the top 4% to the top 9% of each high school class.[11] However, every UC campus ceased pro-

[8]Cullen et al. (2013) find that a small number of students switched high schools in order to 'game' this kind of high-school-percentile admissions policy after Texas implemented a similar top percent policy.

[9]See Atkinson and Pelfrey (2004). The courses included two years of English and Mathematics, one year of History, Lab Science, a Non-English Language, and four other UC-approved courses. Students or their parents could opt out of their high school's providing their transcript to UC at their discretion. This centralized ELC administration importantly differs from Texas's program, where high schools were directly responsible for identifying the top ten percent of students; some high schools purposefully extended "Top Ten" eligibility to a greater proportion of students (Golden, 2000).

[10]2011 was also an unusual year because Irvine and San Diego implemented holistic review and ELC admission preferences declined (Bleemer, 2023); all presented results are statistically insensitive to omitting 2011.

[11]The university did not conduct any comprehensive analysis of the ELC program following an inconclusive short-run program evaluation in 2002 (University of California, 2002). A series of academic studies (Rothstein, 2000; Long, 2004, 2007) had concluded that ELC had minimal effect on UC enrollment – generally as a result of their assuming that ELC provided admission to only the least-selective UC campuses – but Bleemer (2023) shows that the 2001-2011 ELC policy increased URM enrollment at the Absorbing UC campuses by about 6 percent.

viding substantial admissions advantages to ELC-eligible applicants after this 'expansion,' forcing the systemwide office to coerce UC Merced to admit otherwise-rejected ELC-eligible students and rendering the program practically defunct Bleemer (2023). As a result, this study focuses on the pre-2012 ELC policy.

3 Data

I combine several primary data sources to conduct this study. First, I compile the annual high school senior database produced by the University of California to administer the ELC program, which contains the top 12.5 percent of California high school seniors' high school, overall GPA, ELC GPA rank, gender, residential ZIP code, and ELC eligibility.[12] About 10 percent of these students are disqualified prior to the eligibility determination – generally as a result of not completing eligibility-conferring courses – and are omitted. The high school database is linked by student identifying characteristics to the universe of California SAT-takers (using data provided by College Board) to their latest standardized test score, testing month, and sociodemographic characteristics provided on a pre-test survey: race and parental income and education.[13] Further details on data sources, construction, quality, and matching are available in Appendix A.

Next, I compile an annual database of all 2001-2011 undergraduate applications to any University of California campus. Each record contains the applicant's residential address, high school, gender, ethnicity, parental education, SAT or ACT score, and family income, as well as whether they applied to, were admitted to, and/or enrolled at each campus and their intended majors. The application data also include a unique identifier matching students to the high school senior database.

I construct three datasets to measure applicants' short- and long-run outcomes. First, a UC student enrollment database provides first-year, second-year, and overall college GPAs for all UC enrollees. Second, the National Student Clearinghouse's StudentTracker database contains each UC applicants' enrollment and graduation records across nearly all U.S. two- and four-year col-

[12] These records were preserved on an employee's local computer and are available for 2001-2011 excluding 2009, which were mistakenly internally overwritten.

[13] While the UC application permitted students to submit ACT scores instead of SAT scores, only 2 percent of applicants in the period did so.

leges and universities.[14] NSC records are censored by a small number of students and institutions, but their near-completeness throughout the study period means that it is highly unlikely that differential NSC reporting could be a substantial factor driving the results presented below.[15] Science, Technology, Engineering, and Mathematics (STEM) majors are categorized by CIP code following the U.S. Department of Homeland Security (2016).

Finally, I collect quarterly 2002-2021 wages for each UC applicant as observed by the California Employment Development Department.[16] The EDD maintains employment records for unemployment insurance administration, and are unavailable for workers outside California, self-employment, and federal employment. About 63 percent of applicants in the sample have positive wages ten or eleven years after high school graduation. All continuous variables are winsorized within sample at 1 percent above and below to exclude outliers.

Table 1 reports summary statistics for the resulting dataset. High-achieving California high school students – those in the top 12.5 percent of their class by GPA – are 63 percent female and on average come from ZIP codes at about the state's median household income. Restricting to the 76 percent who uniquely match in the College Board data little changes the sample on observables and shows that about 26 percent are from underrepresented minorities (Black or Hispanic) and that the students have an average SAT score of 1150, almost one standard deviation above the national average.

Restricting the high school sample to the 69 percent who apply to the University of California applicants results in a somewhat positively-selected 238,987 students described in the fourth column of Table 1. I then further restrict the sample to the 204,136 applicants from sufficiently-sized high schools within 15 GPA ranks of their school's ELC eligibility threshold, the main estimation sample below.[17] Compared to the average UC applicant, the estimation sample is sharply positively selected on high school GPA (by construction) but has a similar sociodemographic makeup, though female and rural students are over-represented. Sixty percent of these students enroll at UC cam-

[14] In particular, it contains semesterly enrollment records and graduation records (including degrees, majors earned, and year of graduation) for all degree-granting institutions that accept federal Title IV funding.

[15] Appendix B shows that nearly all California colleges and universities were reporting to NSC by 2003 and that a comparison between UC and NSC records reveals very low degree attainment and major censorship rates.

[16] All wage statistics were originally estimated as institutional research (see Bleemer (2018)).

[17] Figure A-3 shows that some small school-years have fewer than three unique ELC GPAs above or below their eligibility threshold, challenging estimation across the threshold. They are omitted from all analysis, though Table 7 shows that all estimates are robust to their inclusion.

puses, with the rest roughly equally split between the CSU system, private California universities, out-of-state universities, and no four-year college enrollment.

The last four columns of Table 1 summarize the estimation sample by high school quartile, ranking schools by the average leave-year-out SAT scores of their top students.[18] Because the ELC program guaranteed admission to four percent of every high school's applicants, its expected impact will be larger at lower-performing high schools where high-GPA students have fewer or less-desirable alternative enrollment options.[19] Indeed, applicants from the bottom quartile of high schools have lower SAT scores (GPAs) by 335 (0.32) points and are almost four times more likely to attend CSU campuses than applicants from the top quartile. Lower-quartile applicants are also far more likely to be Black or Hispanic and come from far lower-income households. Below, I refer to applicants from the bottom half and quarter of California high schools as the 'B50' and 'B25' samples, respectively.

4 Empirical Methodology

I estimate the reduced-form effects of ELC eligibility using a discrete regression discontinuity design (Hahn et al., 2001). Let $Y_i(1)$ and $Y_i(0)$ denote student i's potential outcomes if they are ELC-eligible or ineligible, respectively. The effect of ELC eligibility on near-threshold applicants is:

$$LATE_{RD}(Y) = \lim_{Rank \downarrow 0} E[Y_i(1)|Rank] - \lim_{Rank \uparrow 0} E[Y_i(0)|Rank] \tag{1}$$

where $Rank$ is student i's discrete number of GPA ranks above or below their school's ELC eligibility threshold. I estimate $LATE_{RD}(Y)$ by $\hat{\beta}$ from a linear regression model:

$$Y_{it} = \beta ELC_i + f(Rank_i) + \delta X_i + \alpha_{h_i} + \gamma_t + \epsilon_{it} \tag{2}$$

[18] In particular, high schools are annually ranked by the average SAT score of students in the complete ELC senior database in every *other* year and divided into student-weighted quartiles.

[19] Cortes and Lincove (2019) find greater takeup of Texas's top percent policy among students from less-competitive schools.

where ELC_i indicates ELC eligibility, X_i are covariates that absorb spurious variation in Y_{it}, and α_{h_i} and γ_t are high school and application year (t) fixed effects.[20] I estimate Equation 2 stacked across all participating high schools with the error terms ϵ_{it} clustered by $h_i \times t$, the level of treatment assignment (Kolesar and Rothe, 2018; Abadie et al., 2023). In the main specification I parameterize f by third-order polynomials on either side of the eligibility threshold with a uniform bandwidth of 15 ranks; Table 7 presents estimates from a series of alternative specifications.

4.1 Identification

The key identification assumption justifying the regression discontinuity design is that $E[Y_i(1)|GPA]$ and $E[Y_i(0)|GPA]$ are smooth at $GPA = 0$. There are two potential threats to smoothness in this context. First is the traditional concern that students or high schools might 'game' ELC eligibility by manipulating their ELC GPA to achieve eligibility, perhaps through additional investment in junior-year course performance. Such behavior is highly unlikely in this context, since students were unaware of their own ELC GPA (which was specially-calculated by the UC system), let alone all of their peers' ELC GPAs or the school's eligibility threshold (which was not determined until months after their final grades were received). 'Gaming' students would have been no more likely to arrive just above than just below their school's eligibility threshold.

The traditional McCrary (2008) test for bunching above the eligibility threshold, however, fails for a different reason. Bunching in the underlying ELC GPA – which is discrete, averaged over 11 courses and rounded to the nearest hundredth – implies that the 96th percentile GPA used to determine the eligibility threshold is more likely to occur at more-popular GPAs than at less-popular GPAs. When this occurred, ELC eligibility was provided to *all* students at eligibility-determining GPA rank, generating bunching at exactly $Rank_i = 0$. Figure A-4(b) shows exactly this pattern, inconsistent with 'gaming' (which would also lead to increased mass at $Rank_i = 1$ and decreased mass at $Rank_i = -1$) but consistent with the chosen eligibility protocol.

The observed bunching is a threat to identification only if students at popular GPAs have different trajectories to students at less-popular GPAs. The analysis below preserves these students in the sample but visualizes outcomes for every $Rank$, showing little evidence of non-smoothness

[20]In the main specification, X_i includes gender and ethnicity indicators, overall high school GPA, and mean ZIP code income.

among this group of students. Table A-8 presents specifications omitting $Rank_i = 0$ students, which modestly strengthens most of the presented results.

A second smoothness concern arises when the sample of all high school seniors is restricted to University of California applicants, which is necessitated by data availability in studying long-run student outcomes. Students were aware of their ELC eligibility prior to choosing whether to send an application to any UC campus, and Figure 3 shows that this information increased students' likelihood of UC application by 6 percentage points (about 8 percent), or 9 percentage points among B50 students.[21] As a result, the outcomes of above-threshold students may differ from their below-threshold peers as a result of differential selection into UC application.

It isn't obvious whether the 'application compliers' – students who only applied to UC as a result of their ELC eligibility – would be relatively positively or negatively selected. They might be students intending to enroll at a more-selective university who were convinced into applying to UC campus as a backup 'safety school' (likely positively-selected), or they might be students who hadn't previously applied because they believed that they were unlikely to admitted to UC campuses no matter whether they applied (likely negatively-selected). Table A-1 shows that, when compared to other near-threshold applicants, the application compliers are observably negatively selected, especially among B50 students: they have substantially lower SAT scores, high school GPAs, and parental incomes (proxied by residential ZIP code) and are much more likely to be URM. The latter explanation thus seems predominant: the students that ELC caused to apply were likely students who had previously chosen against applying to UC because they believed that admission was unlikely.[22]

Figure 3(b) projects late-20s wages onto detailed applicant characteristics – gender, ethnicity, parental income and education, and ZIP code economic characteristics – and presents averages by relative ELC rank for both all high school seniors (solid lines) and the subset of UC applicants (dashed lines).[23] While there is positive selection overall into UC application at higher-testing high schools, UC applicants look approximately representative of all high-scoring seniors at B50 and B25 high schools. However, there is evidence of negative selection across the eligibility thresh-

[21] Appendix D shows evidence of another behavioral response to ELC's UC admission guarantee: above-threshold students were less likely to retake the SAT and ended up with relatively lower SAT scores, making standardized test scores endogenous to eligibility and prohibiting their use as a potential covariate.

[22] Poor information could have also played a role; e.g. Hoxby and Turner (2013); Bleemer and Zafar (2018).

[23] Table A-2 presents separate regression discontinuity estimates for each characteristic and sample.

old among UC applicants: if anything, being informed of their ELC eligibility appears to have disproportionately (though statistically insignificantly) increased UC application rates among relatively disadvantaged seniors, particularly as measured by their parents' relatively lower likelihood of college attainment.

These evidence suggest that the expected net effect of selection into UC application as a result of ELC eligibility is to somewhat depress the observed long-run outcomes of immediately above-threshold students. If anything, this could somewhat bias the estimates below of the effect of ELC eligibility downward, though the observed magnitudes appear unlikely to meaningfully alter the presented results.

5 ELC and College Attendance

5.1 Admission and Enrollment

Figure 4 plots the likelihood of admission to each UC campus (conditional on applying to that campus) by relative ELC rank, overall and applicants from the bottom half (B50) or quartile (B25) of California high schools by SAT. Admission to UC's most-selective Berkeley and UCLA campuses slightly and statistically-insignificantly increased across the threshold, implying that those two campuses provided little if any admissions advantage to ELC-eligible applicants. However, the four selective UC campuses – San Diego, Irvine, Davis, and Santa Barbara – provided large admissions advantages to above-threshold students, with relatively larger advantages for students from lower-testing high schools. Near-threshold B25 applicants became 30-40 percentage points more likely to be admitted to UC Davis and UC Irvine as a result of ELC eligibility. The three less-selective UC campuses were already granting admission to nearly all applicants near the ELC eligibility threshold, leaving little scope for ELC eligibility to impact applicants' admission likelihood at those campuses. Appendix E shows that ELC eligibility had generally consistent effects on admissions at each UC campus in each year between 2002 and 2011.[24]

[24] Figure A-6 shows that ELC eligibility also shifted UC applicants' relative likelihoods of applying to each campus, with barely-eligible applicants becoming slightly more likely to apply to campuses that provided ELC admissions advantages and slightly less likely to apply to the less-selective campuses. However, the application effects are an order of magnitude smaller than the changes in admissions likelihood, suggesting that the latter largely account for the resulting enrollment shifts.

Table 2 summarizes ELC's effect on barely-eligible applicants' enrollment at UC and other postsecondary institutions.[25] Because non-UC institutions could not observe or deduce applicants' ELC eligibility, enrollment responses at any universities across the eligibility threshold likely resulted from changes in applicants' UC admission. Panel A shows below-threshold students' baseline likelihood of enrollment and Panel B shows the $\hat{\beta}$ coefficients associated with ELC eligibility.[26] At baseline, about 55 percent of near-threshold B50 students enrolled at a UC campus. Thirteen percent enrolled at Berkeley and UCLA, and ELC eligibility may have slightly increased that enrollment – by 1-2 percentage points – as a result of shifts in application behavior and the small admissions advantages provided by those campuses. Another 32 percent enrolled at the four selective UC campuses that provided ELC-eligible applicants with large admissions advantages, and net enrollment at those campuses increased by 11.2 percentage points (35 percent) across the eligibility threshold. While ten percent of B50 applicants enrolled at the three less-selective UC campuses at baseline, their enrollment declined by 3 percentage points at the eligibility threshold as applicants switched into more-selective campuses.[27] Enrollment effects were similar among B25 students.

The remaining columns of Table 2 reveal the counterfactual enrollments of the students who enrolled at selective UC campuses as a result of their ELC eligibility. ELC-eligible B50 applicants' enrollment in the CSU system declined by 6.4 percentage points, and about 2 percentage points came from enrolling at community colleges or having no observable postsecondary enrollment.[28] In sum, these estimates show that the primary net enrollment effect of the ELC policy was to lead students to shift their initial college enrollment from less- to more-selective public universities in California.

[25] Coefficients are estimated using Equation 2 for enrollment in the fall semester following UC application. Baseline estimates are estimated for below-threshold compliers following Abadie (2002), which requires the monotonicity assumption that no near-threshold ELC-eligible student became *less* likely to enroll at the selective UC campuses.

[26] Baseline enrollment shares are defined by where the below-threshold polynomial from estimation of Equation 2 intersects with 0, omitting covariates.

[27] Table A-3 presents estimated changes in admission and enrollment at each UC campus for barely above-threshold applicants, showing that these aggregated changes at the threshold are mirrored at each of the respective campuses.

[28] Students who took time off from school after high school are categorized here as non-enrollees, as are students or institutions with masked records; see Appendix B.

5.2 Characteristics of Compliers

Who are the near-threshold applicants who enroll at selective UC campuses as a result of their ELC eligibility? Following Abadie (2002), the average fixed characteristic W_i of near-threshold 'ELC compliers' can be estimated by $\frac{LATE_{RD}(Sel_i \times W_i)}{LATE_{RD}(Sel_i)}$, where Sel_i indicates enrolling at a selective (or more-selective) UC campus, under two technical assumptions:[29]

- Random ELC eligibility assignment. This follows from the regression discontinuity setting.
- Monotonicity: $Sel_i(1) - Sel_i(0) \geq 0 \quad \forall i \; s.t. \; |Rank_i| < \epsilon$, for some small bandwidth ϵ. This is justified by the admissions patterns shown in Figure 4.

I estimate ELC compliers' characteristics using Equation 2.[30] Table 3 shows that about 80 (40) percent of compliers come from B50 (B25) high schools. About half of B50 compliers are URM – compared to 19 percent of all enrollees at the selective UC campuses – and their $75,000 average family income is more than $40,000 lower than the selective UC average.

While B50 compliers' high school GPA matches UC's overall average, their SAT scores are far below. Table 3 shows that B50 compliers' average SAT score of 1022 is almost 0.9 national standard deviations below average (at the 14th percentile of selective UC students), and B25 compliers' average score of 934 is lower than all but the lowest-scoring students at those campuses (see Figure A-7). In addition to their relative socioeconomic disadvantages, then, near-threshold ELC compliers are led to enroll at institutions where their measured academic preparation is substantially poorer than the large majority of their peers, despite their having been top performers at their (low-performing) high schools prior to enrollment. Moreover, other lower-testing students would have typically been admitted to UC on the basis of a compensating differential valued by UC admission offices, while ELC participants strictly comprised those who would otherwise *not* have been admitted (since if they had been admitted, they would not be a 'complier' of the policy); while the most-qualified ELC participants may have been on the UC admission margin, the typical participant would have fallen below that margin. These substantial disadvantages make it easy to explain why many observers were doubtful of ELC compliers' potential success at the University of California (e.g. Orfield, 1998; Cox, 2002).

[29]Note that complier estimation does *not* require an exclusion restriction.

[30]All presented complier characteristics are estimated for immediately *below*-threshold compliers, permitting interpretation of compliers' SAT scores despite potential test-taking responses to eligibility; see Appendix D.

6 Educational and Labor Market Outcomes

ELC eligibility caused thousands of UC applicants – mostly from the bottom half (B50) or quartile (B25) of California high schools – to enroll at one of four Absorbing UC campuses instead of enrolling at less-selective public California colleges and universities. Panel (a) of Figure 5 visualizes the 11-13 percentage point increase in Absorbing UC campus enrollment for barely ELC-eligible B50 and B25 applicants.

Panel (b) of Figure 5 shows that above-threshold B50 (B25) students enrolled at institutions with higher graduation rates by 2.8 (3.8) percentage points, indexing institutions' selectivity by the five-year bachelors attainment of their students, a metric defined over both two- and four-year institutions.[31] Table 4 shows that these institutions are also more selective in terms of the average SAT score of their enrollees. As suggested in Figure 1, these institutions also invest substantially greater resources into their educational and research activities (and, to a lesser extent, their student services). While they generally charge higher tuition prices, the Absorbing UC campuses largely offset these cost differences with grant aid for the lower-income ELC participants, though Absorbing UC campus enrollment may have increased those students' college costs by decreasing their likelihood of living at home through college.[32]

6.1 Academic Performance

Table 5 summarizes ELC participants' academic preparation and performance during their time at UC. ELC compliers overperformed their relative SAT rank in their first year, with B50 students earning a B-/C+ average, the 23rd GPA percentile (despite being at the 14th SAT percentile).[33] ELC compliers' relative performance improved over time, likely in part due to attrition – final grades are only available for the 64 (60) percent of B50 (B25) students who earn UC degrees – and the final GPAs of B50 compliers were at the 31st percentile of all final GPAs.[34]

ELC participants' relative overperformance at UC suggests that the SAT – an exam designed

[31] Graduation rates are defined by linking all UC applicants to their first enrollment institution and measuring their five-year Bachelor's degree attainment from any institution, even if they transfer elsewhere. See Appendix C.

[32] Table A-4 shows similar conditional differences across the ELC eligibility threshold in the selectivity, expenditures, and cost of the institutions where degree-attainers earn their undergraduate degrees.

[33] Recall that the SAT percentile is measured among *below*-threshold compliers, since eligibility affected test-taking behavior (Appendix D).

[34] First-year grades are observed for over 99 percent of ELC compliers.

to predict first-year college course performance – provides a downward-biased measure of their course performance at selective universities, though their grades remain substantially below the average GPA achieved by their relatively more-prepared peers. The participants also underperform their high school GPA – B50 (B25) students were at the 48th (38th) HS GPA percentile – which is unsurprising given that those grades were awarded by relatively low-performing schools.

6.2 Longer-Run Outcomes

ELC participants' relatively poor college academic performance might appear to justify the Master Plan's assertion that selective university admission should be awarded to the "more able ... [to] predict success in the [more-selective] state colleges". However, educational value may not be well-proxied by students' level of academic performance.[35] Figure 6 shows that only about two-thirds of above-threshold ELC compliers from B50 high schools had earned a college degree within five years of matriculation, substantially below the 75 percent graduation rate of the UC campuses where they enrolled. However, graduation rate was substantially *higher* than five-year degree attainment below the eligibility threshold; in the reduced-form, crossing the ELC eligibility threshold led to an increase in five-year degree attainment by about two percentage points. While the estimates are statistically noisier for students from B25 high schools, the positive point estimate suggests that even those students – whose academic preparation and course performance was at the very bottom of their respective classes – were if anything benefited by their access to more-selective universities. Figure A-9 shows that these gaps do not persist – there is no observable change in ELC-eligible students' ever receiving a college degree – but these evidence suggest a notable speeding-up of the time to degree for the low-performing students who enrolled at highly-selective universities as a result of the ELC policy.

Enrollment at more-selective universities has no observable impact on students' major choice or graduate school enrollment. While a number of prior studies have found suggestive evidence that lower-testing students are less likely to earn lucrative STEM degrees if they enroll at more-selective universities via an access-oriented admission policy (e.g. Arcidiacono et al., 2016), ELC

[35] I do not observe whether ELC participants' performance would have been any stronger at less-selective institutions. Bleemer (2022) shows that the relatively poor STEM performance and persistence of Black and Hispanic students targeted by race-based affirmative action was unaffected by their more-selective university enrollment, and their poor performance could instead be wholly explained by their pre-college academic opportunity and preparation.

participants' STEM degree attainment is unchanged across the eligibility threshold (see Figure A-10).[36] Table A-6 shows the full transition matrix between applicants' intended disciplines (as reported on their UC application) and their attained major disciplines; other than some evidence that students become more likely to earn a degree in their intended major (particularly in the social sciences), there is little systematic evidence of changes in college majors.[37]

Selective public university admissions based on academic preparation are primarily justified by the hypothesis that low-performing students would have little to gain – and potentially much to lose – from being admitted in place of their higher-performing peers. Figure 7 provides evidence of the opposite relationship. The low-testing students from B50 high schools who gain access to highly-selective universities through the ELC policy have substantially higher average early-career wages measured 10-11 years after high school graduation (when they are approximately age 28-29), subsequent to most graduate training and after employers have had years to evaluate and adjust their wages to match productivity. Late-20s wages rose in the reduced-form by about \$2,700$\pm$\$2,300 per year (indicating the 95-percent confidence interval), and by a statistically-noisier \$1,900$\pm$\$2,900 per year among students from B25 high schools. Figure A-11 shows that extensive-margin employment did not change across the eligibility threshold – ruling out labor market compositional changes as playing a first-order role in the presented wage findings – and that similar (though noisier) data patterns hold when annual income is measured in logs. Table A-10 shows that above-threshold wages were consistently and increasingly higher for B50 and B25 students every year between ages 24 and 29, though the age-by-age estimates are individually statistically noisy.

In sum, these findings strongly suggest that even students below the traditional level of academic preparation required at the University of California's selective university campuses would derive long-run labor market value from enrolling at those institutions, a sharp rejection of mismatch despite these students' poor academic preparation.[38] Table 7 provides estimates for each outcome using a series of alternative specifications – changing the polynomial order, bandwidth,

[36] Major restriction policies were increasingly prevalent especially at CSU campuses in the 2000s (Bleemer and Mehta, 2022, 2021), potentially explaining the absence of STEM enrollment declines. The 95-percent confidence interval can reject any reduced-form decline in STEM attainment greater than 2 percentage points, though the estimates are also consistent with similar-magnitude increases from the B50 baseline 27 percent STEM attainment.

[37] Table A-5 shows that applicants' intended disciplines do not change across the eligibility threshold.

[38] Table A-8 replicates these analyses omitting immediately above-threshold students – due to the bunching behavior discussed above – which generally results in larger and statistically more-precise estimates.

covariate specification, or sample selection of the presented estimates and showing relatively minimal sensitivity to alternative specifications in terms of treatment magnitude, though statistical significance varies across some specifications.

6.3 Instrumental Variable Estimation

How should these reduced-form findings be scaled to measure the relative return to university selectivity for the low-performing students targeted by the ELC policy? Table 6 provides two-stage least squares estimates when two potential variables are specified as the endogenous selective university treatment mediating the effects of the ELC policy. The first employs an indicator for enrolling at a more-selective or Absorbing UC campus, all of the campuses where students might have become more likely to enroll as a result of their ELC eligibility. This has the effect of multiplying the reduced-form estimates by about 8, since selective UC enrollment rose by about 12.5 percentage points across the eligibility threshold. The estimates imply that enrolling at a selective UC campus increased five-year degree attainment by 18 percentage points and increased late-20s earnings from about $64,000 to $84,000 per year.

Straightforward interpretation of this instrumental variable design requires both quasi-random assignment into ELC eligibility and the exclusion restriction that ELC eligibility influences students' educational and labor market outcomes only by influencing whether they enroll at a selective UC campus. While quasi-random assignment follows from the same identification argument discussed above, exclusion may fail in this setting. ELC eligibility may lead students to enroll at selective UC campuses instead of other universities, but it may also lead students to switch their enrollment *between* selective UC campuses. If students systematically switch toward selective UC campuses in a manner that improves their educational or labor market outcomes, then these 2SLS estimates overstate the value of selective UC enrollment, since part of that value is actually derived from between-campus switches. As a result, while these estimates are instructive in providing an approximate magnitude of the relative value of selective UC campuses over students' counterfactual enrollments – mostly CSU campuses and the less-selective UC campuses – they may be biased upward.

The subsequent column in Table 6 provides an alternative scaling of the estimated effects of more-selective university enrollment. The endogenous variable is specified as the five-year graduation rate of the first institution where the student enrolls, a measure shown to rise by 2.9 percentage points at the eligibility threshold. This linear projection of outcomes onto an index of university selectivity – as in, e.g., Kling (2001) – satisfies exclusion if applicant outcomes scale (on average) by the change in five-year graduation rate of the institution where they enroll. Table A-9 presents a series of over-identification and specification tests that provide suggestive evidence favoring this IV design, each failing to reject that the relationship between five-year graduation rate and student outcomes is linear. The resulting estimates suggest that students' five-year degree attainment rises by about 0.8 percentage points per one-percentage-point rise in the institution's graduation rate, while earnings rise by about $1,100 (1%) per unit rise in graduation rate.[39]

7 Educational Meritocracy and Efficiency

About 400 students per year enrolled at selective UC campuses as a result of the 2001-2011 ELC policy, mostly at the four Absorbing campuses (Bleemer, 2023). Those campuses enrolled a total of about 25,000 new students each year, implying that ELC changed the composition of less than two percent of participating campuses' students. This suggests that ELC likely had minimal peer effects on the other students at participating campuses, and that the observed treatment effects on ELC compliers are partial equilibrium effects resulting from on-the-margin changes in selective university enrollment. Admissions policies that meaningfully shift selective universities' enrollment composition could both change the overall treatment effect of enrolling at participating universities and have differing net effects on targeted students, though there is little evidence of such large-scale peer effects (e.g. Bleemer, 2022).

Given this justification for abstracting from the policy's general equilibrium effects, the Kaldor-Hicks efficiency of a given admission policy can be evaluated by comparing the value generated for the students who enroll at selective universities as a result of the policy with the value lost by the students who lose access because of the policy, where value is defined by the admissions objective of the university. Rather than evaluating the efficiency of the ELC policy as implemented – which

[39] Cohodes and Goodman (2014) and Bleemer (2022) find approximately unit elasticity between students' own likelihood of on-time degree attainment and their first enrollment institution's graduation rate among lower-preparation students admitted to more-selective universities.

is only of local interest – I employ the ELC policy to investigate the efficiency of the traditional test-based meritocratic admissions policy implemented at all UC campuses and most public and private universities in the US. If traditional meritocratic admission policies are efficient, then the value derived by students on the university's admission margin should exceed the value that would have been derived from any other students who could have enrolled in their stead. This inequality should hold to an even greater extent with regard to the *average* value derived by students at the university, which should itself exceed the marginal value of that enrollment.

In order to evaluate the efficiency of traditional meritocratic admissions policies at public universities, I assume that public universities' admission objective is to maximize the cumulative earnings of the state's high school graduates. As a result, the university admits a student body such that the earnings value-added of the university to those students is maximized relative to alternative enrollments. This objective justifies public support for public universities – since earnings maximization will strengthen the state's economy and return to the state via taxation – and is implied in the California Master Plan documentation by the stated intention of university admissions to maximize "success in the state colleges".

Thus, in partial equilibrium, we can test the efficiency of traditional meritocratic admissions policies by comparing selective institutions' average wage value-added to the wage value-added derived by students who would not have been admitted but through an alternative pathway like the ELC policy. Given that California's public universities were bound by enrollment capacity limits throughout the 2000s, this comparison requires holding fixed students' counterfactual enrollment institutions. The relevant question is: Who gets more (in terms of wage value-added) out of enrolling at a school like UC Davis relative to a school like CSU Sacramento; the typical students who enroll at UC Davis or the student pulled into Davis from CSU by the ELC policy?

I measure the average wage value-added of all relevant higher education institutions by estimating linear models of the following form:

$$Y_{it} = \alpha_{U_i} + X_i + \zeta_t + \epsilon_{it} \tag{3}$$

where Y_{it} is i's late-20s California wage, U_i is i's first (two- or four-year) enrollment institution, ζ_t are cohort fixed effects. I parameterize X_i in two alternative ways: as fifth-order polynomials in SAT score and parental income and ethnicity indicators, following Chetty et al. (2020); or as application-admission portfolio indicators for the nine undergraduate UC campuses, following Mountjoy and Hickman (2020).[40] I estimate these models over the full set of 2001-2011 UC applications, holding out the main estimation data (those within 15 ranks of their high school's ELC threshold).

I treat $\frac{1}{|I_1|}\sum_{u\in I_1}\hat{U}_u - \frac{1}{|I_2|}\sum_{u\in I_2}\hat{U}_u$ as the average value-added of universities I_1 compared to I_2 for the typical students who currently enroll at those universities. If I_1 are more selective institutions than I_2, this difference is likely upward-biased for at least two reasons. First, neither specification of X_i is likely to fully absorb students' positive selection into more-selective universities, likely biasing their estimated value-added upward. Second, I do not use empirical Bayes to shrink the value-added estimates, which tends to increase relative differences between institutions, further upwardly biasing the value-added of more-selective institutions (which have higher estimated value-added). Chetty et al. (2020) argue that about 80 percent in the variation of their value-added statistics is "causal," implying that differences in the corresponding set of value-added statistics may overstate differences in institutions' average treatment effects by 25 percent.

Figure 8 assigns each student to their first enrollment institution's $\hat{U}_i$ and shows how B50 and B25 students' enrollment institutions shift across their high schools' ELC eligibility threshold.[41] Barely above-threshold B50 students attend institutions with \$600-\$900 higher value-added than the schools that they would have attended but for their ELC eligibility. The magnitudes are slightly higher for B25 students.[42]

However, these changes in average institutional value-added are strikingly smaller than the estimated changes in students' own wages at the ELC eligibility threshold shown in Figure 7. The standard errors imply a greater than 90 percent likelihood that the low-testing students from low-performing California high schools who enrolled at selective UC campuses through the ELC program didn't just derive as much value from those schools as their higher-testing peers; they actually derived substantially *greater* value than their peers. This is a sharp rejection of the Kaldor-Hicks

[40] See Appendix I Bleemer (2022) for similar institution-level value-added estimates.

[41] For comparability with the wage estimates presented in Figure 7, I estimate $\hat{U}_i$ relative to CSU Long Beach and assign the baseline to the average wage of CSU Long Beach graduates, so that the plotted $\hat{U}_i$ estimates represent the average expected wages of students given only their enrollment institution.

[42] Figure A-12 shows that the rise in B50 institutional value-added at the ELC eligibility threshold is slightly smaller (if anything) when the sample is conditioned on observing late-20s California wages, as in Figure 7.

efficiency of traditional test-based meritocratic admission in higher education. Even ignoring the schools' value to on-the-margin students, there exist students – in particular, high-performing students at the state's lowest-performing high schools – who would not be admitted by traditional admission policies but who appear to be more than twice as effective as the institution's current typical students at taking advantage of the provided education and leveraging it into high-wage employment.

The key scholarly advantage of the ELC policy is its tractable admission of low-testing students to a set of highly-selective public universities, permitting estimation of those institutions' value for such students. Unfortunately, the setting is not very amenable to investigation of the mechanisms by which enrollment at these institutions promote their lowest-testing students. One prominent mechanism, however, can be excluded: ELC eligibility sped compliers' degree attainment but had no net long-run effect on undergraduate attainment or graduate enrollment, implying that additional years of education cannot explain the observed wage growth (as in, e.g., Card (1999)).

8 Conclusion

This study employs a novel comprehensive database of university applications linked to educational and wage outcomes to provide some of the first quasi-experimental estimates of how more-selective university enrollment impacts the lives of the high-GPA low-SAT students targeted by an admission policy that curtails the influence of standardized test scores. The University of California's 2001-2011 Eligibility in the Local Context program provided substantial UC admissions advantages to graduates in the top four percent of their high school class. Implementing a regression discontinuity design across high schools' eligibility thresholds, I find that ELC shifted university enrollment among barely-eligible applicants from much less-selective California public colleges and universities into four highly-resourced UC campuses. As a result of this shift, ELC participants earn their bachelor's degrees more swiftly and obtain large and above-average wage gains in their late 20s.

This study presents unusually transparent evidence on the medium-run impact of selective university admission under an access-oriented admission policy, finding that broadening selective university access is an impactful and potentially efficient economic mobility lever available to policymakers. It also provides unique analysis of how high-GPA low-SAT students perform at selective research universities that typically would have rejected them because of their poor standardized test scores, showing that the students likely to be advantaged by test-optional or no-test admissions policies would be substantially benefited (though selective universities' graduation rates and other average student outcomes may decline as they enroll more-disadvantaged students). Finally, this study challenges a central tenet supporting test-based meritocratic university admissions policies – that the policies efficiently allocate educational resources to students who will best be able to take advantage of them – by providing a strong proof by counterexample among the low-testing (perhaps high-noncognitive-skill) and low-opportunity applicants targeted by California's top percent policy in the 2000s.

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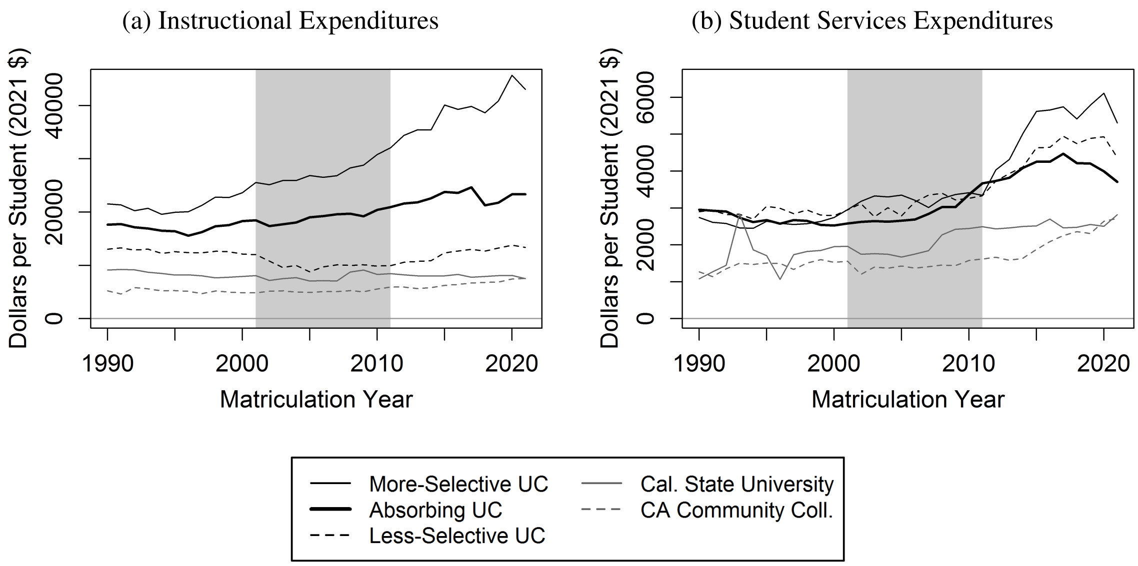
Figure 1: Annual Per-Student Expenditures at Public Colleges and Universities in California



Note: Average annual expenditure per FTE student on instruction and student services at the more-selective (Berkeley and UCLA), mid-selective (Davis, Irvine, San Diego, and Santa Barbara), and less-selective (Santa Cruz, Riverside, and Merced) UC campuses, CSU institutions, and California community colleges, in CPI-adjusted 2021 dollars. Shading indicates the years of the 4% ELC policy. Averaged across institutions by first-time freshman enrollment. See Appendix A for details on data construction and variable definitions. Source: IPEDS.

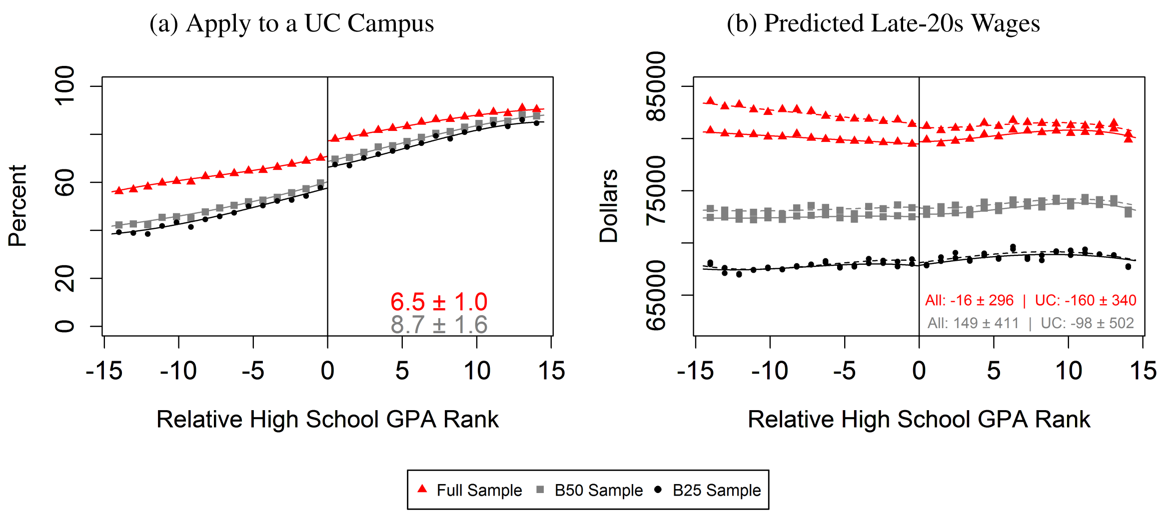
Figure 2: 2002 Admissions Protocol used by UC Davis

POINT RANGES & WEIGHTS FOR SELECTION CRITERIA

Criteria	Point range	Weight	Total possible score
HS GPA	2.8–4.0	1000	4000
5 Exams (SAT I/ACT & 3 SAT II)	200–800 each	1	4000
ELC (Eligibility in the Local Context)	0 or 1	1000	1000
Number of "a-f" courses beyond minimum	0–5	100	500
Individual Initiative	0 or 1	500	500
EOP (Educational Opportunity Program)	0 or 1	500	500
Pre-collegiate motivational program	0 or 1	500	500
First-generation university attendance	0 or 1	250	250
Non-traditional	0 or 1	250	250
Veteran/ROTC Scholarship	0 or 1	250	250
Significant Disability	0 or 1	250	250
Leadership	0 or 1	250	250
Special Talent	0 or 1	250	250
Perseverance	0 or 1	250	250
Marked improvement in 11th grade	0 or 1	250	250
TOTAL REVIEW			13,000

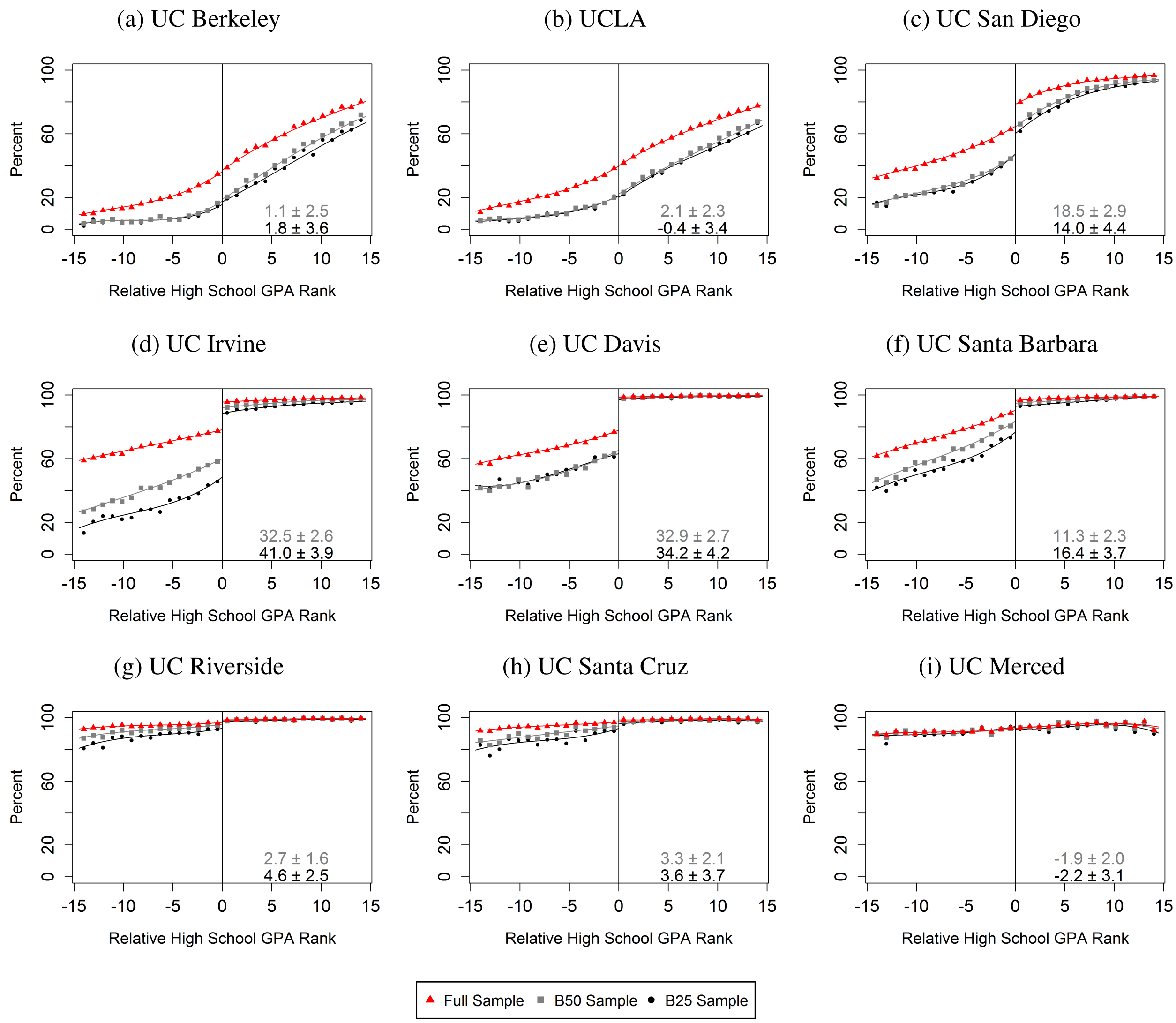
Note: This photograph shows an internal archival UC Davis admissions document visualizing Davis's 2002 freshman admissions protocol. Applicants were assigned points on the basis of application characteristics, and those with scores above a designated threshold were admitted to the campus. Source: Fall 2002 UC Davis Selection Criteria, Admissions Office Slide Collection, AR-123, Special Collections, UC Davis Library.

Figure 3: Local Effect of ELC Eligibility on Applicants' Likelihood of UC Application



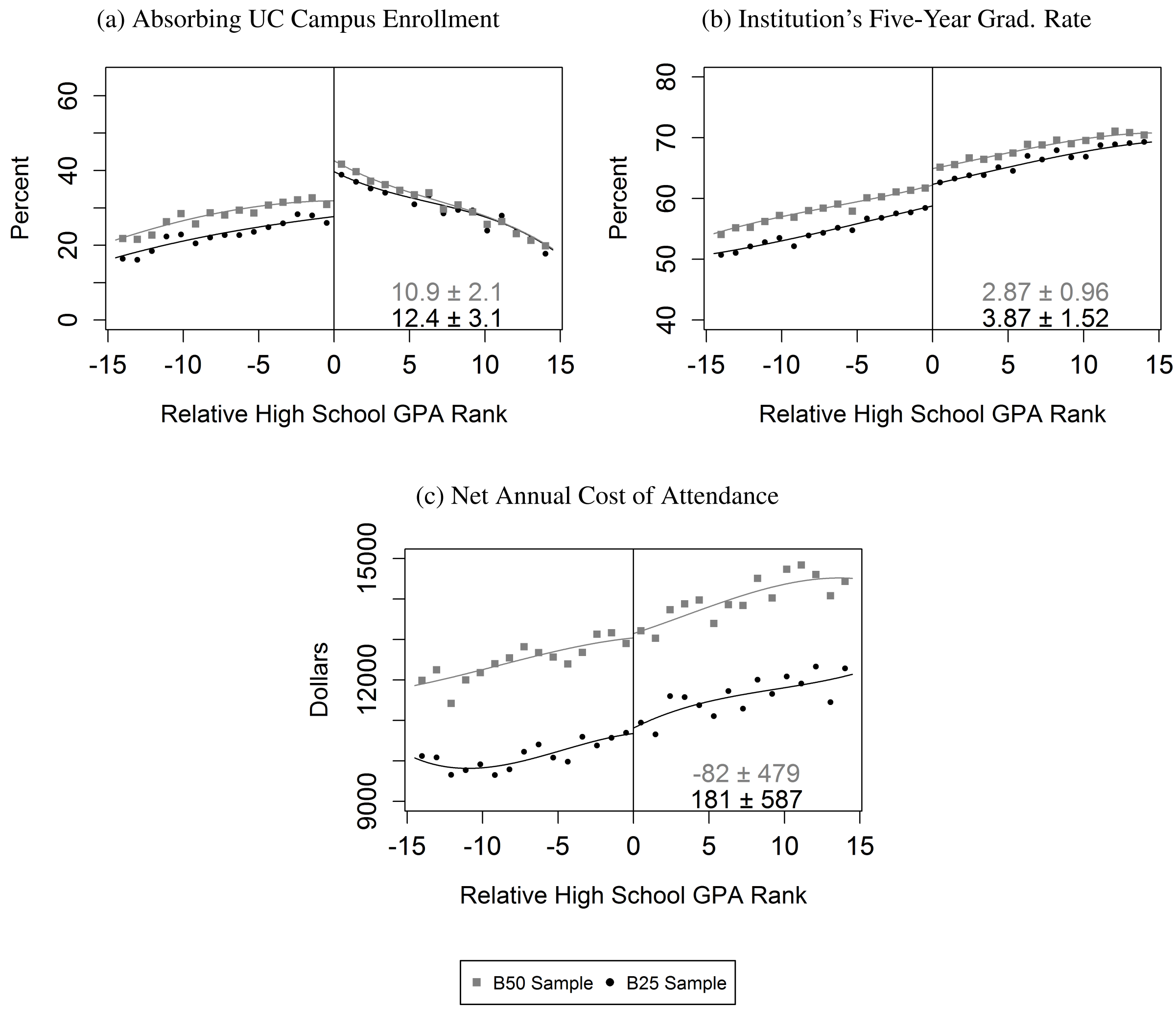
Note: Top California high school students' likelihood of applying to UC by their ELC GPA rank distance from their high school's ELC eligibility threshold and those students' predicted late-20s wages on the basis of pre-college characteristics, among all applicants and among those from the bottom half (B50) or quartile (B25) of California high schools by leave-year-out average SAT, **overall (solid line and left coefficient)** and **among UC applicants (dotted line and right coefficient)**. Points are binned averages; lines are cubic fits. Beta estimates and 95-percent confidence intervals (clustered by school-year) are from cubic regression discontinuity models following Equation 2 over all high-GPA high school students within 15 ELC GPA ranks of their high school's ELC eligibility threshold and (in the right panel) restricting to UC applicants, overall and for students from the bottom half (B50) and quartile (B25) of CA high schools by leave-year-out average SAT. Predicted wages are estimated on a 20 percent hold-out sample using gender-ethnicity indicators, parental income and education bins, and average ZIP code family income. See Appendix A for details on data construction. Source: UC Corporate Student System, the National Student Clearinghouse, and IRS SOI.

Figure 4: Local Effect of ELC Eligibility on Applicants' Likelihood of Admission to each UC Campus



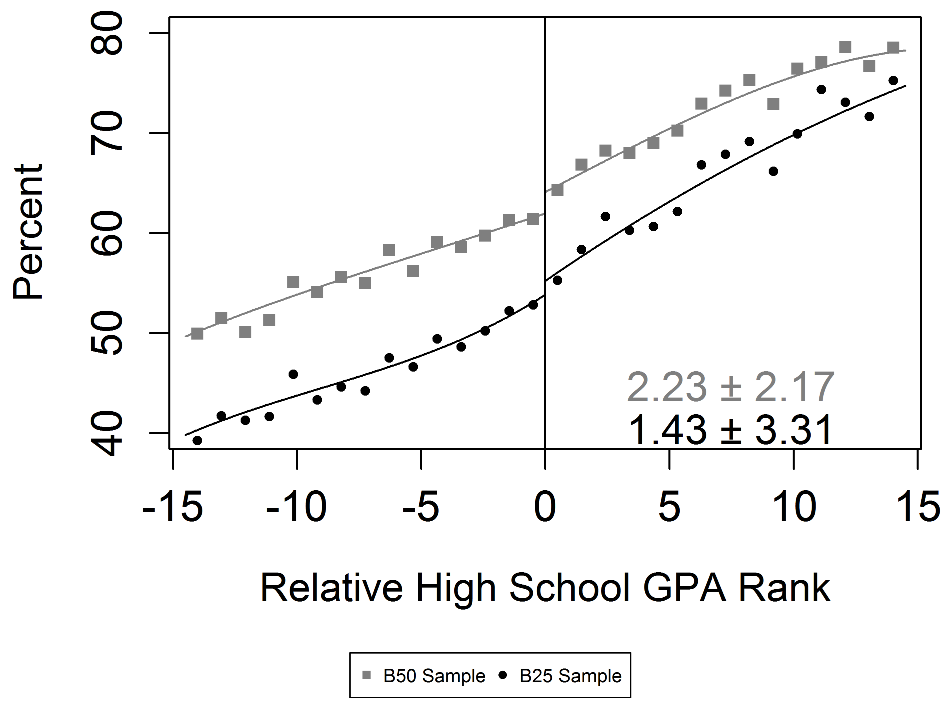
Note: UC applicants' likelihood of admission to each UC campus by their ELC GPA rank distance from their high school's ELC eligibility threshold, among all applicants and those from the bottom half (B50) or quartile (B25) of California high schools by leave-year-out average SAT. Points are binned averages; lines are cubic fits. Beta estimates and 95-percent confidence intervals (clustered by school-year) are from cubic regression discontinuity models following Equation 2 for the B50 and B25 samples. Each panel conditions on applying to that UC campus. Source: UC Corporate Student System.

Figure 5: Local Effect of ELC Eligibility on UC Applicants' College Enrollment



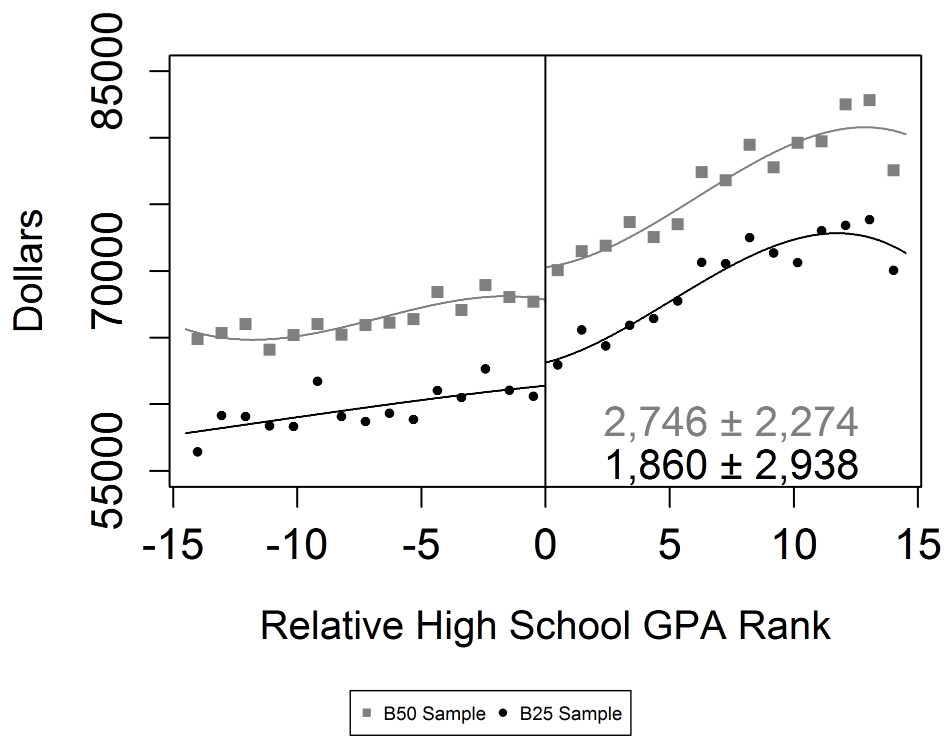
Note: UC applicants' enrollment at Absorbing UC campuses, first enrollment institution's five-year BA attainment rate, and own net cost of attendance at first institution by their ELC GPA rank distance from their high school's ELC eligibility threshold, among applicants from the bottom half (B50) or quartile (B25) of California high schools by leave-year-out average SAT. Points are binned averages; lines are cubic fits. Beta estimates and 95-percent confidence intervals (clustered by school-year) are from cubic regression discontinuity models following Equation 2 for each sample. Absorbing UC campus enrollment – which includes Davis, Irvine, San Diego, and Santa Barbara – is measured in the fall semester following UC application. Institutions' graduation rates are defined for institution of first enrollment (within six years after graduating high school); see Appendix C for details. Net price is only available after 2007 and includes tuition and fees, expected room and board, books and supplies, and other expenses net of federal, state, local, or institutional grant aid; calculated as the average net price at that institution-year for students in the applicant's family income bin. Source: UC Corporate Student System, National Student Clearinghouse, and IPEDS.

Figure 6: Local Effect of ELC Eligibility on UC Applicants' Five-Year Degree Attainment



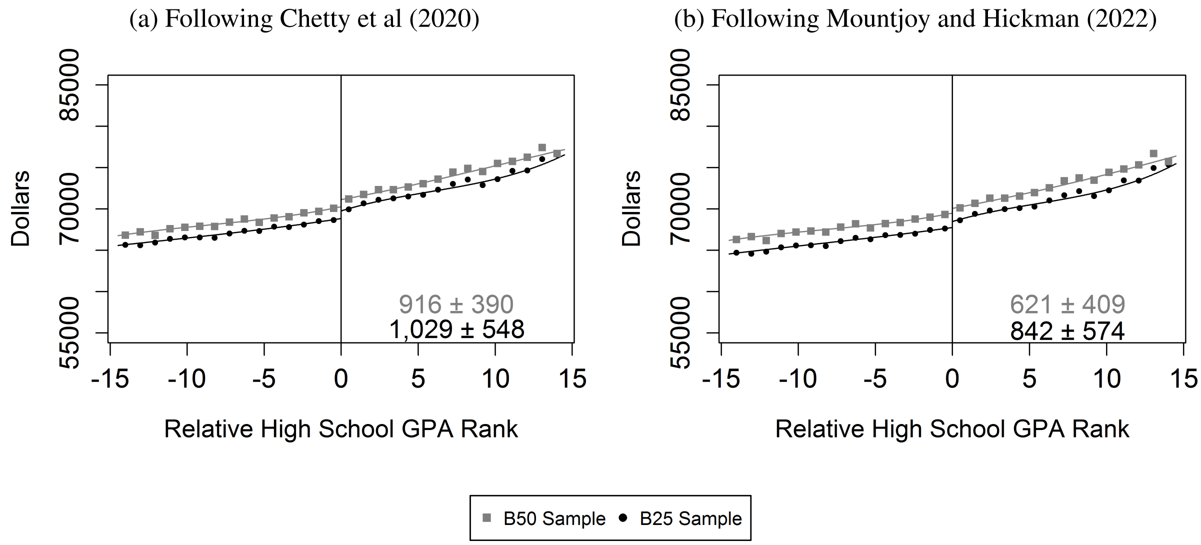
Note: UC applicants' bachelor's degree attainment within five years of graduating high school by their ELC GPA rank distance from their high school's ELC eligibility threshold, among applicants from the bottom half (B50) or quartile (B25) of California high schools by leave-year-out average SAT. Points are binned averages; lines are cubic fits. Beta estimates and 95-percent confidence intervals (clustered by school-year) are from cubic regression discontinuity models following Equation 2 for each sample. Degree attainment measured in the National Student Clearinghouse. Source: UC Corporate Student System and National Student Clearinghouse.

Figure 7: Local Effect of ELC Eligibility on UC Applicants' Late-20s Annual Wage



Note: UC applicants' average late-20s California annual wages by their ELC GPA rank distance from their high school's ELC eligibility threshold, among applicants from the bottom half (B50) or quartile (B25) of California high schools by leave-year-out average SAT. Points are binned averages; lines are cubic fits. Beta estimates and 95-percent confidence intervals (clustered by school-year) are from cubic regression discontinuity models following Equation 2 for each sample. Wages are averaged over California covered wages 10-11 years after high school graduation, when they are approximately age 28-29, omitting zero-wage years and dropping applicants with no wages in either year. Source: UC Corporate Student System and the California Employment Development Department (Bleemer, 2018).

Figure 8: Local Effect of ELC Eligibility on UC Applicants' Institutional Value-Added by Late-20s Annual Wage



Note: UC applicants' first enrollment institution's estimated late-20s wage value-added by their ELC GPA rank distance from their high school's ELC eligibility threshold, among applicants from the bottom half (B50) or quartile (B25) of California high schools by leave-year-out average SAT. Points are binned averages; lines are cubic fits. Beta estimates and 95-percent confidence intervals (clustered by school-year) are from cubic regression discontinuity models following Equation 2 for each sample. Institutional value-added estimates are produced by linear regression across all 2001-2011 UC applications (holding out the main estimation sample) of California covered wages 10-11 years after high school graduation on either (a) fifth-order polynomials in SAT score and parental income and ethnicity indicators, following Chetty et al. (2020), or (b) application-admission portfolio indicators for the nine undergraduate UC campuses, following Mountjoy and Hickman (2020). I estimate the university fixed effects relative to CSU Long Beach and then define value-added by the sum of the estimated coefficient (0 for Long Beach) and the mean late-20s wages of CSU Long Beach enrollees, facilitating comparability with Figure 7. Standard errors are not adjusted for variation in the value-added coefficients. Source: UC Corporate Student System, National Student Clearinghouse, and the California Employment Development Department (Bleemer, 2018).

Table 1: Descriptive Statistics

	Top HS Students		Applicants to the University of California							
		College Board		Top HS	Near ELC Thresh.		By High School SAT Quartile[1]			
	All	SAT Matches	All App.	Matches	All	Est. Sample	1st	2nd	3rd	4th
% Female	62.6	62.4	56.2	61.0	61.1	61.0	64.5	62.1	60.1	54.7
% White		35.3	33.9	34.5	35.1	34.9	10.0	31.1	44.4	
% Asian		26.0	32.5	32.3	32.1	32.5	23.7	33.7	33.0	
% Hispanic		22.6	21.3	22.7	22.2	22.3	55.4	24.9	12.8	
% Black		2.9	5.0	3.4	3.4	3.2	6.9	3.9	2.3	
Decline		8.5	4.9	4.9	5.0	5.0	2.1	3.7	5.2	
Urban	40.7	39.7	46.1	42.0	42.0	41.5	45.3	40.1	37.2	43.7
Suburban	47.7	48.5	48.7	48.8	48.3	49.1	44.4	47.6	49.9	52.8
Rural	11.7	11.8	5.2	9.1	9.7	9.3	10.3	12.3	12.9	3.5
SAT Score		1150	1160	1203	1209	1210	1018	1149	1240	1347
HS GPA	3.94	3.95	3.67	4.01	4.02	4.02	3.84	3.96	4.06	4.16
Median Parent Income[2]			94,100	90,400	91,500	91,600	42,500	75,500	106,000	146,100
Median Avg. ZIP Inc.[2]	69,700	70,100	84,000	75,800	75,800	76,100	46,800	63,700	81,700	116,200
Enrollment Rates (%)										
UC Campuses			45.1	56.5	57.4	57.7	56.2	59.7	59.8	55.6
More-Selective			11.7	21.8	22.9	23.0	17.1	17.6	20.9	32.4
Absorbing			22.8	28.3	28.7	29.0	28.4	34.2	33.6	21.7
Less-Selective			10.6	6.3	5.8	5.8	10.7	7.8	5.3	1.5
CSU			17.6	12.8	12.1	12.1	19.2	15.6	12.0	5.0
Community Coll.			9.1	4.7	4.3	4.3	7.2	5.8	4.2	1.4
CA Private Univ.			9.1	9.7	9.9	9.7	5.9	7.9	10.2	13.2
Non-CA Univ.			10.9	9.8	10.0	9.9	3.7	5.8	8.7	17.7
No NSC Enrollment			8.3	6.6	6.5	6.3	7.8	5.2	5.1	7.1
# of Observations	345,078	263,134	729,896	238,987	215,592	203,795	40,335	45,563	53,487	62,851

Note: Characteristics of the top 12.5 percent of 2002-2011 California high school seniors whose grades were submitted to UC for ELC evaluation (first two columns) and 2002-2011 California-resident freshman UC applicants (remaining columns) overall, among those matched to College Board standardized test data, among those within 15 GPA ranks of their high school's ELC eligibility threshold ('Near'), and among those in the study's main estimation sample (which requires the student's school-year to have at least 3 ELC GPA ranks above and below the eligibility threshold). SAT scores are out of 1600; high school GPAs are weighted out of 5. Enrollment is measured in the fall semester following high school graduation; categories partition all applicants. See Appendix A for variable definitions and details on linking. [1]High schools are divided into student-weighted quartiles by the leave-year-out average SAT score of observed high-GPA seniors at that school; these columns are restricted to the main estimation sample. [2] Dollars in CPI-adjusted 2021 dollars. Average ZIP code income is the mean adjusted gross income in the student's home ZIP code in the year they graduated high school.

Source: UC Corporate Student System, College Board, National Student Clearinghouse, IRS SOI, and NCES.

Table 2: Local Effect of ELC Eligibility on First Enrollment Institution

	UC Campuses More-Sel.	UC Campuses Absorbing	UC Campuses Less-Sel.	CSU	Comm. Coll.	CA Priv.	Non-CA	No Coll.
Panel A: Baseline Enrollment Likelihood (%)								
All	22.6	28.3	5.6	13.6	4.4	9.7	9.2	6.6
B50	12.9	31.9	9.9	20.6	7.2	6.8	4.0	6.8
B25	11.6	27.7	12.2	24.1	7.7	4.9	3.0	8.7
Panel B: Local Change in Enrollment Likelihood Caused by ELC Eligibility (p.p.)								
All	0.2	7.0	-1.6	-4.1	-0.5	-0.4	0.5	-1.1
	(0.6)	(0.7)	(0.3)	(0.5)	(0.3)	(0.4)	(0.4)	(0.4)
B50	1.6	10.9	-3.3	-6.3	-1.1	-0.9	0.4	-1.3
	(0.8)	(1.1)	(0.7)	(0.9)	(0.6)	(0.6)	(0.5)	(0.6)
B25	1.4	12.4	-3.7	-7.9	-1.0	-0.1	0.4	-1.6
	(1.1)	(1.6)	(1.1)	(1.4)	(0.9)	(0.8)	(0.6)	(1.0)

Note: This table presents the share of immediately below-ELC-threshold applicants who enroll at each of a partition of higher education institutions in the fall semester following high school graduation, and the estimated change in enrollment at the ELC eligibility threshold (β). Values in percentage points; estimates overall and for students from the bottom half (B50) and quartile (B25) of CA high schools by leave-year-out average SAT. Estimates are from cubic regression discontinuity models over UC applicants within 15 ELC GPA ranks of their high school's ELC eligibility threshold following Equation 2 with standard errors in parentheses clustered by school-year; baseline values are where the below-threshold polynomial intersects with the eligibility threshold (absent covariates). See Appendix B for evidence on NSC data quality.

Source: UC Corporate Student System and National Student Clearinghouse.

Table 3: Characteristics of Near-Threshold ELC Compliers

Panel A: Student Characteristics

	Female (%)	URM (%)	Rural (%)	SAT Score	HS GPA	Family Income ($)	Below-Med. Fam. Inc. (%)
All	65.0	34.8	15.2	1043	3.87	74,577	49.3
	(7.4)	(6.4)	(4.0)	(34)	(0.03)	(16,098)	(6.9)
B50	69.7	46.1	15.7	1021	3.82	69,541	56.0
	(6.7)	(6.3)	(3.7)	(24)	(0.03)	(8,663)	(6.4)
B25	63.2	55.5	13.0	933	3.72	49,428	77.8
	(9.3)	(8.5)	(4.6)	(32)	(0.04)	(9,101)	(8.3)
UC Mean[1]	55.9	19.0	4.9	1193	3.81	117,529	40.0

Panel B: High School SAT Quartiles

	1st	2nd	3rd	4th
All	37.6	40.5	22.5	-0.6
	(4.9)	(5.2)	(5.0)	(6.0)
UC Mean[1]	13.6	17.7	24.2	44.6

Note: Estimated characteristics of near-threshold ELC enrollment compliers, or the barely above-threshold UC applicants who enroll at selective UC campuses as a result of their ELC eligibility, estimated following Abadie (2002) using Equation 2. Standard errors in parentheses are clustered by school-year. Estimates are restricted to students from the bottom half (B50) or quarter (B25) of high schools by leave-year-out average SAT score. See the text for definition of high school quartiles and Appendix A for data definitions. Median California household income is the annual California median (US Census). [1]The average characteristics of freshman CA-resident students who first enrolled at an Absorbing UC campus between 2002 and 2011.

Source: UC Corporate Student System and NCES.

Table 4: Local Effect of ELC Eligibility on Characteristics of First Enrollment Institution

	Five-Year Grad. Rate	Avg. SAT[1]	Annual Exp. per Student Instruction	Annual Exp. per Student Research	Annual Exp. per Student Student Serv.	Sticker Price	Est. Net Price[2]
B50 Sample							
Baseline	52.6	1590	10,034	3,080	2,638	22,617	12,895
β	2.9	29	1,612	2,230	39	302	-82
	(0.5)	(4)	(225)	(238)	(34)	(261)	(244)
IV: Enroll	22.9	229	12,585	17,413	305	2,364	-518
at Sel. UC	(3.2)	(23)	(1,553)	(1,428)	(266)	(2,083)	(1,553)
# Obs.	85,831	85,826	81,698	81,698	81,698	75,468	28,052
B25 Sample							
Baseline	49.9	1562	9,349	3,441	2,232	19,086	9,507
β	3.9	34	1,845	2,022	115	860	181
	(0.8)	(6)	(331)	(347)	(50)	(368)	(300)
IV: Enroll	28.1	249	12,921	14,159	803	5,782	872
at Sel. UC	(4.4)	(30)	(1,920)	(1,739)	(356)	(2,588)	(1,439)
# Obs.	40,299	40,297	37,984	37,984	37,984	34,605	13,277
Source:	NSC/UC	NSC/UC	IPEDS	IPEDS	IPEDS	IPEDS	IPEDS/UC

Note: Reported coefficients are the estimated characteristics of applicants' first enrollment institution at the barely ELC-ineligible baseline, the change in those characteristics across the ELC eligibility threshold (β), and the estimated change in those characteristics for selective UC enrollment compliers estimated using ELC eligibility as an instrumental variable. Estimates are from cubic regression discontinuity models over UC applicants within 15 ELC GPA ranks of their high school's ELC eligibility threshold following Equation 2 with standard errors in parentheses clustered by school-year, restricting the sample to students from the bottom half (B50) or quarter (B25) of CA high schools by leave-year-out SAT score. Baseline estimates estimated for below-threshold enrollment compliers following Abadie (2002). Enrollment measured as the first two- or four-year college or university of enrollment between July following high school graduation and six years later; applicants who enroll at a community college but then enroll at a four-year university within 6 months are assigned to the latter institution. All dollars are reported in CPI-adjusted 2021 dollars. See Appendix A for variable definitions and Appendix C for five-year graduation rates. [1]SAT scores are on a 2400 point scale, including verbal, math, and writing. [2]Net price is only available after 2007 and includes tuition and fees, expected room and board, books and supplies, and other expenses net of federal, state, local, or institutional grant aid; calculated as the average net price at that institution-year for students in the applicant's own family income bin.

Source: UC Corporate Student System, National Student Clearinghouse, and IPEDS.

Table 5: Academic Preparation and Performance of Near-Threshold ELC Compliers

	Pre-College		College GPA		
	HS GPA	SAT	Year 1	Year 2	Final
Panel A: B50 Sample					
ELC Compliers	3.82 (0.03)	1021 (24)	2.51 (0.08)	2.74 (0.07)	2.93 (0.06)
UC Percentile	47.8	14.1	23.2	30.9	31.4
Percent Observed	100	100	97.8	81.5	63.5
Panel B: B25 Sample					
ELC Compliers	3.74 (0.04)	933 (32)	2.20 (0.11)	2.50 (0.09)	2.76 (0.08)
UC Percentile	37.6	5.9	11.7	17.9	20.2
Percent Observed			98.7	77.5	59.6
UC Average	3.81	1193	2.92	2.99	3.14

Note: Estimated pre-college and college academic performance of near-threshold application (and enrollment) ELC compliers, or the barely below-threshold (for pre-college characteristics) or above-threshold (for college performance) UC ELC enrollment compliers (who only enrolled at an Absorbing or more-selective UC campus as a result of their ELC eligibility), estimated following Abadie (2002) with Equation 2. College GPAs are only observed for UC students (non-enrollees are set to 0 for estimation but are never compliers) and are observed at the end of the first year, the end of the second year, and at bachelor's degree attainment. GPAs are missing if the student is no longer enrolled at UC in that period; 'Percent Observed' gives the share of UC enrollees who persisted long enough to have each observed GPA. The table also shows the compliers' characteristic as a percentile of all 2002-2011 California-resident freshman Absorbing UC students along with the mean characteristic among Absorbing UC students. Standard errors in parentheses are clustered by school-year. Estimates are restricted to students from the bottom half (B50) or quarter (B25) of high schools by leave-year-out average SAT score. See the text for definition of high school quartiles and Appendix A for data definitions.

Source: UC Corporate Student System.

Table 6: Impact of ELC Eligibility on Schooling and Labor Market Outcomes

	B50 Sample					B25 Sample				
	Reduced Form	IV Estimates		Potential Outcomes		Reduced Form	IV Estimates		Potential Outcomes	
		Sel. UC	Grad Rate	Below	Above		Sel. UC	Grad Rate	Below	Above
Enroll at Sel.	12.53		4.37			13.79		3.56		
US Campus (%)	(1.14)		(0.61)			(1.67)		(0.56)		
Univ Five-Year	2.87	22.87		52.56	75.42	3.87	28.05		49.94	77.99
Grad. Rate (%)	(0.49)	(3.21)		(2.90)	(1.43)	(0.77)	(4.44)		(4.06)	(1.94)
Grad. Within	2.23	17.76	0.77	48.38	66.13	1.43	10.39	0.36	45.05	55.44
Five Years (%)	(1.10)	(8.65)	(0.36)	(6.65)	(5.70)	(1.69)	(12.07)	(0.42)	(9.35)	(7.90)
Number of	-0.03	-0.20	-0.01	4.73	4.53	-0.02	-0.11	-0.00	4.70	4.59
Years Enrolled	(0.03)	(0.22)	(0.01)	(0.18)	(0.13)	(0.05)	(0.33)	(0.01)	(0.27)	(0.19)
Earn STEM	-0.37	-2.91	-0.13	26.58	23.66	-0.39	-2.85	-0.11	13.03	10.18
Degree (%)	(0.87)	(6.99)	(0.31)	(4.58)	(5.54)	(1.04)	(7.58)	(0.27)	(5.02)	(5.82)
# Late-20s	0.01	0.07	0.00	1.38	1.45	0.04	0.27	0.01	1.31	1.59
Years Employed	(0.02)	(0.17)	(0.01)	(0.13)	(0.12)	(0.03)	(0.24)	(0.01)	(0.18)	(0.15)
Average Late-20s	2,746	20,367	1,142	63,901	84,268	1,860	12,531	511	53,102	65,633
CA Wages ($)	(1,160)	(8,887)	(551)	(6,178)	(6,506)	(1,499)	(10,214)	(421)	(7,578)	(7,168)
Average Late-20s	0.028	0.208	0.012	10.908	11.116	0.018	0.123	0.005	10.773	10.895
Log CA Wages	(0.016)	(0.123)	(0.007)	(0.087)	(0.089)	(0.023)	(0.156)	(0.006)	(0.119)	(0.107)
Univ. Wage	916	6,876	284			1,029	6,933	255		
Value-Added ($)	(199)	(1,435)	(53)			(280)	(1,705)	(55)		

Note: This table presents OLS reduced-form, 2SLS instrumental variable, and potential outcome coefficient estimates of the relationship between ELC eligibility, selective UC campus enrollment, and student educational and labor market outcomes. Estimates are from cubic regression discontinuity models over UC applicants within 15 ELC GPA ranks of their high school's ELC eligibility threshold following Equation 2 with standard errors in parentheses clustered by school-year, restricting the sample to students from the bottom half (B50) or quarter (B25) of high schools by leave-year-out average SAT score. The IV columns report 2SLS coefficients where ELC eligibility is the instrument and either enrollment at an Absorbing or more-selective ('selective') UC campus or the five-year graduation rate of the students' first enrollment institution (see Appendix C) is the endogenous variable; potential outcomes are presented for the former (selective UC enrollment) following Abadie (2002). 'Late-20s' employment outcomes are measured 10-11 years following high school graduation in CPI-adjusted 2021 dollars; average annual wage and log wage are conditional on having observed EDD wages. University wage value-added statistics (for the student's first enrollment institution) are estimated for late-20s wages over leave-out UC applicants following Chetty et al. (2020). See Appendix A for details on variable definition and data construction.

Source: UC Corporate Student System, National Student Clearinghouse, and the California Employment Development Department (Bleemer, 2018).

Table 7: Impact of ELC Eligibility on Schooling and Labor Market Outcomes, Alternative Specifications

	B50 Sample							B25 Sample						
	Main	(1)	(2)	(3)	(4)	(5)	(6)	Main	(1)	(2)	(3)	(4)	(5)	(6)
Enroll at Sel. US Campus (%)	12.53 (1.14)	11.33 (0.84)	14.03 (1.44)	12.73 (1.24)	12.33 (1.14)	12.06 (1.07)	12.51 (1.71)	13.79 (1.67)	12.79 (1.25)	16.07 (2.11)	14.05 (1.85)	13.50 (1.67)	12.77 (1.57)	12.77 (2.48)
Univ Five-Year Grad. Rate (%)	2.87 (0.49)	2.82 (0.36)	3.22 (0.63)	3.12 (0.54)	2.78 (0.49)	2.98 (0.46)	2.87 (0.72)	3.87 (0.77)	3.57 (0.57)	4.41 (0.98)	4.31 (0.85)	3.70 (0.77)	3.73 (0.72)	3.57 (1.11)
Grad. Within Five Years (%)	2.23 (1.10)	1.95 (0.82)	1.70 (1.40)	2.68 (1.21)	2.10 (1.11)	2.38 (1.04)	4.33 (1.63)	1.43 (1.69)	1.84 (1.27)	1.19 (2.12)	1.76 (1.86)	1.29 (1.70)	1.24 (1.58)	4.23 (2.49)
Number of Years Enrolled	-0.03 (0.03)	-0.02 (0.02)	-0.04 (0.04)	-0.04 (0.03)	-0.03 (0.03)	-0.04 (0.03)	-0.03 (0.04)	-0.02 (0.05)	-0.01 (0.04)	-0.07 (0.06)	-0.03 (0.05)	-0.02 (0.05)	-0.03 (0.04)	-0.01 (0.06)
Earn STEM Degree (%)	-0.37 (0.87)	-0.24 (0.65)	-1.41 (1.10)	-0.98 (0.96)	-0.47 (0.88)	0.16 (0.80)	1.91 (1.40)	-0.39 (1.04)	-0.44 (0.79)	-1.79 (1.31)	-0.87 (1.13)	-0.75 (1.05)	-0.37 (0.95)	2.19 (1.75)
# Late-20s Years Employed	0.01 (0.02)	0.00 (0.02)	0.01 (0.03)	0.01 (0.02)	0.01 (0.02)	0.01 (0.02)	-0.01 (0.03)	0.04 (0.03)	0.02 (0.02)	0.05 (0.04)	0.04 (0.04)	0.04 (0.03)	0.04 (0.03)	0.03 (0.05)
Average Late-20s CA Wages ($)	2,746 (1,160)	905 (894)	3,039 (1,489)	2,684 (1,274)	2,451 (1,170)	2,546 (1,084)	4,485 (1,845)	1,860 (1,499)	899 (1,135)	3,983 (1,873)	2,266 (1,626)	1,343 (1,503)	1,439 (1,399)	3,379 (2,349)
Average Late-20s Log CA Wages	0.028 (0.016)	0.017 (0.012)	0.031 (0.021)	0.027 (0.018)	0.025 (0.016)	0.022 (0.015)	0.060 (0.025)	0.018 (0.023)	0.016 (0.017)	0.042 (0.029)	0.022 (0.025)	0.012 (0.023)	0.009 (0.021)	0.059 (0.035)
Univ. Wage Value-Added ($)	916 (199)	937 (155)	722 (254)	975 (215)	873 (199)	1,094 (196)	1,265 (343)	1,029 (280)	1,337 (218)	1,067 (349)	1,225 (297)	972 (280)	1,184 (278)	1,147 (502)

Note: This table presents OLS reduced-form estimates of the relationship between ELC eligibility and student educational and labor market outcomes, estimated using a number of alternative linear regression models. ‘Main’ estimates are from cubic regression discontinuity models over UC applicants within 15 ELC GPA ranks of their high school’s ELC eligibility threshold following Equation 2. The specifications are: **(1)** allow only second-order polynomials in the running variable; **(2)** allow fourth-order polynomials in the running variable; **(3)** restrict the data to only 10 ranks on either side of the eligibility threshold; **(4)** omit all covariates; **(5)** omit the sample restriction to school-years with at least three GPA ranks on either side of the eligibility threshold; and **(6)** omit students at exactly their high school’s ELC eligibility threshold. Standard errors in parentheses are clustered by school-year, and the sample is restricted to students from the bottom half (B50) or quarter (B25) of high schools by leave-year-out average SAT score. ‘Late-20s’ employment outcomes are measured 10-11 years following high school graduation. University wage value-added statistics (for the student’s first enrollment institution) estimated for late-20s wages over leave-out UC applicants following Chetty et al. (2020). See Appendix A for details on variable definition and data construction.

Source: UC Corporate Student System, National Student Clearinghouse, and the California Employment Development Department (Bleemer, 2018).

Online Appendix

Top Percent Policies and the Return to Postsecondary Selectivity

Zachary Bleemer

January 2024

Table of Contents

Appendix A: Data Appendix

This appendix complements Section 3 by providing additional details on the administrative University of California, College Board, IPEDS, and California Employment Development Department data analyzed in this study.

A.1 University of California ELC High School Data

The University of California produced an annual dataset for ELC administration annually between 2001 and 2011 containing features of the high school transcripts of the top 12.5 percent of California high school seniors, whose secondary school records were provided to UC administrators for data entry in the summer prior to students' senior year. The data contain the student's ELC GPA rank, the running variable used in this study's analysis (see Section 2 for details), as well as their ELC eligibility designation: eligible, qualified (meaning that the student completed the necessary coursework but was not in the top 4% of their class), or disqualified (if the student had not completed the requisite coursework to permit eligibility). The data also contain the student's high school GPA and rank as calculated by their schools – which generally substantively differs from ELC rank – as well as two varieties of identifying information: (1) high school, birth date, home address, and telephone number, and (2) a unique identifier that links each student to their UC application (if they apply to a UC campus).[43] Some years include the student's name.

These records were never formally archived by the University of California, and only continue to exist because they were stored on the local hard drive of Tongshan Chang, a University of California administrator who participated in the administration of the ELC project and who facilitated the author's data access for this study. The 2009 spreadsheet was mistakenly overwritten by the 2010 file and is believed to be permanently lost.

Applicants are linked to the mean family adjusted gross income of residents in their ZIP code using the Internal Revenue Service Statistics of Income series, matching on the year in which the applicant graduated high school.[44]

A.2 College Board Data

The College Board administrative data contain records for all SAT test-takers in the state of California from 2001 to 2011. They include the highest piece-wise SAT I test score earned by the test-taker across all attempts; for example, if a student does better on the math section on their first attempt and better on the verbal section on their second attempt, the higher of each score is

[43] Students below the ELC eligibility threshold in 2001 and 2002 were not assigned this unique applicant identifier, but I uniquely match 95.3 percent of such applicants by address, gender, birth date, high school, and high school GPA with only 0.4 percent mismatched (measured using eligible students whose IDs are observed).

[44] SOI are unavailable in 2003; 2002 records are used in that year.

provided and combined into the total score. They include the latest date on which the student took the SAT exam. Finally, they include both student self-reported identifying information – name, birth date, high school, home address, and phone number – and self-reported information from a pre-exam survey, including race and (until 2007) parental income and education. Race is available in every year between 2001 and 2011 for 91 percent of test-takers.

The University of California ELC high school data are linked to the universe of SAT-takers in California by all available shared information: high school, birth date, home address, and telephone number (but notably not name, which is generally not available in the ELC data). A match requires birth date and at least two other features (or phone number) to match. Duplicate matches are excluded (which means, e.g., that no twins are matched). Names are available in the College Board records and in a subset of years of the ELC high school records; in cases where names are available, each type of match generates matches with imperfectly-matched names less than 4% of the time, and visual inspection suggests that nearly all such matches are nevertheless accurate (e.g. yielding mismatches due to nicknames, misspellings, different punctuation, etc). SAT records are matched for 77% of high school students.

The combination of UC ELC high school data and College Board data are used to generate the predicted graduation and wages of each student used to test for baseline balance in Figures 3 and A-5. Predicted wages are estimated over a 20 percent hold-out sample by linear regression of observed California wage 10-11 years after high school graduation (see variable definition below) on gender-ethnicity indicators, parental income and education bins (when available), mean ZIP code family income, and log mean ZIP code family income.

A.3 University of California Application Data

The University of California applicant database includes a record for every UC applicant between 2001 and 2013. This subsection discusses variable availability and construction for the applicant dataset.

The study defines 'below-median' ('very low-income') students as those with self-reported parental incomes below (half) the California household median in the year that they applied to UC, where annual California median incomes are reported by the U.S. Census. 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; the 2003-2007 model has an (adjusted) R^2 of 46 (44) percent. Bleemer (2023) shows that UC 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. Parental incomes are CPI-adjusted to 2021 dollars.

About 3% of UC applicants do not report their race on their application. Appendix D.1 of Bleemer (2022) uses highly-detailed applicant characteristics and a multinomial logit prediction model to show that about 95 percent of those applicants are either white or Asian. As a result, rather than predicting race using other characteristics, I assume that all applicants who do not report race are non-URM.

Seven percent of applicants' addresses cannot be geolocated. Parental education is observed as an index of maximum parental education for both parents. ACT scores or SAT scores on the 2400 scale are converted to the 1600 SAT scale using a standard cross-walk.

Intended majors are reported separately for each UC campus to which the applicant applies. While intended majors are generally non-binding, they may be used in admissions (relatively reducing admission likelihood for students who intend more-popular majors) and may commit students to specific professional schools at the institution. About one-third of applicants select 'Undeclared' in the campus's College of Letters and Sciences.

Social security numbers on UC applications are not verified unless the student enrolls at a UC campus. Among enrollees, the verified social security number differs from that reported on their application in fewer than 0.25 percent of cases.

A.4 University of California Student GPA Data

The University of California maintains an undergraduate longitudinal data system (ULONG) that contains annually-updated records for all undergraduates enrolled at any UC campus. The ULONG data include students' GPA at the end of their first year (if they completed at least one course in their first year), at the end of their second year (if they completed at least one course in their second year), and at the end of their undergraduate UC enrollment period (measured up to ten years later, and conditional on either graduating or completing at least one course in the fourth year). These records are linked by unique ID to the UC applicant records for all applicants who enrolled at UC campuses.

A.5 IPEDS

National Student Clearinghouse enrollment and attainment data are discussed in Appendix B. Each NSC institution is mapped to an Integrated Postsecondary Education Data System (IPEDS) unitid by institution name and state; the crosswalk is available from the author.

Institutions are then matched by institution-year to characteristics provided in IPEDS data, where the year is defined as the first academic year after high school graduation. IPEDS data include incoming students' average SAT scores, four-year graduation rates, sticker cost of tuition (which includes in-state tuition and estimated room and board for students living on-campus), and the institution's average instructional, research, and student services expenditure per enrolled student (counting part-time students as 1/3).[45] Instructional expenditures include expenses for "general academic instruction, occupational and vocational instruction, community education, preparatory and adult basic education, and regular, special, and extension sessions." Student services expenditures include "expenses for admissions, registrar activities, and activities whose primary purpose is to contribute to students emotional and physical well-being and to their intellectual, cultural, and social development outside the context of the formal instructional program." See the IPEDS survey glossary for more details.

IPEDS data also include estimated net price of attendance (for Title-IV-aid-awarded enrollees) by parental income bin starting in 2008, including tuition and fees, expected room and board, books and supplies, and other expenses net of federal, state, local, or institutional grant aid. I estimate each applicant's net price of attendance at their first enrollment institution by IPEDS average net price for enrollees in the applicant's family income bin – as observed by their reported family income from their UC application – where the observed bins are $0-30,000, $30,000-48,000, $48,000-75,000, $75,000-110,000, and above $110,000.

A.6 California Employment Development Department

Wage data are observed annually for all UC applicants between 2000 and 2021, matched by applicants' reported (unverified, to preserve comparability) SSN. Wages are measured by the California Employment Development Department for the purpose of administering unemployment insurance, and thus exclude federal employees, self-employment, and employment outside the state of California. Wages are provided quarterly and are summed into annual wages, CPI-adjusted to 2021, and winsorized at the top and bottom 1 percent.

"Late 20s" wages 10-11 years after high school graduation – when applicants are in their late 20s, approximately 28-29 – are averaged between those two years, omitting zeroes and dropping applicants with no observed wages in either year. Wages 11 years after high school graduation are not observed for 2011 applicants and are omitted. Number of years employed is the number of years 10-11 years after high school graduation in which the applicant earned positive wages, and is thus an integer between 0 and 2. Log wages are logged prior to being averaged.

[45] Average SAT score is calculated for each school as the sum of the mean of the 25th and 75th percentiles of each SAT section, converting scores from 1600 scale to 2400 scale when necessary.

Appendix B: National Student Clearinghouse Data Quality

The National Student Clearinghouse's StudentTracker database contains enrollment and graduation records for nearly all two- and four-year postsecondary institutions in the United States. A nonprofit and nongovernmental organization founded in 1993, NSC collects postsecondary student records and provides degree verification and other services back to contributing universities. NSC matches records by first and last name, middle initial, and date of birth using a proprietary match algorithm which has some flexibility for nicknames and typos. The observed data include all NSC matches with 2001-2013 UC applicants conducted at two times: (1) the January after their UC application and (2) Fall 2017.[46] These matches permit observation of those students' enrollment and degrees at both UC and non-UC institutions.[47] This appendix discusses both data completeness and variable definitions in the NSC data.

B.1 Data Completeness

Individual students' enrollment or graduation records may fail to match in the NSC for three reasons: (1) because the student's institution does not report records to NSC; (2) because the student has blocked their record from being shared through NSC; or (3) the student's name and date of birth fail to match using the NSC's match algorithm. NSC reports that about 4 percent of records are censored due to student- or institution-requested blocks for privacy concerns (National Student Clearinghouse Research Center, 2017), and that the only public university in California with censorship greater than 10 percent is UC Berkeley. Dynarski et al. (2015) compare aggregate NSC enrollment to aggregate enrollment reported in the federal Integrated Postsecondary Education Data System (IPEDS) and find that enrollment coverage has been greater than 90 percent in California since at least 2003, the first year of data used in the present study, and is near-comprehensive for public institutions. Coverage is shown to generally be poorest at for-profit institutions.

I directly test the quality of NSC coverage for the institutions at which UC applicants tend to enroll in two ways. Using the complete linked UC-NSC database since 1994, I measure institution's NSC participation by identifying the first recorded year in which each institution appears in the NSC records. Table BB-1 presents a complete list of California public four-year universities along with all private California four-year universities with at least 500 enrolled students in 1998. The largest institution that still fails to report enrollment to NSC in 2003 was the private 4,400-student University of San Diego, but all California public universities were reporting both enrollment and degree attainment by that year. The largest university to begin reporting degree

[46] As discussed below, students may 'mask' their NSC record, such that records appearing in their first January enrollment might be more complete than records obtained years later (after some students implement the mask).

[47] For additional documentation, see NSC's "StudentTracker for Systems of Institutions User Manual": https://studentclearinghouse.info/onestop/wp-content/uploads/STSOI_User_Manual.pdf.

Table BB-1: Latest Year that Four-Year Universities in California Began Contributing to National Student Clearinghouse

	1998	In NSC Data			1998	In NSC Data	
Institution	Enroll.	Enroll.	Grad.	Univ.	Enroll.	Enroll.	Grad.
University of California							
UC Los Angeles	24,101	1995	1995	UC Irvine	14,336	1995	1995
UC Berkeley	22,259	1995	1996	UC Santa Cruz	9,921	1995	1996
UC Davis	19,258	1995	1995	UC Riverside	9,125	**2000**	1996
UC Santa Barbara	17,048	1996	1995	UC Merced (2005)		2008	2006
UC San Diego	15,818	1995	1995				
California State University							
San Diego State Univ.	25,773	1995	1996	CSU San Bernardino	9,636	1995	1996
CSU Long Beach	22,868	1995	1996	CSU East Bay	9,626	1996	1996
CSU Fullerton	21,279	1996	1997	CSU Dominguez Hills	7,834	1996	1996
San Francisco State Univ.	21,044	1994	1995	Humboldt State Univ.	6,534	1995	1997
CSU Northridge	20,955	1995	1995	Sonoma State Univ.	5,856	**1998**	1996
San Jose State Univ.	20,681	1995	1996	CSU Stanislaus	4,992	1997	1995
CSU Sacramento	18,702	1995	1995	CSU Bakersfield	4,223	**2003**	1996
CA State Poly. Univ.	15,351	1996	1995	CSU San Marcos	4,103	1995	1996
CA Poly. State Univ.	15,347	1995	1996	CSU Monterey Bay	1,716	1995	1997
CSU Fresno	14,518	1995	1996	CA State Univ. Maritime Academy	436	**2006**	1998
CSU Los Angeles	13,935	**2003**	1996	CSU Channel Islands (2002)		2006	2003
CSU Chico	13,196	1996	1997				
Private Universities in California (Undergraduate enrollment $\geq$ 500 in 1998)							
Univ. of Southern CA	15,218	1995	1996	Golden Gate Univ.	1,235	**1998**	1996
Stanford Univ.	6,391	1994	1996	Vanguard Univ. of Southern CA	1,180	**2003**	1996
Univ. of San Francisco	4,570	1995	1996	La Sierra Univ.	1,148	1997	1997
Univ. of San Diego	4,439	**2007**	1997	Loma Linda Univ.	1,137	1995	1998
National Univ.	4,393	1995	1997	Claremont McKenna College	1,024	1996	1996
Loyola Marymount Univ.	4,327	1995	1996	Simpson Univ.	1,021	1996	**2003**
Santa Clara Univ.	4,311	**1999**	1997	CA College of the Arts	1,004	**2006**	1997
Academy of Art Univ.	4,023	1997	1998	Notre Dame de Namur Univ.	983	1997	1996
Saint Mary's College of CA	3,234	1996	1997	The Master's Univ. and Seminary	959	1997	1999
Pepperdine Univ.	3,233	1995	1996	Dominican Univ. of CA	946	**2001**	1998
Univ. of La Verne	3,168	**2005**	1995	Woodbury Univ.	931	1996	1998
Univ. of the Pacific	2,802	1996	1996	Marymount CA Univ.	923	**1998**	1995
Azusa Pacific Univ.	2,795	1996	1996	CA Institute of Technology	901	**2004**	1997
Univ. of Redlands	2,737	1997	1997	Pitzer College	880	1997	1997
Chapman Univ.	2,486	**2001**	1996	CA Institute of the Arts	777	1998	1997
Biola Univ.	2,341	1996	1997	Scripps College	776	1996	1997
Point Loma Nazarene Univ.	2,301	1996	1997	Otis College of Art and Design	763	**2004**	1998
Brandman Univ.	2,125	**2011**	**2003**	Fresno Pacific Univ.	754	1997	1997
CA Lutheran Univ.	1,750	1996	1996	Mills College	741	1996	1997
Mount Saint Mary's Univ.	1,687	1996	1996	Hope International Univ.	706	**1998**	1997
CA Baptist Univ.	1,653	1995	1997	Harvey Mudd College	705	1996	1997
Pomona College	1,571	1996	1995	Concordia Univ.	694	1996	1999
Pacific Union College	1,554	1997	1997	San Diego Christian College	648	**2015**	**2015**
Occidental College	1,529	**1999**	1995	Musicians Institute	559	**2011**	**2011**
Art Center College of Design	1,308	**2008**	1998	Ashford Univ.	555	**2000**	**2001**
Westmont College	1,304	1997	1998	Menlo College	534	**2015**	1997
Whittier College	1,279	1995	1996				

Note: This table shows that all public California universities were reporting enrollment and degree attainment throughout the ELC study period. The largest private California university that did not report degree attainment by the beginning of the study period was the 648-student San Diego Christian College. For all four-year public and private (with more than 500 students in 1998) higher education institutions in California, the earliest year in which any 1995-2016 applicant to any UC campus was recorded in the National Student Clearinghouse as being enrolled at that university or having graduated from that university. Years that might interfere with inference in a study of 1996 (or later) UC enrollees – that is, any years that suggest uniformly missing enrollment records after 1997 or missing graduation records after or in 1996+4=2000 – are in bold. Source: UC Corporate Student System and National Student Clearinghouse.

attainment after 2007, the first year of degree receipience for the first cohort in the present study, was the 648-student San Diego Christian College.

Table BB-2 shows similar statistics for the California Community Colleges. As with the private universities, many community colleges did not begin reporting enrollment until the late 1990s or early 2000s, though they reported degree attainment in earlier years. However, by 2003 nearly-all extant schools were reporting enrollment.

Unfortunately, because I only observe enrollment for UC applicants, I cannot directly measure the proportion of enrollees at each California university that appear in the NSC. However, I *can* estimate NSC's data quality for the UC campuses themselves. I first focus on degree attainment, measuring the proportion of UC graduates by campus who are observed as such in the NSC records. The most likely reason for match failure is students' decision to censor their records, as permitted under federal FERPA guidelines, though universities may also choose to censor student records. Table BB-3 presents type 2 error rates (that is, false negative rates) by campus and application year. Censorship rates are persistently highest at UCLA and UC Riverside, which had NSC error rates around 5-10 percent annually between 1995 and 2012. The only school to face large non-reporting bias is UC Santa Cruz, which had error rates between 50 and 80 percent from 1995 until the 2000 entering class, suggesting substantial censorship of degrees from that campus. Interestingly, it does not appear that coverage rates are improving over time – indeed, several campuses' error rates were higher in 2012 than in 1995 – nor does it appear that more-selective campuses systematically have lower error rates than less-selective campuses. In general, however, failure rates are very low at most campuses for the 2002-2011 cohorts.

Finally, I conduct a similar exercise for STEM major choice, conditional on being recorded as having earned a degree in both the NSC and UC records. Students are defined as studying STEM if their stated major is included on a federally designated list of 278 "fields involving research, innovation, or development of new technologies using engineering, mathematics, computer science, or natural sciences (including physical, biological, and agricultural sciences)" (U.S. Department of Homeland Security, 2016). While six-digit CIP codes are available for UC majors, permitting direct matching to the STEM list, the frequent absence of CIP codes in the NSC required hand-coding of each observed major in the NSC dataset (omitting majors ever earned by fewer than 20 UC applicants) and then merging across CIP codes when available. A complete crosswalk is available from the author.

Table BB-4 shows the Type 1 and Type 2 error rates in STEM major attainment for each UC graduate by campus and application year. Type 1 errors tend to occur because the UC campus records a major in NSC that was not recorded as STEM, but its CIP code recorded by UC *is* designated as STEM; these cases are very rare at most campuses. Type 2 errors tend to occur because either no degree is recorded in the NSC file or a different major is recorded; this appears most prevalent among double-majors, with sometimes only a single major reported to NSC (although NSC allows multiple fields for major reporting).[48] UC Berkeley has remarkably low error rates,

[48]Conditional on reporting degree attainment, NSC reports at least one (and up to four) college majors for 99.5 percent

never higher than 0.4 percent, while most campuses have Type 2 error rates around 1-5 percent. As in the case of degrees, these very low error rates serve to increase confidence in the reliability of the major-specific estimates reported in the study.

B.2 Variable Definitions

Each institution in the NSC dataset is geolocated using IPEDS, and distances between applicants and institutions are calculated (as the crow flies) using the geodesic method. California high schools are geolocated using street addresses available from the California Department of Education (with 98 percent success across students) and categorized as rural, urban, or suburban using shapefiles from the National Center for Education Statistics.[49]

STEM includes the 278 "fields involving research, innovation, or development of new technologies using engineering, mathematics, computer science, or natural sciences (including physical, biological, and agricultural sciences)" identified by CIP code. Not all NSC majors have CIP codes; I assign each major to its modal CIP code (in the full observed NSC database) for categorization. Disciplines are also partitioned into arts, humanities, social sciences, natural sciences, engineering, professional, and business by hand-coding from NSC records; the discipline coding is available from the author.

of students, with most of the exceptions being students who appear to have earned degrees without specialization (reported as "not applicable").

[49] See the CDE Public Schools and Districts Data Files, the CDE's Private School Directory, and the NCES's School Locale Definitions. Rural schools are outside of any Census Urbanized Area, which have at least 50,000 residents; urban schools are inside a Census Principal City, which have at least 250,000 residents.

Table BB-2: Maximum Years that California Community Colleges Began Contributing to National Student Clearinghouse

Institution	1998 Enroll.	In NSC Data Enroll.	In NSC Data Grad.	Univ.	1998 Enroll.	In NSC Data Enroll.	In NSC Data Grad.
California Community Colleges							
Pasadena City College	16272	**1998**	1995	West Valley College	4952	**2001**	1995
Orange Coast College	15759	**2000**	1995	Mt San Jacinto C.C. District	4805	1997	1995
Cerritos College	15703	1995	1997	Irvine Valley College	4793	1995	1995
Mt San Antonio College	15073	1996	1995	College of the Desert	4768	1996	1998
San Diego Mesa College	14527	**1998**	2004	Skyline College	4687	1996	1995
City College of San Francisco	13679	**2001**	1995	Ohlone College	4667	1997	1996
Riverside City College	13542	1996	1995	Merced College	4601	**1999**	1995
El Camino C.C. District	13379	1997	1995	Allan Hancock College	4593	1995	1995
American River College	13031	**1999**	1995	MiraCosta College	4307	1996	1995
Santa Monica College	12801	1996	1995	Coastline C.C.	4157	**2000**	2001
Fullerton College	12390	**1998**	1995	Imperial Valley College	4103	**2001**	1995
Palomar College	12338	**1998**	1995	Hartnell College	4093	1995	1997
Diablo Valley College	12229	1997	1995	Mission College	3963	**2001**	1995
De Anza College	11919	1995	1995	San Diego Miramar College	3905	**1998**	2004
Santa Rosa Junior College	11727	**1998**	1995	Victor Valley College	3680	**2001**	1998
Fresno City College	11491	**1998**	1995	Los Medanos College	3632	**2000**	1995
Long Beach City College	11247	1995	1995	Las Positas College	3508	1996	1995
Grossmont College	10976	**1999**	1998	Cuyamaca College	3463	**1999**	2003
Sacramento City College	10273	**1999**	1995	College of the Redwoods	3445	**2000**	1995
Sierra College	10113	1996	1995	Los Angeles Harbor College	3375	**1999**	1995
Modesto Junior College	9790	**2000**	1996	Los Angeles Trade Tech. College	3362	**1999**	1995
Southwestern College	9620	**2001**	1995	Contra Costa College	3237	**2001**	1995
San Diego City College	9574	**1998**	2004	Copper Mountain C.C.	2942	**1999**	2000
Chaffey College	9408	1997	1995	West Los Angeles College	2929	**1999**	1995
Citrus College	9317	**2000**	1995	Monterey Peninsula College	2913	**1998**	2002
Glendale C.C.	8672	**2001**	2001	Napa Valley College	2886	**1998**	1995
San Joaquin Delta College	8432	**1998**	1995	College of Marin	2881	**2000**	1995
Chabot College	8418	1996	1995	Oxnard College	2728	1996	1995
Rio Hondo College	8146	**2001**	1995	Crafton Hills College	2514	1995	1995
Cosumnes River College	7843	**1999**	1995	College of Alameda	2246	1997	1995
College of the Sequoias	7788	**2006**	1995	Los Angeles Southwest College	2112	**1999**	1995
Bakersfield College	7762	**2000**	1995	Los Angeles Mission College	2097	**1999**	1995
Cypress College	7718	**1998**	1995	Canada College	2094	1996	1995
Santa Barbara City College	7689	**1998**	1995	West Hills College	2086	**2001**	1995
Saddleback College	7673	1995	1995	Merritt College	1969	1997	1997
Santa Ana College	7629	1996	1995	Cerro Coso C.C.	1889	**2000**	1998
Moorpark College	7414	1996	1995	Porterville College	1692	**2000**	1998
East Los Angeles College	7151	**1999**	1995	Gavilan College	1650	**2010**	1995
Los Angeles Pierce College	6984	**1999**	1995	Mendocino College	1647	**1998**	1997
Golden West College	6961	**2000**	1997	Berkeley City College	1528	1997	2000
Butte College	6804	**1998**	2000	Barstow C.C.	1434	**1998**	1995
Los Angeles City College	6772	**1999**	1995	Columbia College	1328	**2000**	1997
Cuesta College	6644	1995	1995	College of the Siskiyous	991	**1998**	1998
Evergreen Valley College	6461	**2002**	1998	Lake Tahoe C.C.	910	**2001**	1995
College of San Mateo	6349	1996	1995	Lassen C.C.	837	**1998**	1995
Los Angeles Valley College	6337	**1999**	1995	College of the Canyons	637	**1998**	1995
San Jose City College	6230	**2002**	1995	Taft College	578	**2012**	1995
Foothill College	5836	1996	1995	Feather River C.C. District	486	**1998**	1995
Cabrillo College	5820	1996	1995	Palo Verde College	370	**2009**	2010
Solano C.C.	5602	**1998**	1995	Santiago Canyon College (2001)		2009	2001
Shasta College	5462	**1999**	1997	Folsom Lake College (2004)		2005	2004
Yuba College	5358	**2001**	1995	West Hills College (2006)		2007	2006
Antelope Valley College	5156	**1998**	1998	Woodland C.C. (2009)		2010	2009
Reedley College	5004	**1998**	1995	Moreno Valley College (2010)		2011	2010
Ventura College	4980	1996	1995	Norco College (2010)		2011	2010
Laney College	4978	1997	1997	Clovis C.C. (2016)		2016	2016
San Bernardino Valley College	4968	1995	1996				

Note: This table shows that nearly all California Community Colleges were reporting enrollment to NSC by the start of the study period. For all community colleges in California, the earliest year in which any 1995-2016 applicant to any UC campus was recorded in the National Student Clearinghouse as being enrolled at that college or having graduated from that college. Years that might interfere with inference in a study of 1996 (or later) UC enrollees – that is, any years that suggest uniformly missing enrollment records after 1997 or missing graduation records after or in 1996+4=2000 – are in bold. Source: UC Corporate Student System and National Student Clearinghouse.

Table BB-3: National Student Clearinghouse Degree Data Quality for UC Graduates

Year	UCB	UCD	UCLA	UCR	UCSD	UCSC	UCSB	UCI	UCM
1995	1.3	1.9	5.0	11.6	1.5	79.1	1.7	3.5	
1996	2.5	2.3	6.0	13.1	1.5	78.1	1.6	2.8	
1997	0.9	1.7	6.1	8.2	1.1	74.4	1.6	2.4	
1998	1.5	2.0	6.1	5.2	1.9	69.1	1.4	2.2	
1999	1.2	1.3	5.9	7.3	2.1	70.1	1.2	1.9	
2000	1.4	1.5	7.8	8.6	1.9	55.9	1.1	1.8	
2001	1.2	1.9	6.8	9.2	1.3	5.7	0.9	2.6	
2002	1.1	1.6	6.7	10.5	1.6	2.1	1.8	2.6	
2003	0.3	1.8	6.7	9.9	1.8	2.8	1.9	1.7	
2004	0.8	2.7	6.0	9.5	1.9	2.9	1.7	1.9	
2005	1.2	2.2	6.6	9.0	2.0	2.1	2.5	2.1	1.5
2006	1.4	2.2	8.4	8.5	2.0	3.5	2.4	1.8	0.5
2007	1.1	2.6	8.9	8.7	2.1	3.4	2.0	1.6	3.0
2008	1.1	2.8	7.6	9.4	2.8	3.0	2.2	1.9	1.3
2009	1.2	3.2	7.7	8.1	2.0	3.5	2.9	2.4	1.5
2010	1.5	2.7	8.1	7.6	2.6	2.7	3.1	2.4	1.4
2011	2.4	2.7	6.5	9.7	2.8	3.3	3.5	2.4	0.9
2012	0.4	2.1	4.4	7.3	1.7	2.0	2.5	2.2	1.6

Note: This table shows low levels of missing NSC degree attainment records for UC graduates identified in administrative data throughout the study period. The proportion of UC graduates (within five years of first enrollment), among freshman California-resident enrollees, who are not recorded as having graduated within five years of graduating in their matched National Student Clearinghouse record, by UC campus and year of first enrollment. Source: UC Corporate Student System and National Student Clearinghouse.

Table BB-4: National Student Clearinghouse STEM Major Data Quality for UC Graduates

Year	UCB		UCD		UCLA		UCR		UCSD		UCSC		UCSB		UCI		UCM	
Err. Type:	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
1996	0.2	0.0	0.7	6.3	1.2	3.2	3.0	1.7	3.0	2.7	11.7	2.0	2.6	2.8	1.3	3.1		
1997	0.4	0.1	1.6	5.6	0.4	2.5	3.1	2.2	2.0	4.0	6.8	2.1	1.9	3.5	1.5	3.4		
1998	0.3	0.4	0.9	5.8	0.4	3.0	5.8	2.4	1.6	3.1	8.1	0.5	2.3	2.9	0.7	2.7		
1999	0.1	0.1	0.6	6.0	0.2	2.8	3.7	1.4	1.6	2.9	5.3	2.2	2.8	1.8	0.6	2.1		
2000	0.3	0.2	1.2	6.9	0.4	2.4	6.0	1.6	1.0	4.6	10.1	5.1	2.3	2.4	0.9	2.9		
2001	0.2	0.2	0.9	4.7	0.3	2.6	6.2	1.1	1.7	4.4	6.6	4.9	2.3	1.2	1.7	1.8		
2002	0.1	0.2	0.8	5.2	0.3	2.2	3.8	1.7	1.1	3.5	6.3	6.3	1.7	2.0	1.4	2.7		
2003	0.1	0.0	1.1	5.2	0.3	2.7	5.0	1.1	1.0	4.2	4.2	11.5	1.7	1.9	1.2	1.9		
2004	0.2	0.2	1.1	4.7	0.3	2.5	3.7	1.3	1.0	3.3	5.9	15.3	1.9	1.9	1.2	2.5		
2005	0.1	0.2	1.5	4.5	0.7	2.6	6.4	1.1	1.3	4.0	5.2	8.3	2.5	2.7	1.4	2.5	4.8	0.6
2006	0.0	0.1	1.0	4.5	0.4	2.2	5.0	0.5	1.9	3.1	4.3	7.1	2.4	1.7	0.8	2.5	5.9	0.0
2007	0.2	0.0	1.0	2.9	0.1	2.6	3.8	0.7	1.1	4.4	2.9	6.1	1.9	2.0	1.1	2.6	11.0	0.0
2008	0.1	0.1	0.7	4.0	0.3	2.0	4.0	0.8	0.8	3.0	3.7	5.8	1.5	2.0	1.1	2.2	2.6	0.5
2009	0.0	0.1	0.5	3.7	0.1	2.4	3.9	1.0	0.8	2.9	2.5	2.8	1.5	2.2	1.0	2.4	4.1	0.3
2010	0.1	0.1	0.2	3.2	0.1	1.6	4.0	0.4	0.7	2.2	3.5	2.5	1.5	1.1	0.6	2.0	2.7	0.2
2011	0.1	0.3	0.6	2.5	0.1	1.7	2.7	0.5	0.9	2.1	2.3	2.0	0.8	1.8	1.0	2.7	2.7	0.9
2012	0.1	0.7	0.2	4.1	0.2	2.9	3.3	0.9	0.5	1.8	2.3	1.6	1.4	2.9	0.8	2.9	4.4	1.1

Note: This table shows NSC's very low error rates in identifying UC students who earned STEM degrees throughout the study period. The Type 1 and Type 2 error rate in measurement of STEM major (among students denoted as graduates in base-truth UC records and linked to NSC degree records within five years of first enrollment) among freshman California-resident enrollees. Type 1 error (false positive) indicates non-STEM graduates listed with STEM majors in NSC; Type 2 error (false negative) indicates STEM graduates listed without STEM majors in NSC. STEM defined in U.S. Department of Homeland Security (2016), with NSC majors hand-coded in the absence of CIP codes. Source: UC Corporate Student System and National Student Clearinghouse.

Table CC-1: University of California Campuses

Institution	NSC 5-Yr. G.R.	NSC Avg. SAT	IPEDS 5-Yr. G.R.	IPEDS Avg. SAT	Institution	NSC 5-Yr. G.R.	NSC Avg. SAT	IPEDS 5-Yr. G.R.	IPEDS Avg. SAT
UC Berkeley	82.3	1941	87	1995	UC Davis	74.3	1756	77	1740
UCLA	80.2	1886	88	1928	UC Santa Cruz	72.7	1715	68	1702
UC San Diego	79.4	1884	80	1868	UC Riverside	63.7	1586	60	1568
UC Irvine	79.3	1773	78	1755	UC Merced	58.0	1547		1568
UC Santa Barbara	78.5	1791	76	1778					

Note: This table presents selectivity statistics for the nine undergraduate University of California campuses, showing that the Absorbing UC campuses fall relatively in between the most-selective Berkeley and UCLA campuses and the less-selective Santa Cruz, Riverside, and Merced campuses. University of California estimated graduation rates and average SAT scores. 'NSC' statistics measured from 2001-2011 UC freshman California-resident applicants assigned by first institution of enrollment (using National Student Clearinghouse data), with '5-Yr. G.R.' measuring the percent of those applicants who had earned a Bachelor's degree within five years of high school graduation (according to NSC records) and 'Avg. SAT' measuring their average SAT score. IPEDS presents statistics as publicly reported in 2008. Institutions are ordered by NSC graduation rate. Source: National Student Clearinghouse, UC Corporate Student System, and Integrated Postsecondary Education Data System (IPEDS).

Appendix C: NSC-Estimated Five-Year Graduation Rates

This appendix describes the novel institutional five-year graduation rate and average SAT score statistics produced to index colleges' and universities' selectivity in this study. As discussed in the text, these statistics are calculated for all two- and four-year postsecondary institutions at which at least 100 UC applicants first enroll, making them a much more useful proxy than many alternative selectivity statistics that are unavailable for community colleges (or fail to account for many students' transferring from those colleges after two years). Specifically, I restrict the sample to 2001-2011 California-resident freshman UC applicants outside this study's primary sample – that is, applicants who are not within 15 ELC GPA ranks of their high school's ELC eligibility threshold – which leaves 618,116 applicants. I assign each applicant to their institution of first enrollment using NSC enrollment records from July of their year of high school graduation to six years later.[50]. I then define each institution's average SAT score as the average SAT score (out of 2400, including verbal, math, and writing exams) of assigned applicants, and its five-year graduation rate as the percent of assigned applicants who are reported to have earned a degree in the NSC within five years of high school graduation. 3.0 percent of applicants in this study's sample do not have any enrollment institution reported within six years of high school graduation, and another 3.0 percent enroll at institutions that fewer than 100 applicants from the full sample had enrolled at in the sample period, for which reason they are omitted (since the university characteristics are noisily estimated).

This appendix contains five tables, covering UC, CSU, California community colleges, and

[50] If an applicant enrolls at a two-year institution but has changed enrollment to a four-year institution within six months, I assign them to the latter institution

the top and bottom half of private (and out-of-state) universities. Each table presents each in-sample institution's 'NSC-measured' graduation rate and average SAT score, along with the same measures from 2008 IPEDS where available. These rates differ for three primary reasons: the UC applicant pool is positively selected relative to other California public institutions (though perhaps negatively selected at some highly-selective private institutions), the NSC-measured graduation rates include degrees obtained at other institutions (following transfer), and they do not include degrees censored from NSC by the institutions. The most notable feature of these new statistics is their inclusion of community colleges, which have NSC-measured graduation rates ranging from 6.6 to over 40 percent.

Table CC-1 shows the estimated selectivity statistics for the nine undergraduate University of California campuses, ordered by their NSC-calculated graduation rates. The third and fourth columns show 2008 IPEDS measures of the campuses' average SAT score and five-year graduation rates. The most-selective UC campuses had published graduation rates over 80 percent and average SAT scores over 1900 on the 2400 scale, more than a standard deviation above the median SAT test-taker. The least-selective UC campuses have substantially lower SAT scores and graduation rates, with UC Riverside and Merced each reporting average SAT scores of 1568.[51]

These statistics are relatively closely mirrored in the NSC-calculated statistics shown in the first and second columns. Average SAT scores run from 1942 at UC Berkeley down to 1548 at UC Merced, and graduation rates run from 87.0 to 64.9. The Absorbing UC campuses have five-year graduation rates between 74 and 79 percent.

Table CC-2 shows an even greater degree of variation in average SAT scores and graduation rates among the California State Universities, California's public comprehensive university system. According to IPEDS, the two institutions with the strongest statistics are the CSU Maritime Academy and California Polytechnic State University in San Luis Obispo (Cal Poly), with average SAT scores between 1575 and 1780 and five-year graduation rates above 55 percent. That graduation rate is on par with the UC Riverside and UC Merced campuses, though Cal Poly's SAT scores are closer to those of the middle UC campuses. Meanwhile, the CSU Los Angeles and Dominguez Hills campuses have far lower measured statistics, with average SAT scores under 1300 and five-year graduation rates around 25 percent.

The institutional quality measures estimated from the UC-applicant NSC database are generally higher than those available from IPEDS, likely as a result of selection into UC application: the CSU enrollees who had also chosen to apply to at least one University of California campus tend to have higher SAT scores and were otherwise more likely to ultimately earn a college degree. Graduation rates are also higher because of high transfer rates between and out of the CSU system, such that more students who first enroll at a given institution end up earning a college degree than the number of students who earn degrees from that particular university. Average SAT scores are

[51] Since UC Merced was founded in 2005, it did not yet report a five-year graduation rate in 2008.

Table CC-2: California State University Campuses

	NSC		IPEDS			NSC		IPEDS	
Institution	5-Yr. G.R.	Avg. SAT	5-Yr. G.R.	Avg. SAT	Institution	5-Yr. G.R.	Avg. SAT	5-Yr. G.R.	Avg. SAT
CA Maritime Acad.	73.2	1673	57	1575	CSU Fullerton	44.0	1531	38	1470
CA Poly. State Univ.	67.4	1796	60	1778	CA State Poly. Univ.	42.1	1590	38	1530
Sonoma State Univ.	63.0	1611	43	1522	CSU Northridge	39.9	1463	29	1410
San Diego State Univ.	62.4	1627	53	1575	San Jose State Univ.	39.0	1549	26	1492
CSU Chico	59.1	1607	45	1515	CSU East Bay	38.7	1433	35	1365
CSU Monterey Bay	51.4	1519	30	1470	Humboldt State Univ.	38.1	1595	32	1552
CSU San Marcos	47.7	1503	34	1455	CSU Sacramento	37.4	1489	30	1440
CSU Long Beach	47.6	1570	40	1515	CSU San Bernardino	37.2	1393	34	1328
CSU Fresno	46.9	1480	37	1388	CSU Bakersfield	36.7	1427	33	1380
San Fran. State Univ.	45.6	1541	32	1500	CSU LA	30.6	1373	23	1298
CSU Stanislaus	45.3	1464	45	1425	CSU Dominguez Hills	30.1	1340	24	1222
CSU Channel Islands	44.1	1509							

Note: This table presents selectivity statistics for the California State University system, showing that the campuses range in selectivity from schools that look similar to the least-selective UC campuses to schools that have considerably lower graduation rates. California State University estimated graduation rates and average SAT scores. 'NSC' statistics measured from 2001-2011 UC freshman California-resident applicants assigned by first institution of enrollment (using National Student Clearinghouse data), with '5-Yr. G.R.' measuring the percent of those applicants who had earned a Bachelor's degree within five years of high school graduation (according to NSC records) and 'Avg. SAT' measuring their average SAT score. IPEDS presents statistics as publicly reported in 2008. Institutions are ordered by NSC graduation rate. Source: National Student Clearinghouse, UC Corporate Student System, and Integrated Postsecondary Education Data System (IPEDS).

only modestly higher, by between 20 and 120 points, but graduation rates exceed IPEDS-reported rates by as much as 20 percentage points (at Sonoma State University).

As a result, the five-year graduation rates observed at a few top CSU institutions are comparable to those of the middle-selectivity University of California campuses, with a 73 percent graduation rate at the small CSU Maritime Academy and graduation rates above 60 percent at Cal Poly, Sonoma State, and San Diego State. The median CSU campus had a five-year graduation rate around 44 percent, while the least-selective CSU campuses had graduation rates just above 30 percent.

Table CC-3 does not present IPEDS statistics for the California Community Colleges because graduation rates and average SAT scores are unavailable for two-year institutions. The first two columns show the average SAT score and five-year graduation rates of enrollees at each California Community College, omitting colleges with fewer than 100 UC-applicant enrollees in the sample period. As in the case of the CSU system, these statistics are likely upward-biased snapshots of the actual student body of each college, since CC enrollees who chose to apply to a UC campus after graduating high school were likely positively selected relative to the average CC enrollee. Nevertheless, these selectivity statistics are relevant for the UC applicants who comprise the main estimation sample in this study.

UC-applicant enrollees at many California community colleges are strikingly prepared for university enrollment. About half of all community colleges have measured average SAT scores that

Table CC-3: CA Community Colleges

Institution	NSC 5-Yr. G.R.	NSC Avg. SAT	IPEDS 5-Yr. G.R.	IPEDS Avg. SAT	Institution	NSC 5-Yr. G.R.	NSC Avg. SAT	IPEDS 5-Yr. G.R.	IPEDS Avg. SAT
Moorpark C.	43.5	1674	-	-	Cuesta C.	25.1	1678	-	-
Saddleback C.	41.0	1689	-	-	Cuyamaca C.	25.0	1545	-	-
Las Positas C.	40.1	1677	-	-	Reedley C.	24.9	1512	-	-
C. of San Mateo	40.1	1623	-	-	Berkeley City C.	24.9	1673	-	-
Ohlone C.	39.8	1644	-	-	El Camino C.	24.8	1511	-	-
Folsom Lake C.	38.6	1718	-	-	Yuba C.	24.8	1508	-	-
C. of Marin	38.5	1723	-	-	San Joaquin Delta C.	24.6	1499	-	-
Diablo Valley C.	37.9	1651	-	-	Cabrillo C.	23.9	1628	-	-
Santa Barbara City C.	37.7	1637	-	-	Mission C.	23.7	1592	-	-
De Anza C.	37.4	1660	-	-	San Jose City C.	22.9	1545	-	-
Shasta C.	37.0	1652	-	-	C. of the Redwoods	22.6	1665	-	-
Skyline C.	36.8	1563	-	-	LA Valley C.	22.5	1515	-	-
MiraCosta C.	36.7	1683	-	-	Laney C.	22.5	1495	-	-
Irvine Valley C.	36.4	1678	-	-	Merritt C.	22.4	1467	-	-
Foothill C.	36.1	1739	-	-	Los Medanos C.	22.3	1497	-	-
Glendale C.C.	35.7	1568	-	-	Bakersfield C.	22.0	1557	-	-
West Valley C.	35.0	1698	-	-	Cosumnes River C.	21.9	1531	-	-
Orange Coast C.	34.5	1624	-	-	Coastline C.C.	21.8	1613	-	-
Sierra C.	34.0	1663	-	-	Antelope Valley C.	21.5	1511	-	-
Canada C.	32.2	1633	-	-	Modesto Junior C.	21.2	1554	-	-
Santa Rosa Junior C.	31.7	1703	-	-	Citrus C.	20.6	1505	-	-
Palomar C.	31.7	1642	-	-	Long Beach City C.	20.0	1499	-	-
C. of the Canyons	30.9	1599	-	-	Allan Hancock C.	19.5	1543	-	-
City C. of San Francisco	30.5	1573	-	-	Grossmont C.	19.2	1557	-	-
Butte C.	30.2	1616	-	-	LA Mission C.	19.0	1430	-	-
Santa Monica C.	30.0	1583	-	-	Crafton Hills C.	18.5	1522	-	-
Sacramento City C.	30.0	1562	-	-	Oxnard C.	18.5	1439	-	-
Santiago Canyon C.	29.8	1652	-	-	C. of the Sequoias	17.9	1448	-	-
Contra Costa C.	29.8	1464	-	-	LA Harbor C.	16.5	1465	-	-
Golden West C.	29.2	1594	-	-	West Hills C.	16.5	1400	-	-
LA Pierce C.	29.2	1585	-	-	Cerritos C.	16.2	1460	-	-
San Diego Miramar C.	29.2	1623	-	-	Imperial Valley C.	16.1	1401	-	-
Napa Valley C.	28.2	1571	-	-	San Diego City C.	15.8	1449	-	-
American River C.	28.1	1608	-	-	Hartnell C.	15.6	1477	-	-
Solano C.C.	28.1	1574	-	-	Chaffey C.	15.5	1489	-	-
San Diego Mesa C.	27.9	1587	-	-	Southwestern C.	15.2	1443	-	-
Ventura C.	27.7	1554	-	-	Merced C.	15.2	1422	-	-
Pasadena City C.	27.4	1586	-	-	Rio Hondo C.	14.8	1463	-	-
Chabot C.	27.3	1519	-	-	Mt San Jacinto C.C.	14.3	1500	-	-
C. of Alameda	27.0	1440	-	-	Victor Valley C.	13.5	1473	-	-
Fullerton C.	26.8	1619	-	-	West LA C.	13.5	1479	-	-
Evergreen Valley C.	26.5	1526	-	-	C. of the Desert	13.3	1430	-	-
Mt San Antonio C.	26.4	1559	-	-	Riverside City C.	12.5	1452	-	-
Santa Ana C.	26.0	1533	-	-	East LA C.	11.7	1401	-	-
Fresno City C.	25.5	1494	-	-	LA City C.	11.1	1463	-	-
Monterey Peninsula C.	25.5	1632	-	-	LA Trade Tech. C.	7.1	1293	-	-
Cypress C.	25.4	1610	-	-	San Bernardino Valley C.	6.6	1422	-	-

Note: This table presents selectivity statistics for the California Community College system, showing that many community colleges have average SAT scores comparable to middle-selective public universities, though their five-year graduation rates tend to be comparable only to the least-selective universities. California Community College estimated (Bachelor's) graduation rates and average SAT scores, among colleges with at least 100 enrollees among applicants in the NSC sample. 'NSC' statistics measured from 2001-2011 UC California-resident freshman applicants assigned by first institution of enrollment (using National Student Clearinghouse data), with '5-Yr. G.R.' measuring the percent of those applicants who had earned a Bachelor's degree within five years of high school graduation (according to NSC records) and 'Avg. SAT' measuring their average SAT score. IPEDS statistics unavailable for community colleges. Institutions are ordered by NSC graduation rate. Source: National Student Clearinghouse, UC Corporate Student System, and Integrated Postsecondary Education Data System (IPEDS).

are higher than the average SAT score of enrollees at UC Riverside or UC Merced. The college with the highest average observed SAT score is the Foothill College (in California's high-income Silicon Valley), which has an average SAT score among UC applicants of 1739, higher than all but one CSU institution and approximately equal to the average SAT score of enrollees at UC Davis. Indeed, more than a quarter of the 93 observable community colleges have average SAT scores above 1600 among UC applicants, higher than nearly all CSU campuses.

Moreover, the community colleges have relatively high five-year college graduation rates, despite their not awarding Bachelor's degrees themselves. Seventeen community colleges have graduation rates above 35 percent, comparable to the bottom quartile of CSU institutions. One college – Moorpark College, near the Simi Valley outside of Los Angeles – has a graduation rate of almost 45 percent. While some colleges' graduation rates are low, some even below 10 percent, these calculations suggests that large numbers of UC applicants who choose to enroll at community colleges ultimately earn college degrees, making some colleges of comparable selectivity to lower-tier public universities.

Finally, Tables CC-4 and CC-5 presents statistics for the 200 private and out-of-state univerities with at least 100 UC-applicant enrollees. The schools with the highest graduation rates tend to be private institutions on the East Coast with graduation rates (over 93) and average SAT scores (2000+) considerably higher than the most-selective UC campuses. The median private or out-of-state university in the sample has a graduation rate and average SAT scores comparable to the middle-selectivity UC campuses.

The less-selective private and out-of-state universities, however, shows a small set of outliers – including Harvard University and Mount Holyoke College – that appear to have extremely low graduation rates. These institutions likely do not report degree attainment to National Student Clearinghouse, such that the only reported degrees earned by their enrolled students are from students who transferred and earned degrees elsewhere. While this could be concerning for the graduation rate measures discussed in this study, none of the impacted schools enroll more than a tiny handful of students near their high schools' ELC eligibility thresholds, and (as shown in Table 2) their enrollment is unimpacted by (and largely irrelevant to) ELC eligibility. The other schools that actually have the lowest reported graduation rates include out-of-state public universities and several for-profits (like the University of Phoenix and DeVry University), and have SAT scores comparable to the lower-tier CSU campuses. As a result of these outliers (and also because of the other differences discussed above), the correlation between IPEDS and NSC-measured graduation rates is only about 0.56, while the correlation between average SAT scores is over 0.95.

Table CC-4: Top Half of Private and Out-of-State Universities (by Grad. Rate)

	NSC		IPEDS			NSC		IPEDS	
Institution	5-Yr. G.R.	Avg. SAT	5-Yr. G.R.	Avg. SAT	Institution	5-Yr. G.R.	Avg. SAT	5-Yr. G.R.	Avg. SAT
Bates C.	96.7	1893	89		Santa Clara Univ.	87.1	1819	84	1822
Swarthmore C.	95.4	2103	91	2152	Kenyon C.	87.0	1965	88	2002
Williams C.	94.7	2085	95	2130	Univ. of San Diego	86.8	1798	74	1785
Bowdoin C.	94.4	2017	89	2108	Macalester C.	86.8	2015	87	2040
Haverford C.	94.3	2061	94	2085	Univ. of Portland	86.3	1794	70	1792
Northwestern Univ.	93.6	2110	93	2152	Whitworth Univ.	86.3	1804	75	1808
Claremont McKenna C.	93.5	2002	94	2100	Johns Hopkins Univ.	86.0	2085	88	2100
Pomona C.	93.1	2099	94	2212	Univ. of Southern CA	85.9	1961	86	2055
Princeton Univ.	93.0	2167	95	2228	Univ. of North Carolina at Chapel Hill	85.4	2003	83	1958
Wesleyan Univ.	92.6	2063	92	2092	Stanford Univ.	85.4	2142	92	2152
Middlebury C.	92.6	2036	93	2092	Univ. of Virginia	84.9	2019	92	1995
Carleton C.	92.4	2052	92	2100	Bryn Mawr C.	84.4	1944	85	1958
Brown Univ.	92.4	2098	92	2145	Colorado C.	84.3	1966	86	1972
Yale Univ.	92.4	2180	95	2242	Pepperdine Univ.	84.1	1816	80	1860
Tufts Univ.	92.3	2068	91	2130	Seattle Univ.	84.0	1796	68	1718
Duke Univ.	92.3	2127	88	2160	Southern Methodist Univ.	84.0	1854	72	1868
Amherst C.	92.2	2093	93	2130	New York Univ.	83.9	1992	83	2018
Colby C.	92.0	1981	90	2032	Brandeis Univ.	83.6	1991	88	2055
Univ. of Pennsylvania	91.6	2126	94	2138	Miami Univ.	83.5	1787	40	1770
Wellesley C.	91.3	2062	90	2051	Lehigh Univ.	83.2	1922	83	1972
Dartmouth C.	91.2	2099	94	2160	Boston Univ.	83.0	1894	79	1905
Wheaton C.	90.9	1792	81		Brite Divinity School	83.0	1769	67	1748
Connecticut C.	90.5	1870	87	1988	Clark Univ.	83.0	1830	72	1800
Georgetown Univ.	90.4	2050	92	2032	Loyola Marymount Univ.	82.7	1749	78	1755
Skidmore C.	90.4	1882	81	1890	Trinity Univ.	82.6	1886	80	1935
Whitman C.	90.4	2006	91	1980	George Washington Univ.	82.4	1932	80	1935
Davidson C.	90.2	2022	93	2046	Univ. of Wisconsin Extension	82.0	1842	78	1905
Univ. of Chicago	90.2	2115	91	2130	Point Loma Nazarene Univ.	81.8	1726	69	1680
Villanova Univ.	90.2	1881	88	1958	Grinnell C.	81.8	1929	85	2010
Wash. U. in St Louis	90.2	2131	92	2190	Univ. of Denver	81.6	1790	72	1792
Vanderbilt Univ.	90.1	2038	89	2122	Baylor Univ.	81.1	1819	71	1808
Boston C.	89.7	1988	90	2010	American Univ.	81.1	1907	75	1890
CA Inst. of Tech.	89.6	2219	87	2272	Indiana Univ.	81.0	1813	69	1725
Rice Univ.	89.5	2111	92	2138	Seattle Pacific Univ.	81.0	1774	61	1725
Oberlin C.	89.2	2021	82	2032	Tulane Univ. of Louisiana	80.9	1969	73	2010
Bucknell Univ.	89.1	1932	88	1965	Sarah Lawrence C.	80.8	1872	71	
Harvey Mudd C.	89.0	2144	89	2242	Emerson C.	80.7	1864	75	1838
Univ. of Michigan	88.7	1952	85	1988	Univ. of Puget Sound	80.3	1883	75	1860
RI School of Design	88.5	1903	85	1838	Willamette Univ.	80.3	1860	69	1838
Wake Forest Univ.	88.4	1962	88	1980	Carnegie Mellon Univ.	80.1	2047	84	2092
Scripps C.	88.4	1994	82	2025	Syracuse Univ.	80.0	1781	79	1755
Barnard C.	88.3	2066	88	2018	Fordham Univ.	79.5	1879	78	1838
MA Inst. of Tech.	88.2	2161	92	2205	Lewis & Clark C.	79.4	1891	70	1965
Smith C.	88.1	1905	88	1920	Case Western Reserve Univ.	79.3	1992	78	1965
Columbia Univ.	88.1	2096	92	2152	Univ. of Vermont	79.2	1829	69	1785
Dickinson C.	88.0	1720	84	1935	Univ. of Maryland	79.1	1944	80	1912
Wheaton C.	87.9	2004	83	1950	Marquette Univ.	79.0	1766	74	1755
Occidental C.	87.5	1868	85	1912	Brandman Univ.	78.9	1789	62	1837
Gonzaga Univ.	87.2	1790	78	1770	Univ. of Washington	77.9	1865	73	1608
Emory Univ.	87.2	2009	87	2078	Univ. of Miami	77.7	1870	75	1928

Note: This table presents selectivity statistics for the top half of private and out-of-state universities, showing that many of these schools tend to be even more selective than the most-selective UC campuses. Estimated graduation rates and average SAT scores of the private and out-of-state universities with at least 100 enrollees among applicants in the UC-NSC sample. 'NSC' statistics measured from 2001-2011 UC freshman California-resident applicants assigned by first institution of enrollment (using National Student Clearinghouse data), with '5-Yr. G.R.' measuring the percent of those applicants who had earned a Bachelor's degree within five years of high school graduation (according to NSC records) and 'Avg. SAT' measuring their average SAT score. IPEDS presents statistics as publicly reported in 2008. Institutions are ordered by NSC graduation rate. Source: National Student Clearinghouse, UC Corporate Student System, and Integrated Postsecondary Education Data System (IPEDS).

Table CC-5: Bottom Half of Private and Out-of-State Universities (by Grad. Rate)

	NSC		IPEDS			NSC		IPEDS	
Institution	5-Yr. G.R.	Avg. SAT	5-Yr. G.R.	Avg. SAT	Institution	5-Yr. G.R.	Avg. SAT	5-Yr. G.R.	Avg. SAT
The Univ. of Texas at Austin	77.0	1924	73	1838	Oregon State Univ.	63.5	1715	57	1605
Univ. of Oregon	76.4	1736	61	1635	Notre Dame de Namur Univ.	63.0	1507	53	1446
Rensselaer at Hartford	76.2	1958	81	2002	The Evergreen State C.	62.6	1790	59	1695
Spelman C.	75.8	1618	0	1605	Arizona State Univ.	62.5	1659	50	1612
Vassar C.	75.7	2029	91	2070	Concordia Univ.	62.0	1555	59	1740
Pitzer C.	75.7	1822	69		Univ. of the Pacific	61.8	1769	62	1740
Univ. of Rochester	75.6	1918	82	1980	Colgate Univ.	61.5	1986	91	2048
Univ. of Illinois at Urbana	75.0	1943	80	1942	Hofstra Univ.	61.5	1769	52	1762
Saint Mary's C. of CA	75.0	1646	63	1612	Pacific Union C.	61.2	1706	36	1492
Univ. of Redlands	75.0	1686	73	1725	Pace Univ.	60.8	1725	53	1605
Reed C.	74.7	2059	76	2070	Washington State Univ.	60.5	1705	62	1665
CA Lutheran Univ.	74.5	1671	68	1642	St John's Univ.	59.4	1667	50	1605
Univ. of Missouri	74.4	1892	65	1792	Rutgers Univ.	59.3	1807	56	1660
Ithaca C.	74.3	1803	77	1778	Dominican Univ. of CA	59.2	1583	46	1538
CA C. of the Arts	74.2	1694	56		Univ. of Iowa	58.8	1778	0	1808
Whittier C.	74.0	1614	54	1568	Northern Arizona Univ.	58.4	1647	48	1582
Ohio State Univ. Ag. Tech. Inst.	73.7	1828	35	1845	George Mason Univ.	58.0	1754	55	1672
Creighton Univ.	72.5	1778	75	1755	Morehouse C.	57.9	1589	62	1530
Arizona Board of Regents	72.0	1690	52	1650	Saint Louis Univ.	57.3	1849	73	1800
Hampshire C.	71.8	1884	0	1882	Univ. of Hawaii at Manoa	55.9	1649	40	1635
Pennsylvania State Univ.	71.4	1771	48	1463	Clark Atlanta Univ.	53.3	1362	42	1350
Virginia Poly. Inst. and State Univ.	71.4	1771	75	1808	Yeshiva Univ.	53.3	1925	69	1815
Biola Univ.	71.3	1723	68	1680	Embry	52.4	1699	53	1631
Azusa Pacific Univ.	70.3	1681	60	1605	Univ. of Minnesota	52.1	1842	61	1868
Texas A & M Univ.	70.0	1872	73	1785	Art Center C. of Design	52.1	1731	86	
Drexel Univ.	69.6	1853	56	1800	Boise State Univ.	51.7	1580	19	1545
Loyola Univ. Chicago	69.6	1771	64	1768	CA Inst. of the Arts	50.9	1739	61	
Univ. of Pittsburgh	69.3	1900	56	1557	Univ. of Nevada	48.8	1660	39	1575
Mills C.	69.2	1693	61	1688	Rochester Inst. of Tech.	48.3	1854	54	1800
Univ. of Colorado Boulder	69.1	1755	62	1762	Holy Names Univ.	46.9	1399	11	1397
Univ. of San Francisco	68.8	1682	65	1718	Univ. of New Mexico	46.7	1658	35	1598
Univ. of Massachusetts	68.4	1770	67	1732	Univ. of Utah	46.4	1706	39	1661
The New School	68.0	1780	60	1665	Marymount CA Univ.	45.3	1497		
Vanguard Univ. of Southern CA	67.8	1523	51	1455	Univ. of Nevada	42.0	1546	31	1522
Pratt Inst.	67.6	1772	45	1725	La Sierra Univ.	41.5	1496	25	1478
Northeastern Univ.	67.5	1925	64	1905	Tuskegee Univ.	41.4	1362	39	1312
DePaul Univ.	67.3	1748	60	1702	Southern Oregon Univ.	40.7	1686	33	1500
Purdue Univ.	66.8	1811	66	1725	Fresno Pacific Univ.	38.1	1549	60	1522
Loyola Univ. New Orleans	66.7	1781	61	1778	DeVry Univ.	36.6	1402		
Howard Univ.	66.4	1587	61	1710	Portland State Univ.	35.7	1711	27	1568
Hampton Univ.	66.2	1475	48	1589	Brigham Young Univ.	34.0	1859	53	1845
Georgia Inst. of Tech.	66.1	1982	70	1995	Brigham Young Univ.	33.3	1579	39	1635
Univ. of Notre Dame	66.0	2019	96	2115	Academy of Art Univ.	28.9	1596	24	
Michigan State Univ.	66.0	1756	72	1725	Woodbury Univ.	27.0	1472	54	1395
Western Washington Univ.	65.9	1767	63	1672	Univ. of Phoenix	12.1	1529	4	
Otis C. of Art and Design	65.8	1652	52	1545	Mount Holyoke C.	10.2	1819	82	
Univ. of La Verne	65.5	1514	57	1470	Westmont C.	8.6	1809	78	1822
Colorado State Univ.	64.8	1729	58	1680	Harvard Univ.	5.7	2186	96	2228
Mount Saint Mary's Univ.	64.0	1429	57	1380	CA Baptist Univ.	4.5	1492	45	1574
Cornell Univ.	63.5	2065	92	2100	Soka Univ. of America	2.3	1773	93	1750

Note: This table presents selectivity statistics for the bottom half of private and out-of-state universities, showing that these schools exhibit a comparable selectivity range to the CSU system, though there are a small number of universities that have erroneously-low NSC graduation rates as a result of non-reporting. Estimated graduation rates and average SAT scores of the private and out-of-state universities with at least 100 enrollees among applicants in the UC-NSC sample. 'NSC' statistics measured from 2001-2011 UC freshman California-resident applicants assigned by first institution of enrollment (using National Student Clearinghouse data), with '5-Yr. G.R.' measuring the percent of those applicants who had earned a Bachelor's degree within five years of high school graduation (according to NSC records) and 'Avg. SAT' measuring their average SAT score. IPEDS presents statistics as publicly reported in 2008. Institutions are ordered by NSC graduation rate. Source: National Student Clearinghouse, UC Corporate Student System, and Integrated Postsecondary Education Data System (IPEDS).

Appendix D: ELC Eligibility and the SAT

ELC-eligible high school students were informed of their eligibility by September of their senior year. While most college-going students first take the SAT by the summer prior to their senior year, many students take or retake the exam as late as November or December of senior year.[52] As a result, students' testing behavior and scores may be responsive to ELC eligibility, particularly if they believed that their UC admission was no longer contingent on receiving high test scores.

ELC's admission guarantee is conditional on submitting a standardized test as part of the student's UC application. Nevertheless, Figure DD-1(a) shows slight noisy evidence of declines in SAT-taking behavior among all ELC-eligible students and among UC applicants at the eligibility threshold – as measured in the complete College Board SAT database – with point estimates of around 1 percentage point and 95-percent confidence intervals of 1-1.5 percentage points. For example, these students may have already taken the ACT when they learned of their ELC eligibility and chosen to forego the SAT and submit their ACT scores instead.

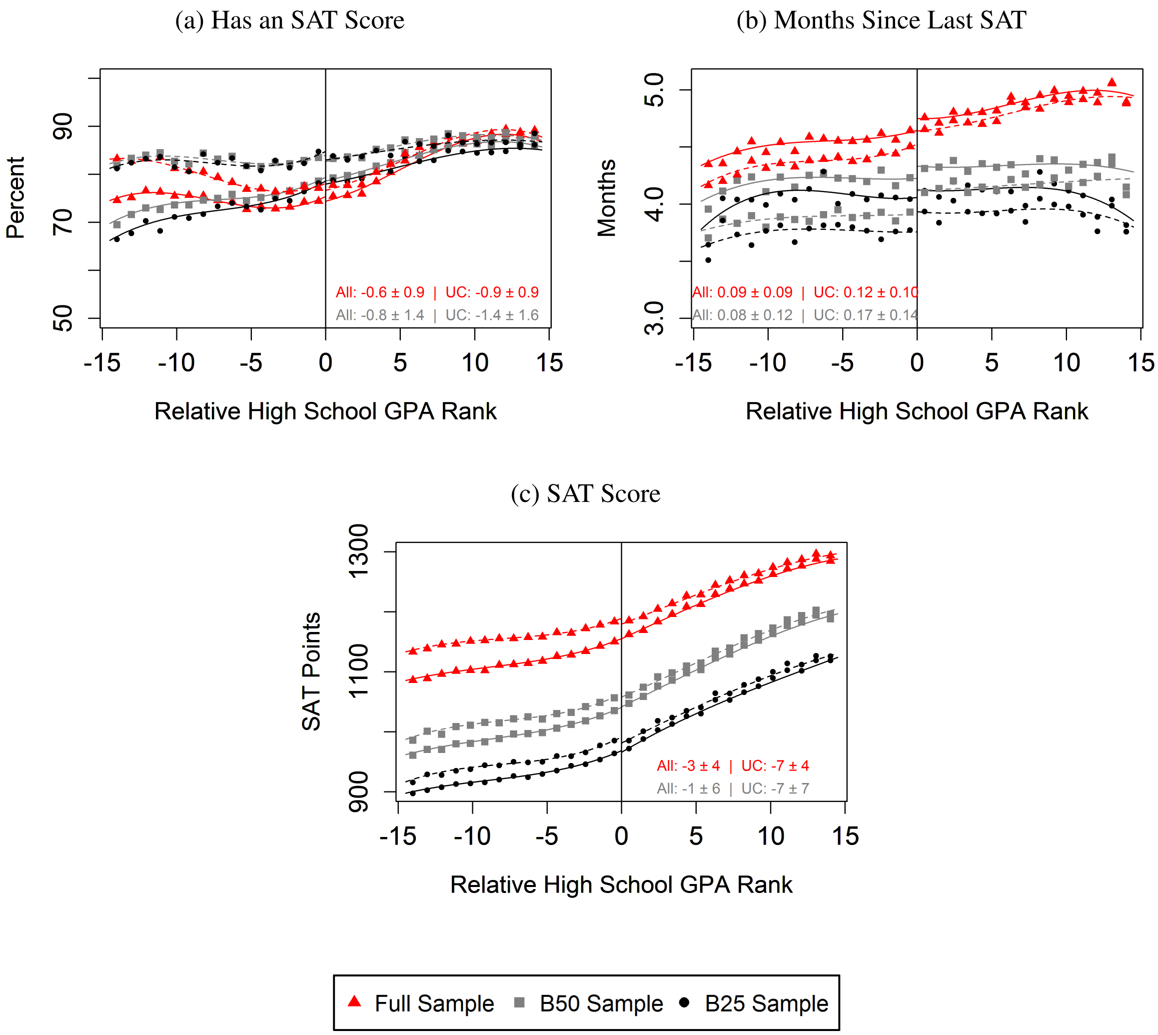
Figure DD-1(b) shows the number of months prior to January of their senior year when students took their last SAT prior to UC application; e.g. a student whose last SAT was taken in August of their senior year would be coded as 5. High-GPA California high school students typically take their last SAT exam 4-5 months before January, with students from lower-testing high schools being more likely to take fall SATs than their peers at higher-testing schools. There is some evidence that all ELC-eligible students become less likely to retake the exam in the fall of their senior year, but clear evidence of gaps among UC applicants: either the subset of students intending to apply to UC become less likely to retake the exam or students who are less likely to retake the exam tend to select into UC application as a result of their ELC eligibility.

These differences in test-taking behavior translate into meaningful test score differences across the ELC eligibility threshold. I only observe students' maximum SAT score (maxing each SAT component separately) across all SAT attempts, the same score used in UC admission. As above, there is noisy evidence of SAT score declines among all high school students – by 3 points (with a 4 point 95-percent confidence interval). There is clearer evidence of test score declines among UC applicants, likely both as a result of behavioral change and students' negative selection into UC application.

These results have import in two ways. First, they suggest some evidence of test-taking behavioral responses to university admission guarantees, which challenges the interpretation of eligible students' test scores in the analysis of the ELC policy. As a result, I do not condition on SAT scores in any estimation and only discuss the test scores of *below*-threshold compliers, which represent the test scores that would have likely been achieved by above-threshold compliers absent behavioral responses (though negative selection at the application threshold likely makes these scores an

[52] While students were permitted to submit ACT instead of SAT exam scores on their UC application, fewer than 2 percent of applicants did not submit SAT scores.

Figure DD-1: SAT Characteristics of UC Applicants



Note: This figure shows some evidence that ELC eligibility led top California high school students to not retake the SAT in the fall semester of their senior year, suggesting that test scores are endogenous to eligibility in this setting. High-GPA California high school students' likelihood of taking the SAT, months since taking the SAT (as of January of their senior year), and highest combined SAT score by their ELC GPA rank distance from their high school's ELC eligibility threshold, among all applicants and among those from the bottom half (B50) or quartile (B25) of California high schools by leave-year-out average SAT, overall (solid line and left coefficient) and among UC applicants (dotted line and right coefficient). Points are binned averages; lines are cubic fits. Beta estimates and 95-percent confidence intervals (clustered by school-year) are from cubic regression discontinuity models following Equation 2 over all high-GPA high school students within 15 ELC GPA ranks of their high school's ELC eligibility threshold and restricting to UC applicants, overall and for students from the bottom half (B50) and quartile (B25) of CA high schools by leave-year-out average SAT. See Appendix A for details on variable definition and data construction. Source: UC Corporate Student System and College Board.

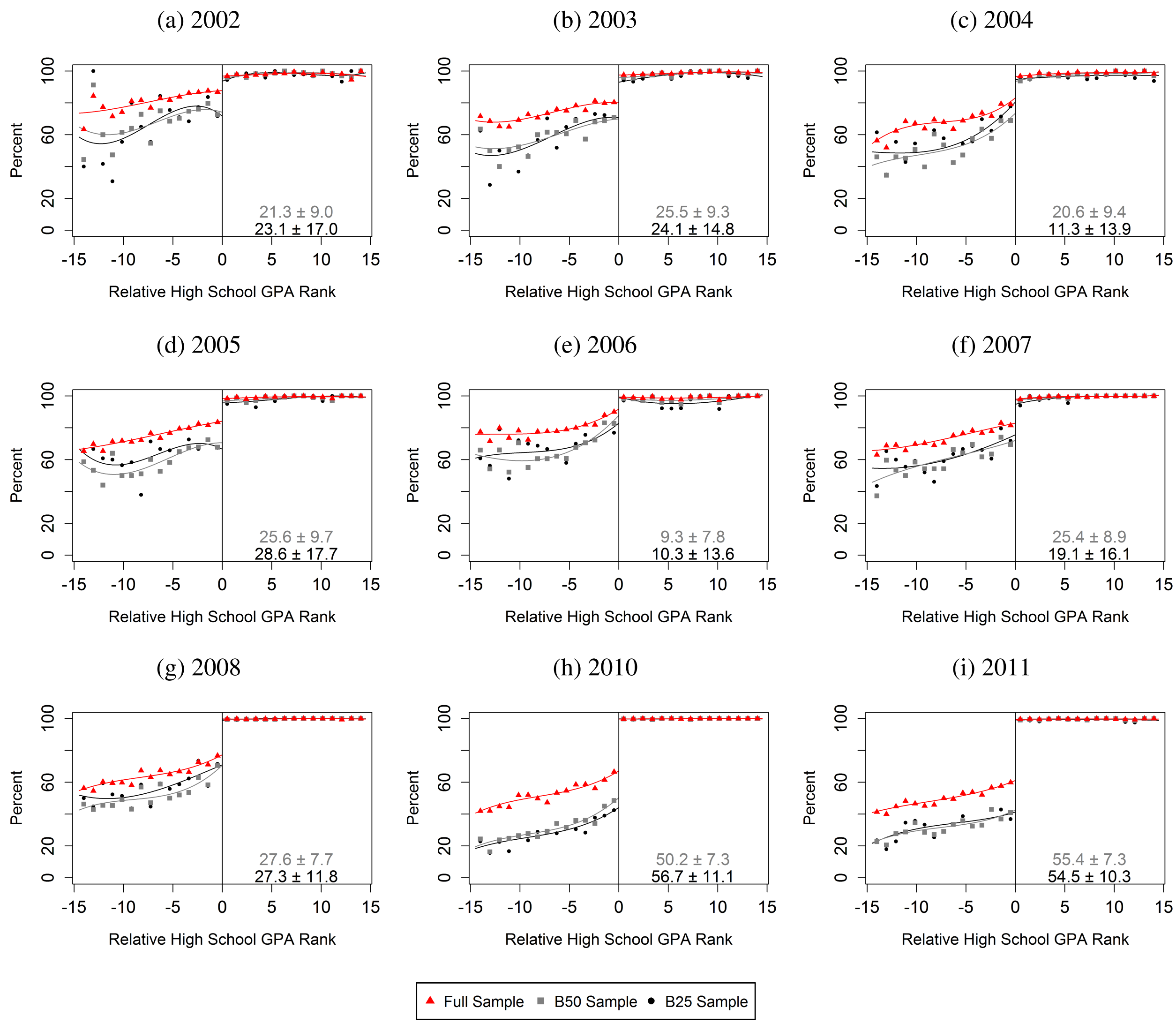
upper bound on ELC participants' unobserved 'true' test scores). Test-taking behavioral responses may challenge economists' interpretation of the standardized test scores of students who apply to college in the presence of admission guarantees (e.g. Black et al., 2016).

Second, these results provide further evidence of negative selection across the ELC eligibility threshold, suggesting that the presented educational and labor market effects of more-selective university enrollment estimated at the ELC eligibility threshold may be slightly downward-biased.

Appendix E: Annual Relationship between ELC GPA and UC Admissions

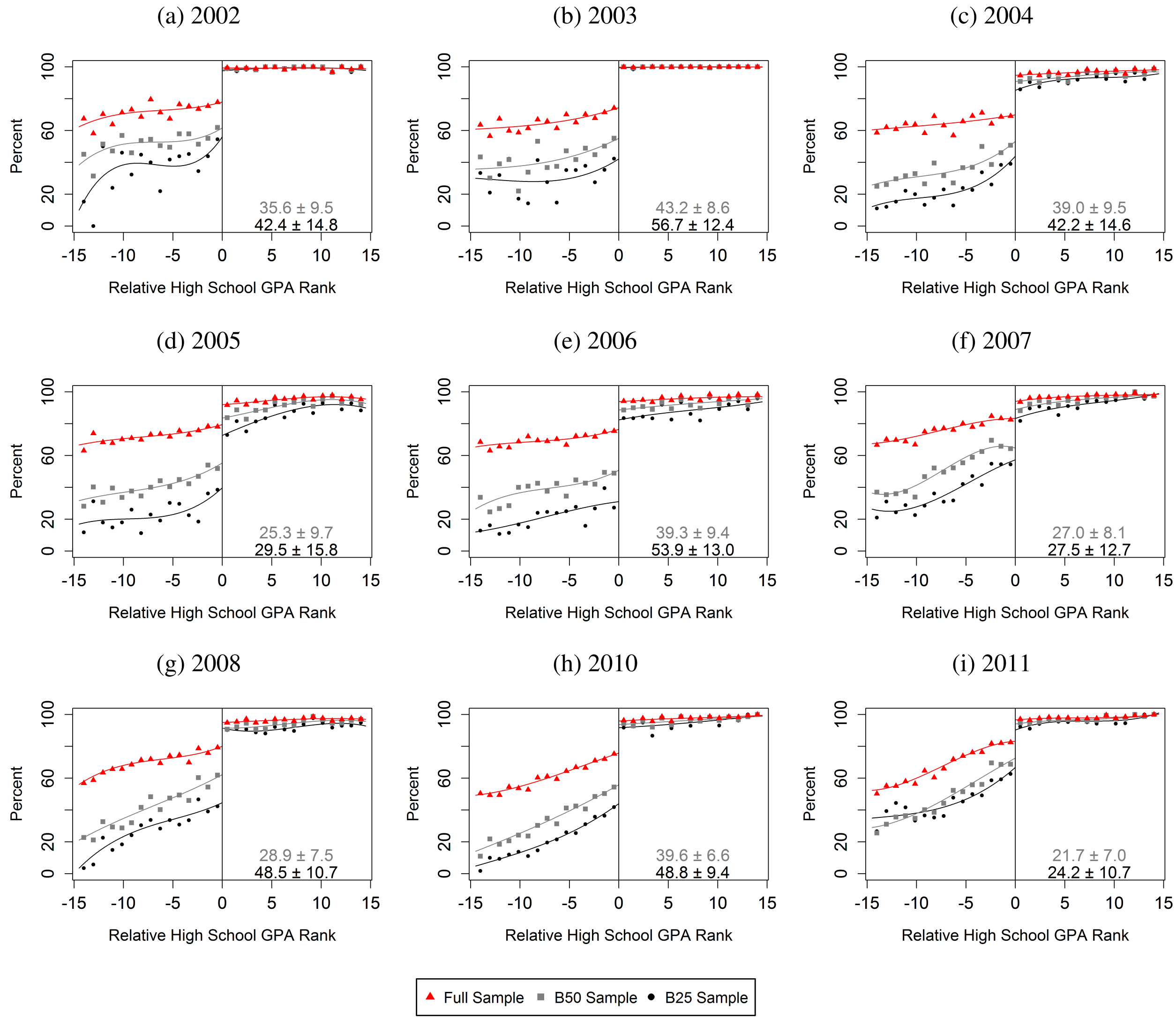
Figures EE-1 to EE-9 show annual break-outs of the effect of ELC eligibility on applicants' likelihood of admission to each campus. They show that the general admissions patterns remain highly persistent across the nine observed years: applicants receive large admissions advantages in most years at the Absorbing UC campuses and negligible admissions advantages at the other UC campuses. Some Absorbing UC campuses' admissions advantages grow somewhat over time, largely driven by the campuses' increasing selectivity in the period (decreasing near-threshold applicants' admissions likelihood through non-ELC admissions).

Figure EE-1: Local Effect of ELC Eligibility on Applicants' Likelihood of Admission to UC Davis



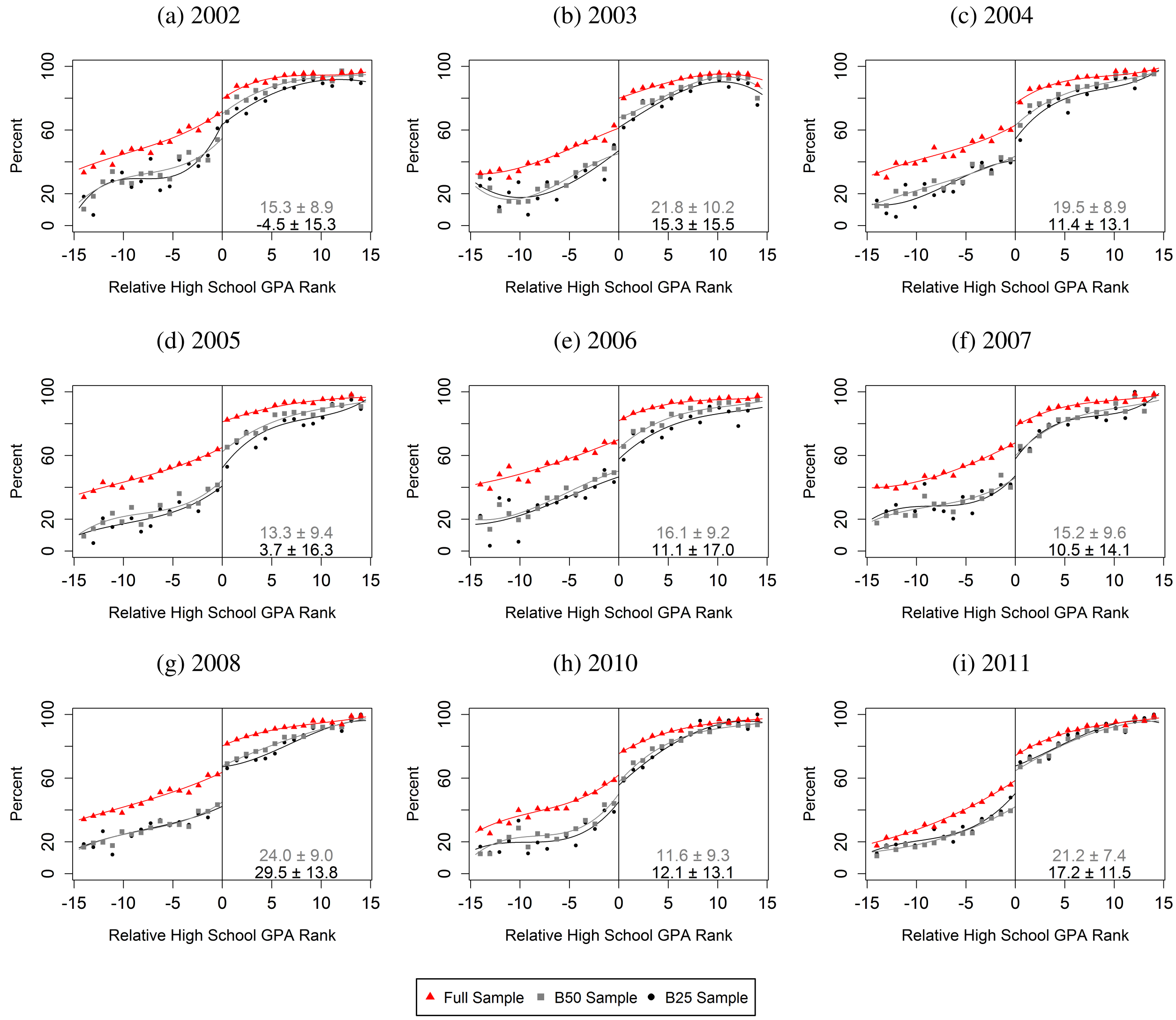
Note: Applicants' annual likelihood of admission to UC Davis by their ELC GPA rank distance from their high school's ELC eligibility threshold, among all applicants and those from the bottom half (B50) or quartile (B25) of California high schools by leave-year-out average SAT. Points are binned averages; lines are cubic fits. Each panel conditions on applying to that UC campus in that year. Source: UC Corporate Student System.

Figure EE-2: Local Effect of ELC Eligibility on Applicants' Likelihood of Admission to UC Irvine



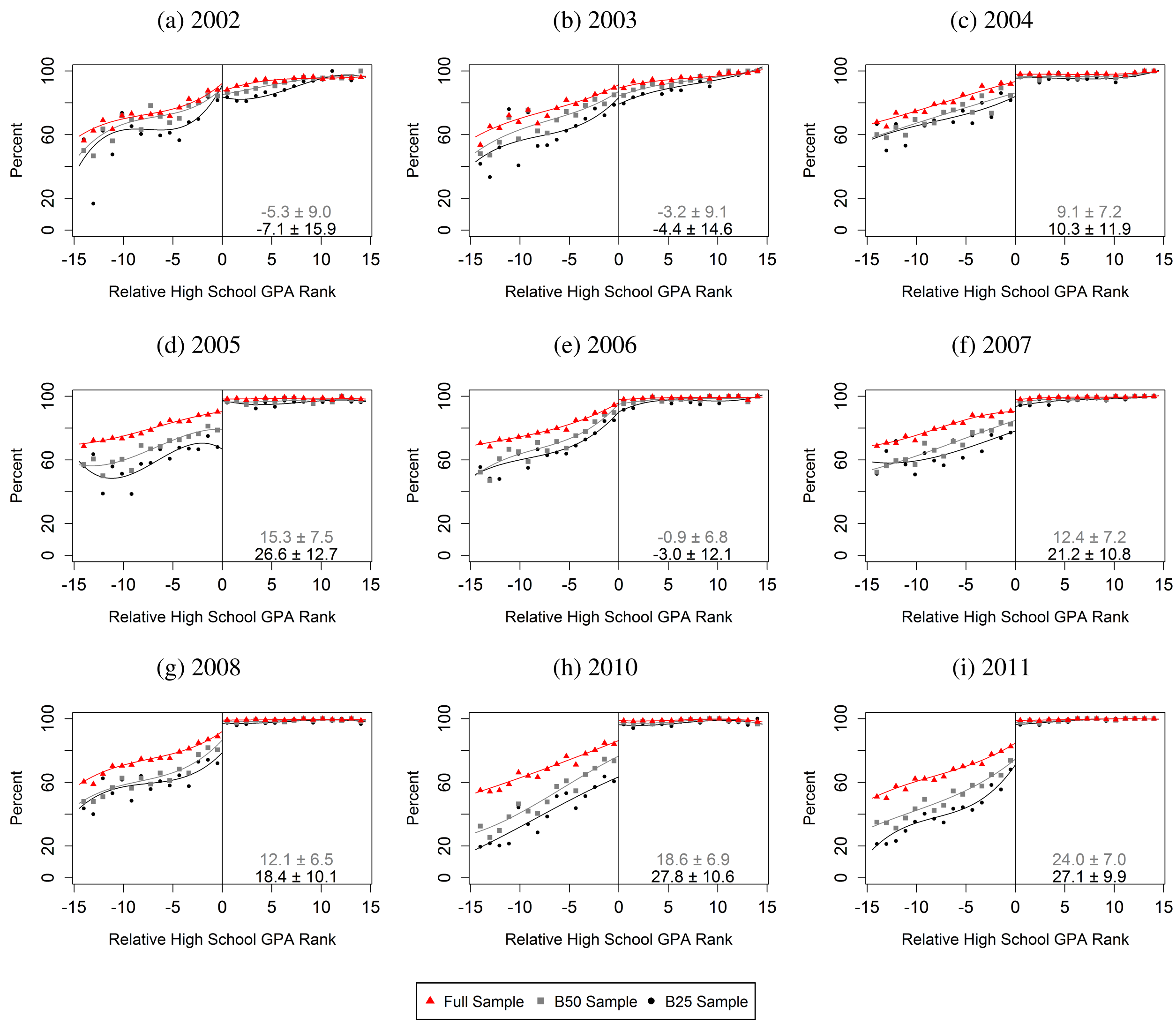
Note: Applicants' annual likelihood of admission to UC Irvine by their ELC GPA rank distance from their high school's ELC eligibility threshold, among all applicants and those from the bottom half (B50) or quartile (B25) of California high schools by leave-year-out average SAT. Points are binned averages; lines are cubic fits. Each panel conditions on applying to that UC campus in that year. Source: UC Corporate Student System.

Figure EE-3: Local Effect of ELC Eligibility on Applicants' Likelihood of Admission to UC San Diego



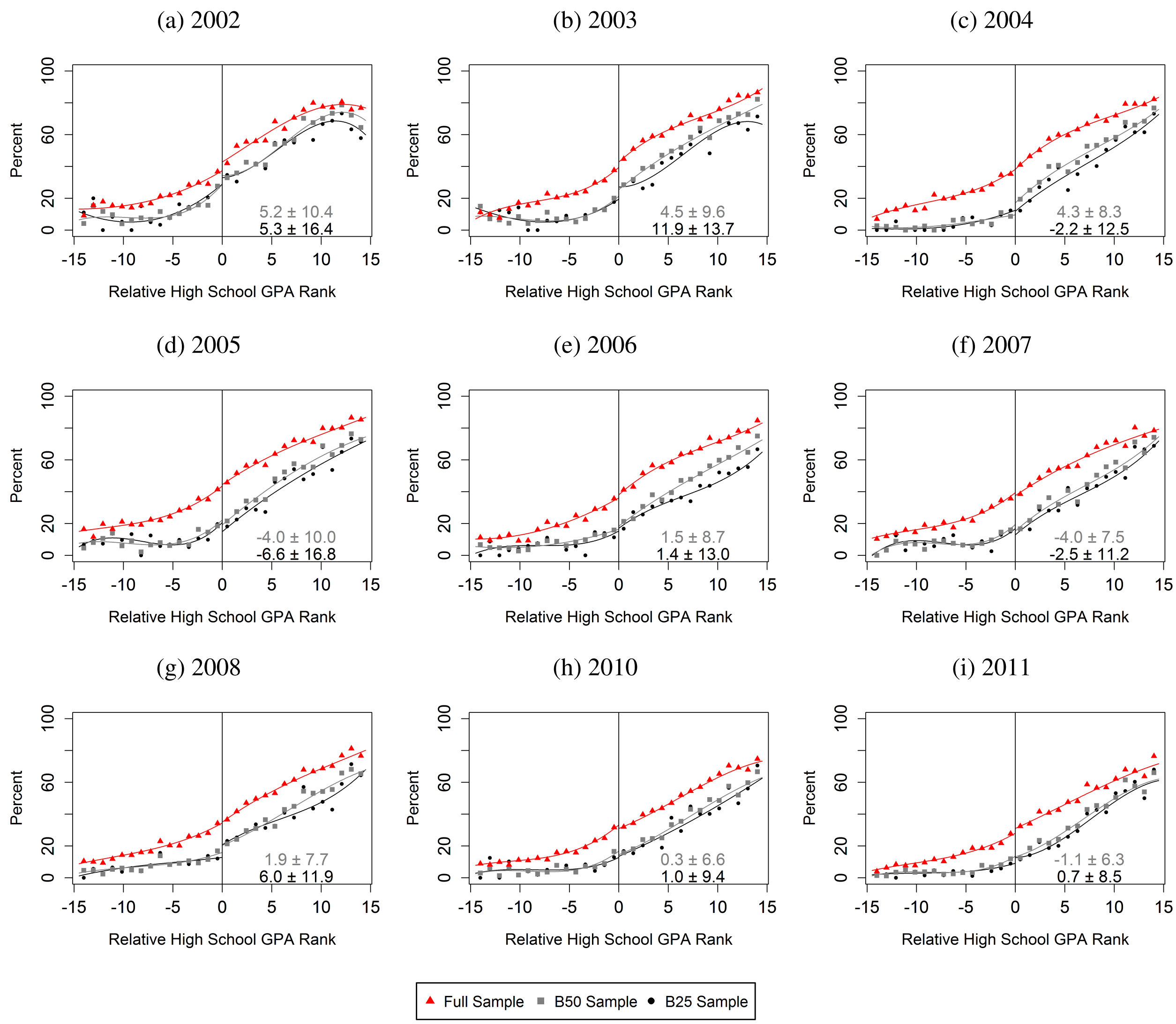
Note: Applicants' annual likelihood of admission to UC San Diego by their ELC GPA rank distance from their high school's ELC eligibility threshold, among all applicants and those from the bottom half (B50) or quartile (B25) of California high schools by leave-year-out average SAT. Points are binned averages; lines are cubic fits. Each panel conditions on applying to that UC campus in that year. Source: UC Corporate Student System.

Figure EE-4: Local Effect of ELC Eligibility on Applicants' Likelihood of Admission to UC Santa Barbara



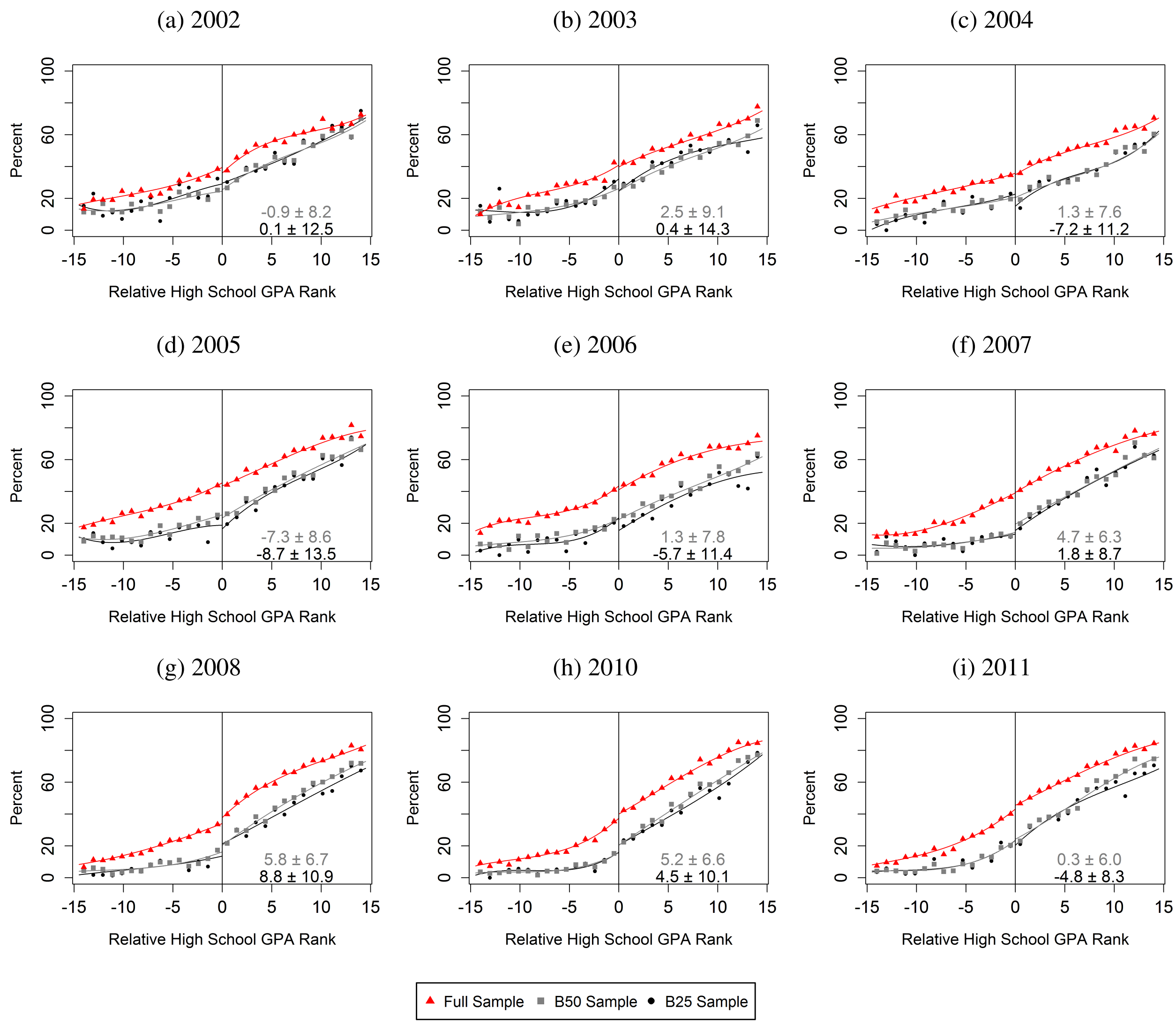
Note: Applicants' annual likelihood of admission to UC Santa Barbara by their ELC GPA rank distance from their high school's ELC eligibility threshold, among all applicants and those from the bottom half (B50) or quartile (B25) of California high schools by leave-year-out average SAT. Points are binned averages; lines are cubic fits. Each panel conditions on applying to that UC campus in that year. Source: UC Corporate Student System.

Figure EE-5: Local Effect of ELC Eligibility on Applicants' Likelihood of Admission to UC Berkeley



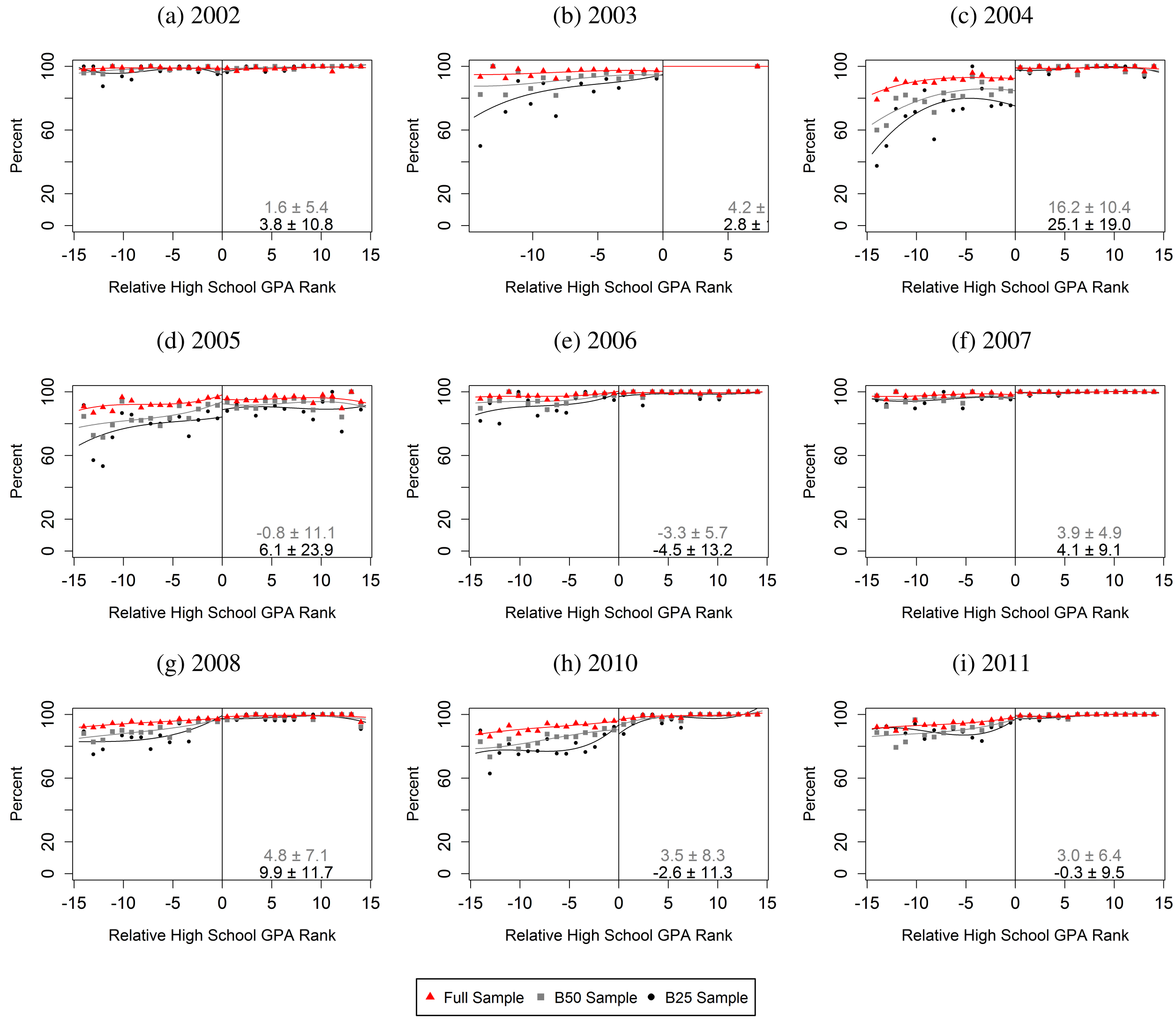
Note: Applicants' annual likelihood of admission to UC Berkeley by their ELC GPA rank distance from their high school's ELC eligibility threshold, among all applicants and those from the bottom half (B50) or quartile (B25) of California high schools by leave-year-out average SAT. Points are binned averages; lines are cubic fits. Each panel conditions on applying to that UC campus in that year. Source: UC Corporate Student System.

Figure EE-6: Local Effect of ELC Eligibility on Applicants' Likelihood of Admission to UCLA



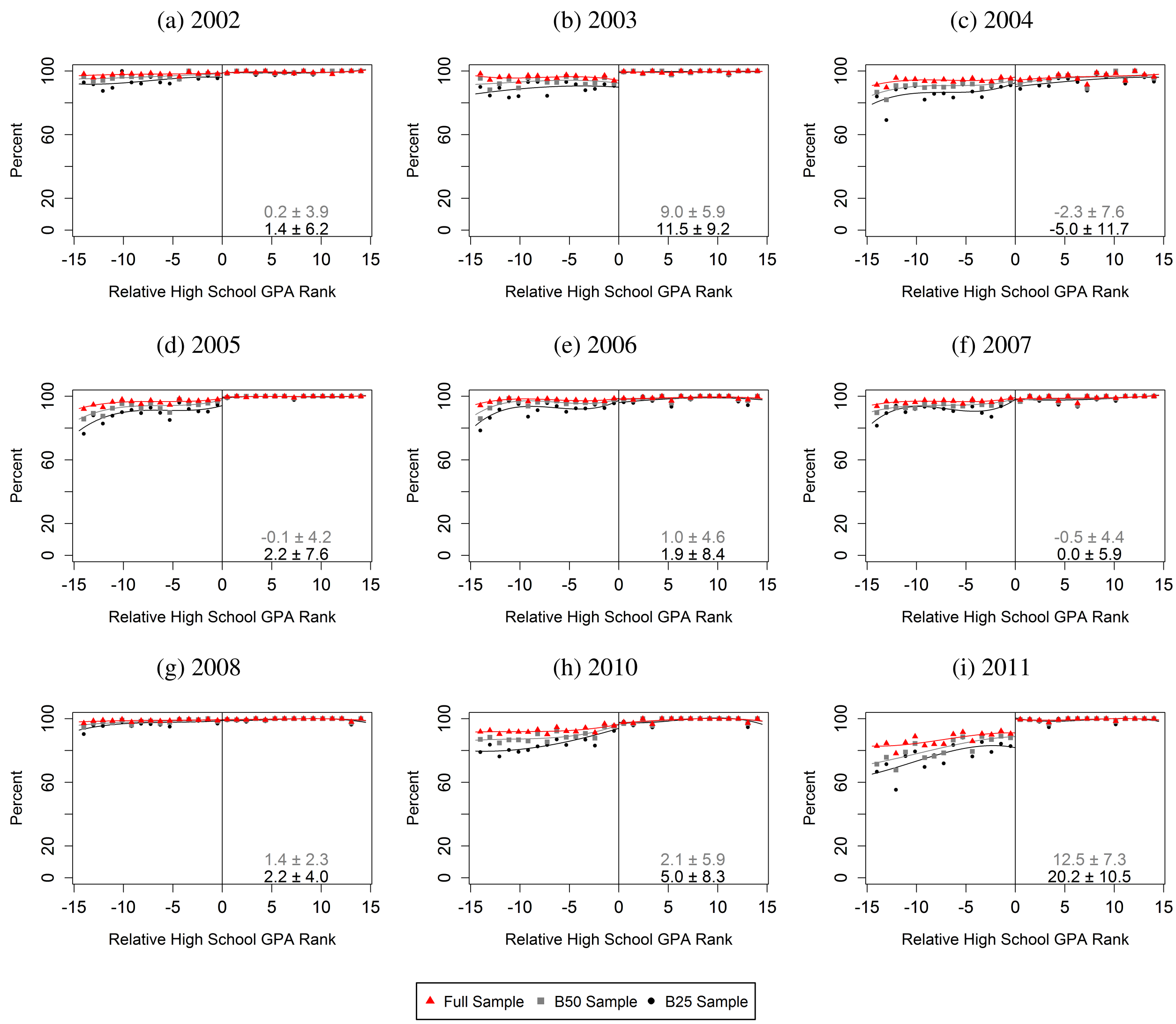
Note: Applicants' annual likelihood of admission to UCLA by their ELC GPA rank distance from their high school's ELC eligibility threshold, among all applicants and those from the bottom half (B50) or quartile (B25) of California high schools by leave-year-out average SAT. Points are binned averages; lines are cubic fits. Each panel conditions on applying to that UC campus in that year. Source: UC Corporate Student System.

Figure EE-7: Local Effect of ELC Eligibility on Applicants' Likelihood of Admission to UC Santa Cruz



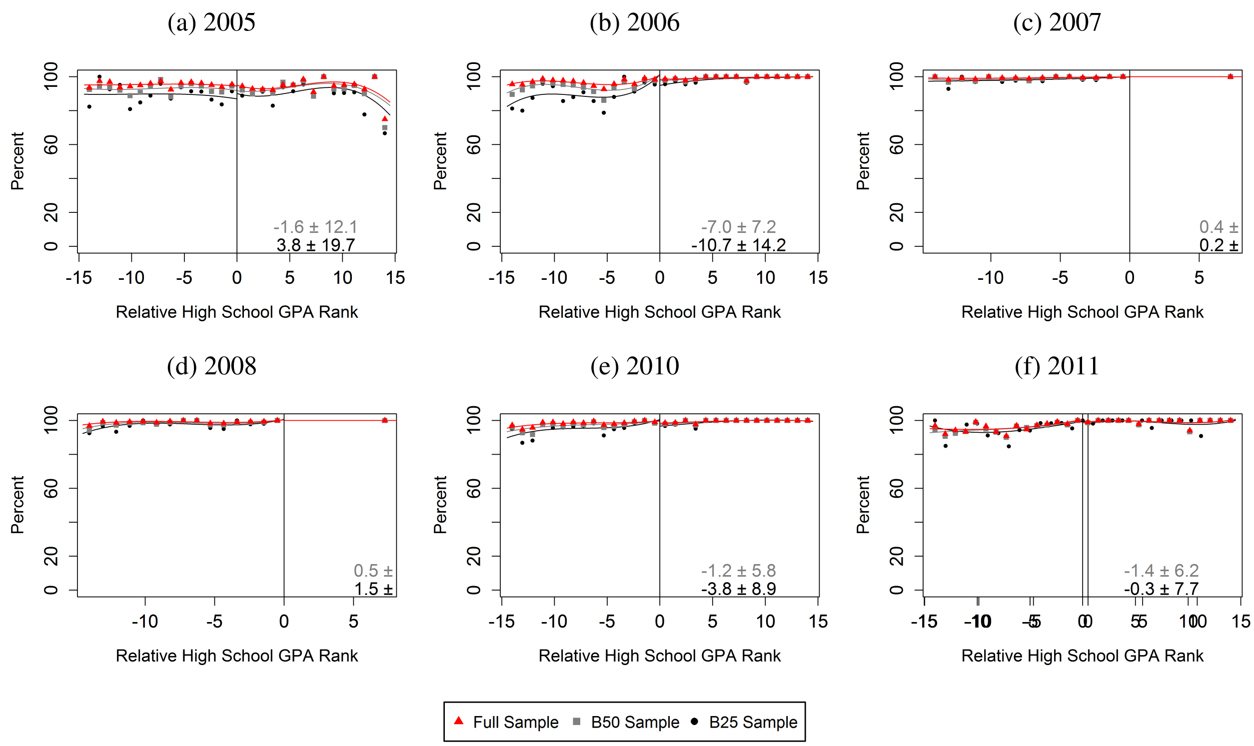
Note: Applicants' annual likelihood of admission to UC Santa Cruz by their ELC GPA rank distance from their high school's ELC eligibility threshold, among all applicants and those from the bottom half (B50) or quartile (B25) of California high schools by leave-year-out average SAT. Points are binned averages; lines are cubic fits. Each panel conditions on applying to that UC campus in that year. Source: UC Corporate Student System.

Figure EE-8: Local Effect of ELC Eligibility on Applicants' Likelihood of Admission to UC Riverside



Note: Applicants' annual likelihood of admission to UC Riverside by their ELC GPA rank distance from their high school's ELC eligibility threshold, among all applicants and those from the bottom half (B50) or quartile (B25) of California high schools by leave-year-out average SAT. Points are binned averages; lines are cubic fits. Each panel conditions on applying to that UC campus in that year. Source: UC Corporate Student System.

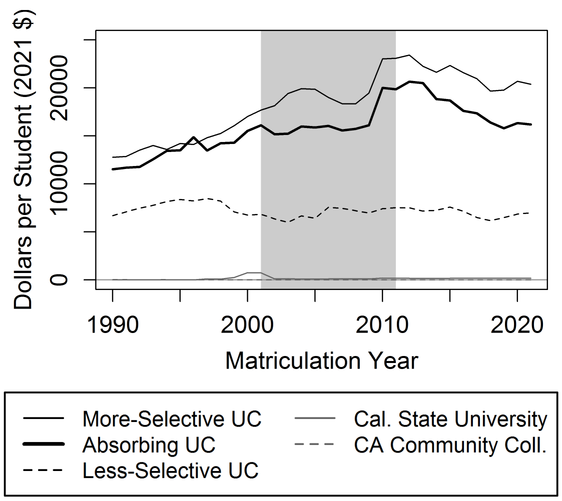
Figure EE-9: Local Effect of ELC Eligibility on Applicants' Likelihood of Admission to UC Merced



Note: Applicants' annual likelihood of admission to UC Merced by their ELC GPA rank distance from their high school's ELC eligibility threshold, among all applicants and those from the bottom half (B50) or quartile (B25) of California high schools by leave-year-out average SAT. Points are binned averages; lines are cubic fits. Each panel conditions on applying to that UC campus in that year. Source: UC Corporate Student System.

Other Appendix Figures and Tables

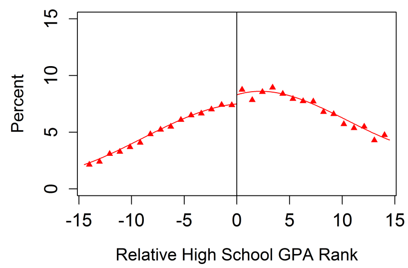
Figure A-1: Annual Per-Student Research Expenditures at Public Colleges and Universities in California



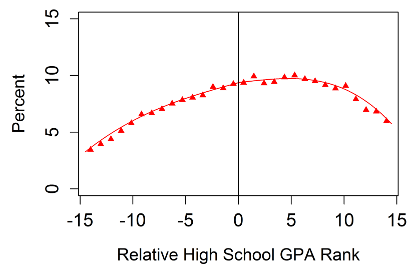
Note: This figure shows that UC campuses – and especially the more-selective and Absorbing UC campuses – have far higher annual research expenditures than California's other public colleges and universities. Note: Average annual research expenditure per FTE student at the more-selective (Berkeley and UCLA), mid-selective (Davis, Irvine, San Diego, and Santa Barbara), and less-selective (Santa Cruz, Riverside, and Merced) UC campuses, CSU institutions, and California community colleges as well as the private Ivy-Plus universities (see Chetty et al., 2023), in CPI-adjusted 2021 dollars. Averaged across institutions by first-time freshman enrollment. See Appendix A for details on data construction and variable definitions. Source: IPEDS.

Figure A-2: Composition of ELC High School Student Sample by Year

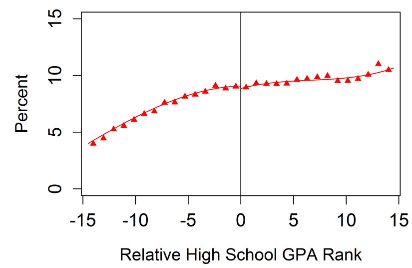
(a) 2001



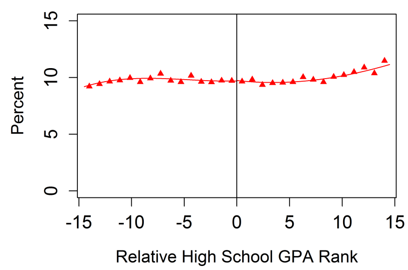
(b) 2002



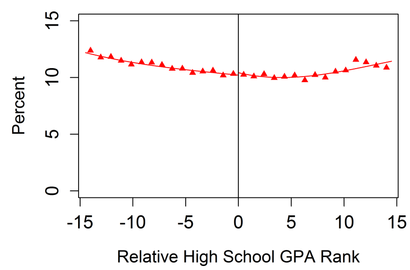
(c) 2003



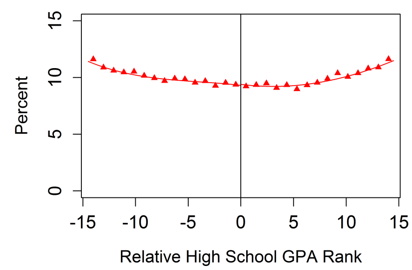
(d) 2004



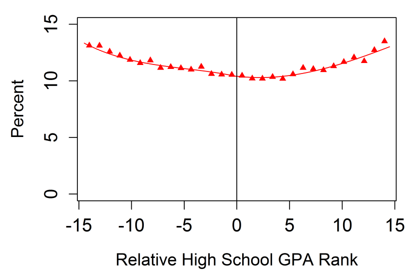
(e) 2005



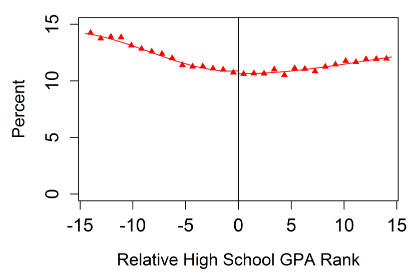
(f) 2006



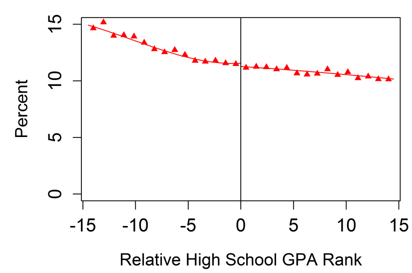
(g) 2007



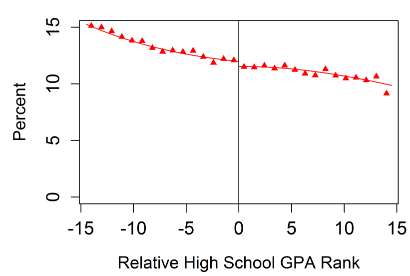
(h) 2008



(i) 2010



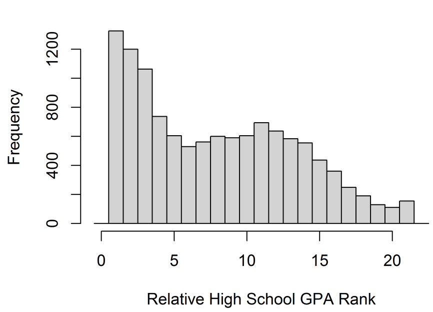
(j) 2011



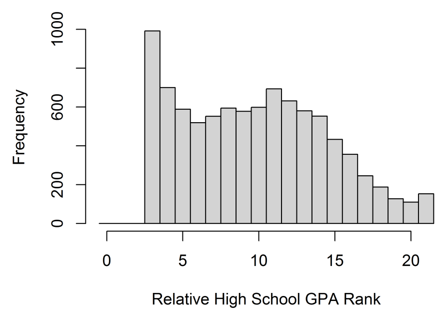
Note: This figure shows that in 2001 (but in no other year) there is an increased density of students above the eligibility threshold, reflecting implementation challenges in the policy's first year (see the text) that motivate excluding that year's data from all presented analysis. Top California 2001-2011 high school seniors' likelihood of graduating in each year between 2001 and 2011 by their ELC GPA rank distance from their high school's ELC eligibility threshold. Points are binned averages; lines are cubic fits. Source: UC Corporate Student System.

Figure A-3: Distribution of Number of Ranks Above Eligibility Threshold, Overall and Around High School Thresholds

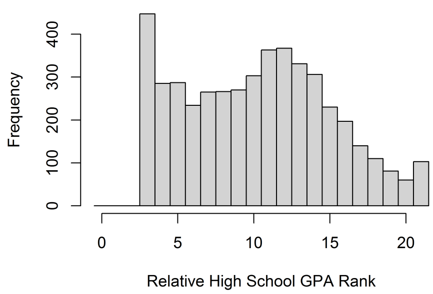
(a) Raw ELC GPAs



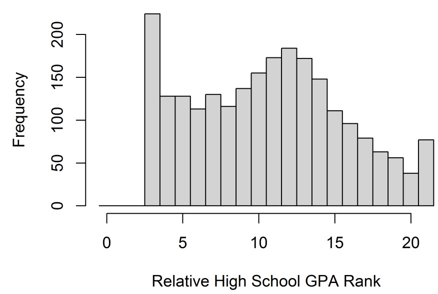
(b) Restricted ELC GPAs



(c) B50 Applicant ELC GPAs

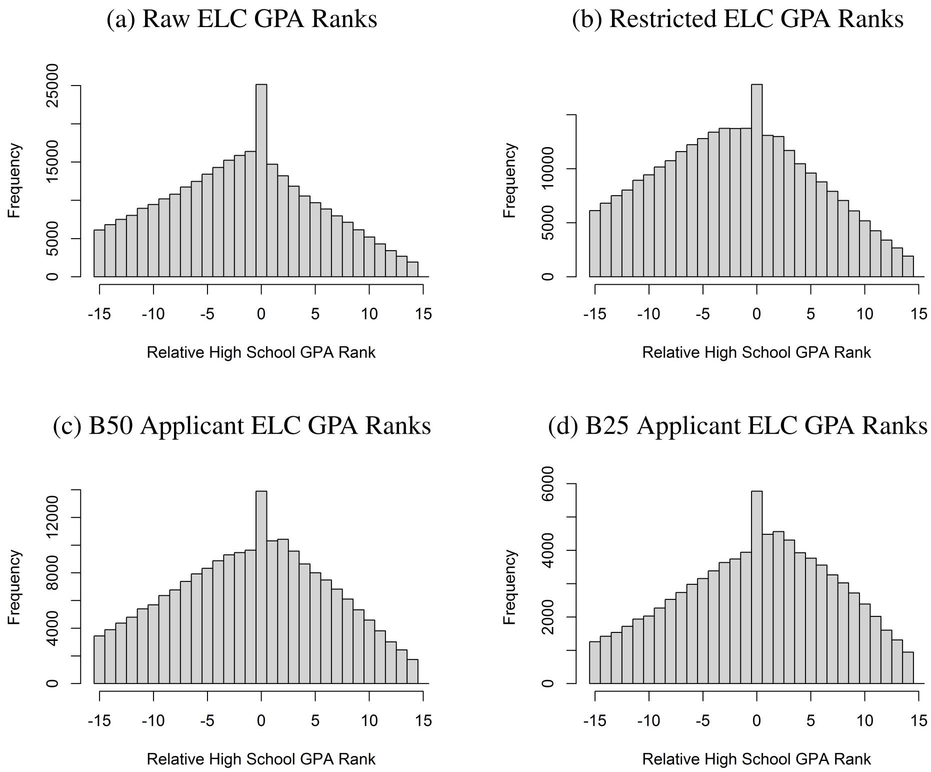


(d) B25 Applicant ELC GPAs



Note: This figure shows that an outsized number of schools have only one or two ELC GPA ranks above or below their school's eligibility threshold; these schools are omitted for lack of estimable variation near the threshold. The discrete distribution of the minimum number of ELC GPA ranks either above or below the school-year's eligibility threshold across all school-years, restricted to those with at least 3, and further restricted to UC applicants from the bottom half (B50) or quartile (B25) of high schools by leave-year-out average SAT score (the main estimation samples). Schools with more than 21 ranks above and below their eligibility threshold are assigned to 21. See Footnote 18 for definition of SAT quartiles. Source: UC Corporate Student System.

Figure A-4: Distribution of ELC GPA Ranks, Overall and Around High School Thresholds



(a) Raw ELC GPA Ranks

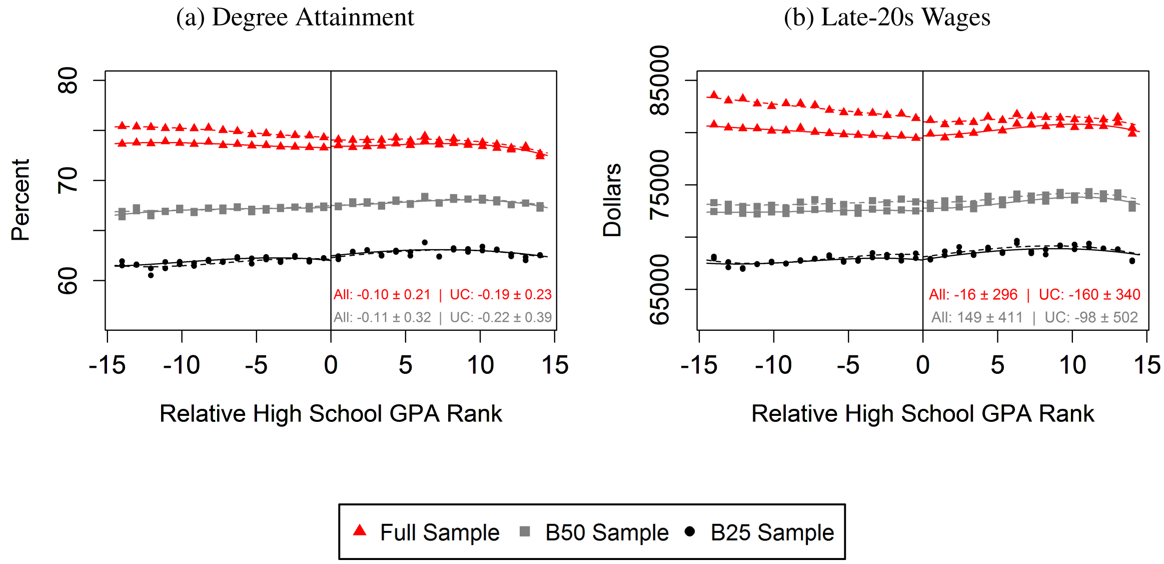
(b) Restricted ELC GPA Ranks

(c) B50 Applicant ELC GPA Ranks

(d) B25 Applicant ELC GPA Ranks

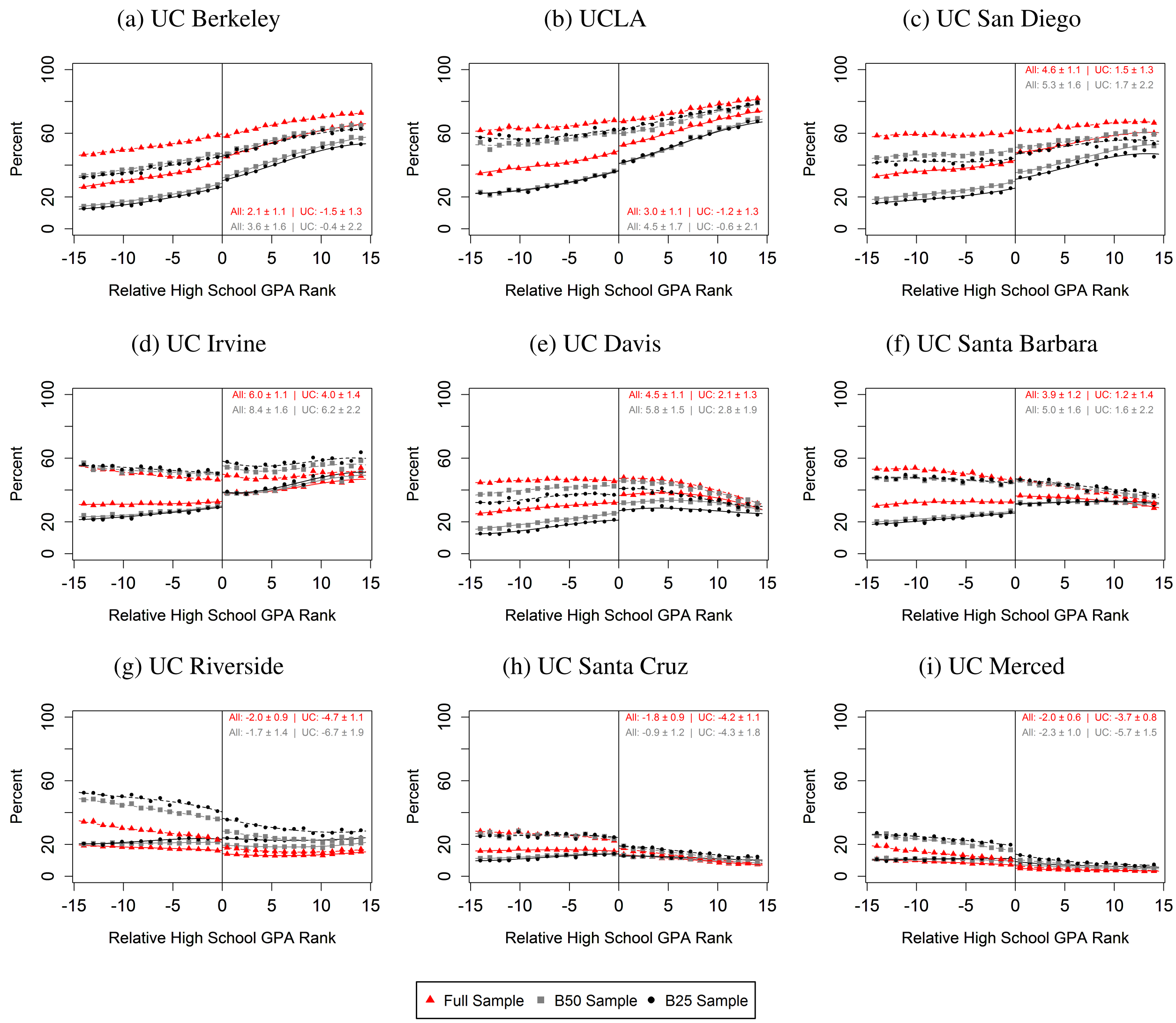
Note: This figure shows that choosing the ELC eligibility threshold using the lumpy discrete GPA running variable leads to bunching at exactly the threshold, but without any evidence of students moving themselves over the threshold, while restricting the sample to applications leads to increased mass above the threshold. The discrete distribution of the ELC GPA rank running variable within 15 ranks of the high school's eligibility threshold in the full sample of top California high school students, restricted to students whose high schools have at least 3 ranks above and below the eligibility threshold, and further restricted to UC applicants from the bottom half (B50) or quartile (B25) of high schools by leave-year-out average SAT score (the main estimation samples). See Footnote 18 for definition of SAT quartiles. Source: UC Corporate Student System.

Figure A-5: Socioeconomic-Predicted Student Outcomes



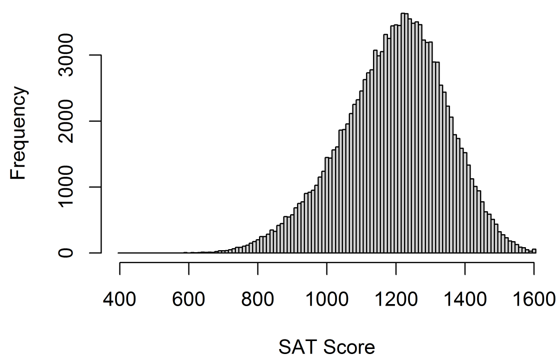
Note: This figure summarizes baseline sample balance across the ELC eligibility threshold using high school students' and UC applicants' predicted five-year degree attainment and late-20s wages (on the basis of socioeconomic characteristics), showing that restricting to applicants leads to slight negative selection across the ELC eligibility threshold. Regression discontinuity plot of 2002-2011 UC applicants' predicted likelihood of five-year degree attainment and late-20s wages by their ELC GPA rank distance from their high school's ELC eligibility threshold, over all California high school seniors (solid lines) and over all UC applicants (dashed lines), among all applicants or applicants from the bottom half (B50) or quartile (B25) of California high schools by leave-year-out average SAT. Points are binned averages; lines are cubic fits. Beta estimates and 95-percent confidence intervals (clustered by school-year) are from cubic regression discontinuity models following Equation 2 over all high-GPA high school students within 15 ELC GPA ranks of their high school's ELC eligibility threshold and restricting to UC applicants, overall and for students from the bottom half (B50) and quartile (B25) of CA high schools by leave-year-out average SAT. Predicted wages are estimated on a 20 percent hold-out sample using gender-ethnicity indicators, parental income and education bins, and average ZIP code family income. See Appendix A for details on data construction. Source: UC Corporate Student System, the National Student Clearinghouse, and IRS SOI.

Figure A-6: Local Effect of ELC Eligibility on Applicants' Likelihood of Application to each UC Campus



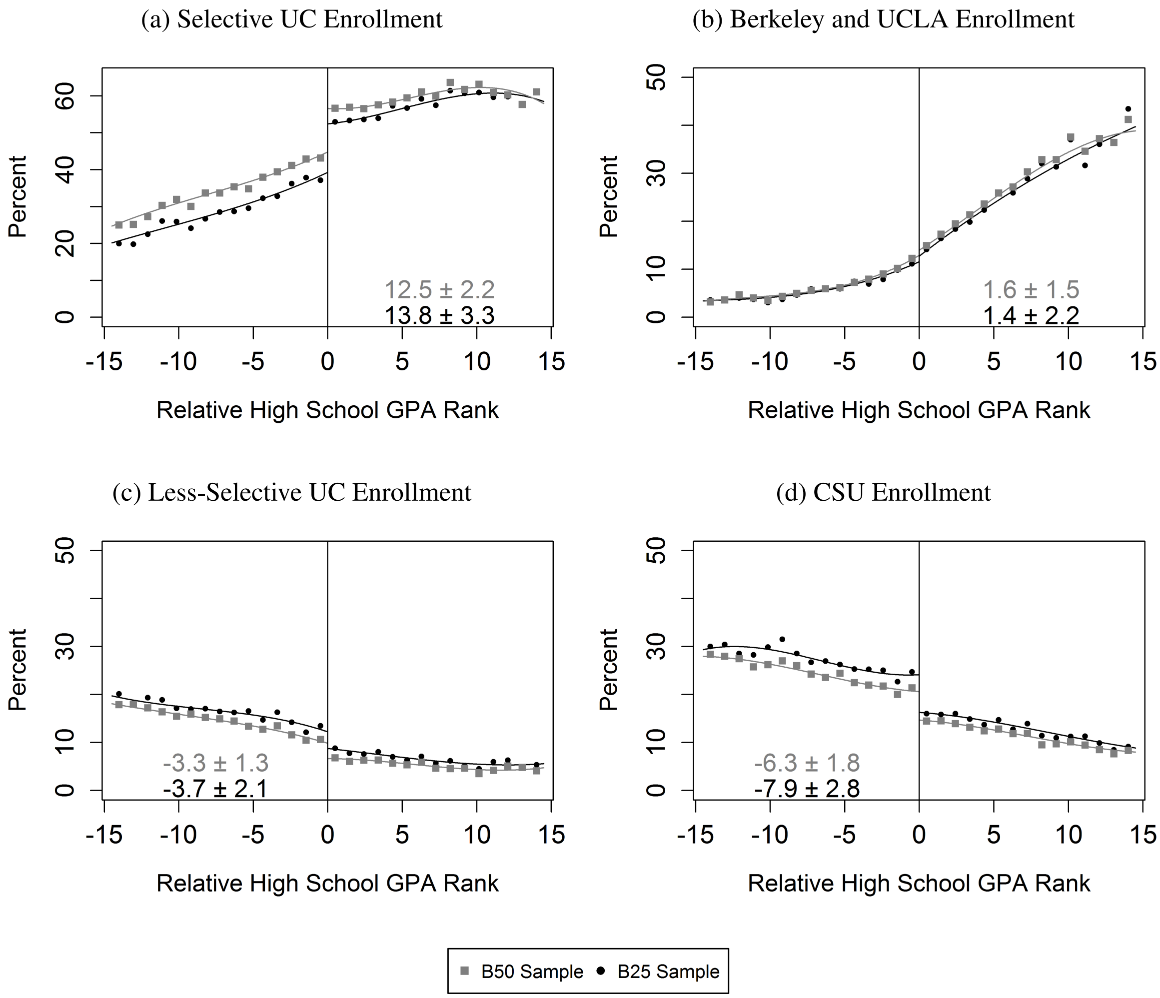
Note: This figure shows that barely ELC-eligible applicants responded to their Absorbing UC campus admissions advantages by becoming slightly more likely to apply to those campuses and slightly less likely to apply to the less-selective campuses, though the magnitudes are far smaller than the shifts in those applicants' admissions likelihoods. 2002-2011 UC applicants' likelihood of application to each UC campus by their ELC GPA rank distance from their high school's ELC eligibility threshold, over all California high school seniors (solid lines) and over all UC applicants (dashed lines), among all UC students and those from the bottom half (B50) or quartile (B25) of California high schools by leave-year-out average SAT. Points are binned averages; lines are cubic fits. Beta estimates and 95-percent confidence intervals (clustered by school-year) are from cubic regression discontinuity models following Equation 2 over all high-GPA high school students within 15 ELC GPA ranks of their high school's ELC eligibility threshold and restricting to UC applicants, overall and for students from the bottom half (B50) and quartile (B25) of CA high schools by leave-year-out average SAT. Source: UC Corporate Student System.

Figure A-7: SAT Distribution at the Absorbing UC Campuses



Note: This figure shows the full distribution of SAT scores at the Absorbing UC campuses, showing how few students have SAT scores as low as the typical B50 or B25 ELC participant. The discrete distribution of SAT verbal and mathematics scores of 2002-2011 freshman California-resident enrollees (excluding 2009) at the four Absorbing UC campuses. Source: UC Corporate Student System and National Student Clearinghouse.

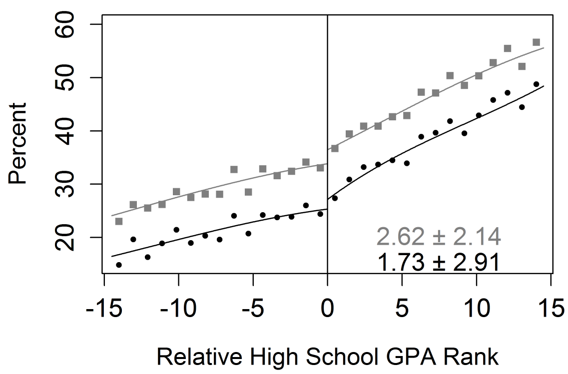
Figure A-8: Local Effect of ELC Eligibility on University Enrollment



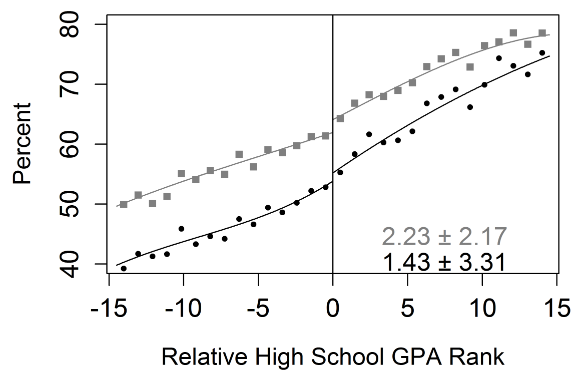
Note: This figure shows that ELC eligibility leads students to become more likely to enroll at the Absorbing and (to a lesser degree) more-selective UC campuses and less likely to enroll at less-selective UC campuses and CSUs. Regression discontinuity plots of applicants' enrollment at selective (that is, more-selective or Absorbing) UC campuses, more-selective UC campuses, less-selective UC campuses, or CSUs by their ELC GPA rank distance from their high school's ELC eligibility threshold, among applicants from the bottom half (B50) or quartile (B25) of high schools by SAT. Points are binned averages; lines are cubic fits. Beta estimates and 95-percent confidence intervals (clustered by school-year) are from cubic regression discontinuity models following Equation 2 for the B50 and B25 samples. See Appendix A for details on data construction and variable definitions. Source: UC Corporate Student System and National Student Clearinghouse.

Figure A-9: Local Effect of ELC Eligibility on UC Applicants' Other Education Outcomes

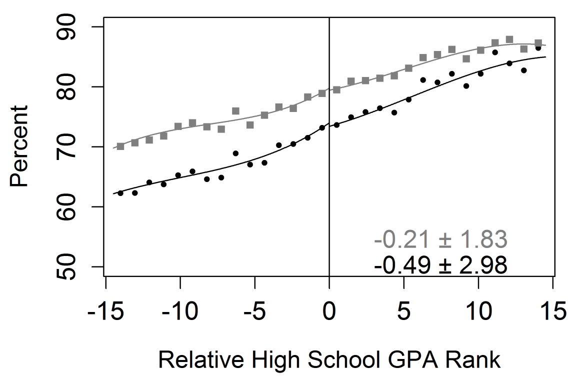
(a) BA in Four Years

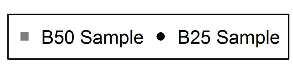


(b) BA In Five Years



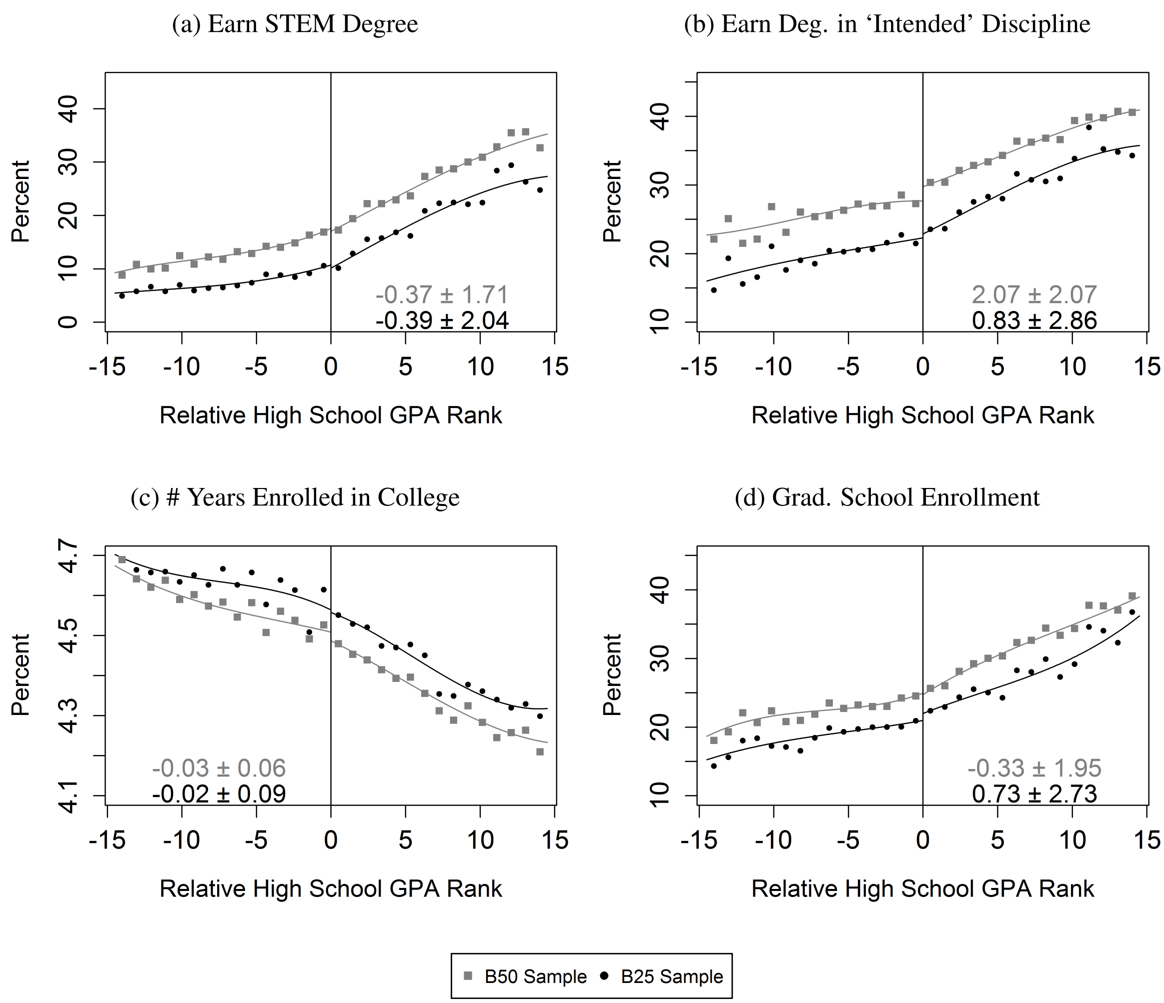
(c) Ever Earn BA





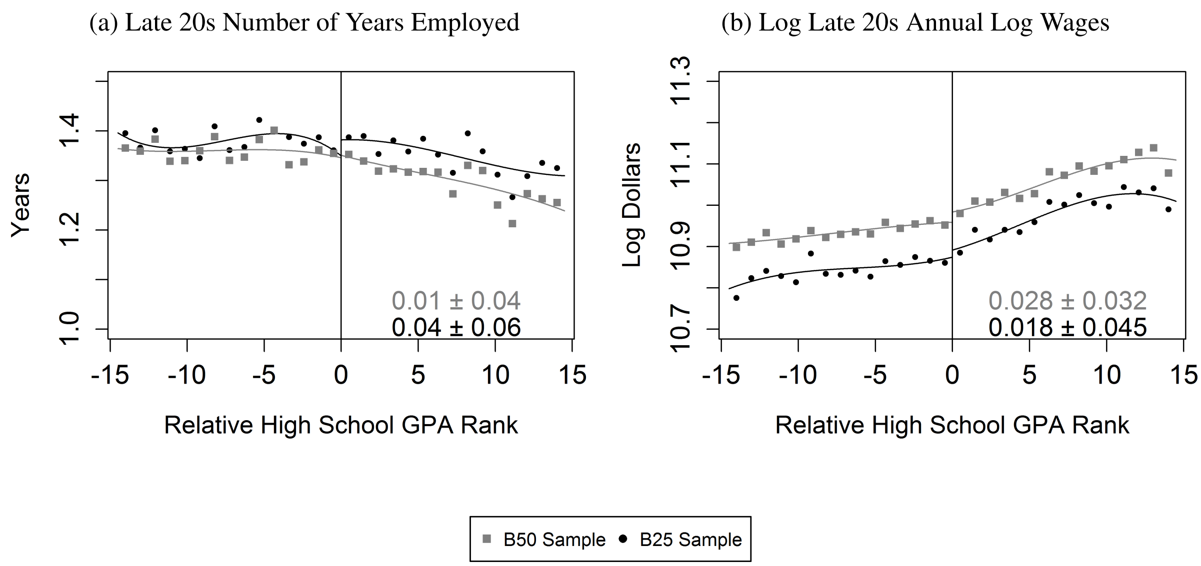
Note: This figure shows that ELC eligibility accelerated near-threshold students' degree attainment but did not affect students' likelihood of ever attaining a college degree. Regression discontinuity plots of applicants' bachelor's degree attainment within four or five years or by 2019 by their ELC GPA rank distance from their high school's ELC eligibility threshold, among applicants from the bottom half (B50) or quartile (B25) of high schools by SAT. Points are binned averages; lines are cubic fits. Beta estimates and 95-percent confidence intervals (clustered by school-year) are from cubic regression discontinuity models following Equation 2 for the B50 and B25 samples. See Appendix A for details on data construction and variable definitions. Source: UC Corporate Student System and National Student Clearinghouse.

Figure A-10: Local Effect of ELC Eligibility on UC Applicants' Other Education Outcomes



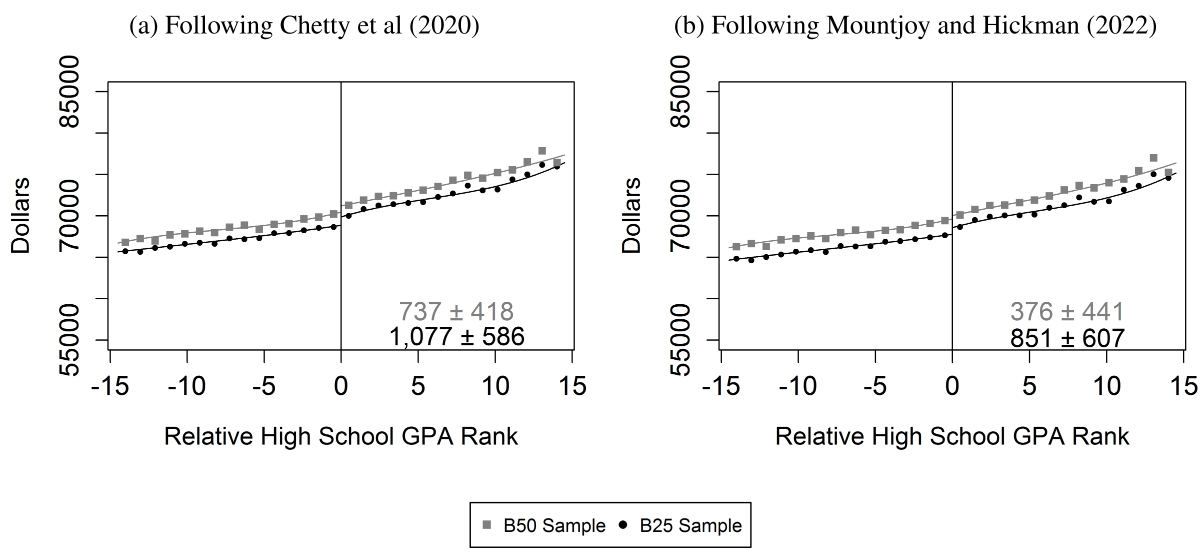
Note: This figure shows that ELC eligibility had no measurable impact on STEM degree attainment or graduate school enrollment, but may have somewhat increased students' likelihood of earning a college degree in the intended major reported on their UC application and (if anything) decreased their total number of years enrolled in college. Regression discontinuity plots of applicants' measured outcomes by their ELC GPA rank distance from their high school's ELC eligibility threshold, among applicants from the bottom half (B50) or quartile (B25) of high schools by leave-year-out average SAT score. Points are binned averages; lines are cubic fits. Beta estimates and 95-percent confidence intervals (clustered by school-year) are from cubic regression discontinuity models following Equation 2 for the B50 and B25 samples. Degree attainment by discipline is unconditional on overall attainment. Intended discipline is applicants' most-selected prospective major discipline reported to UC campuses. Number of years enrolled in college is the number of academic years within seven years of high school graduation in which the applicant is observed enrolled at a postsecondary institution but has not yet earned a Bachelor's degree. See Appendix A for details on data construction and variable definitions. Source: UC Corporate Student System and National Student Clearinghouse.

Figure A-11: California Log Wage and Employment Across the ELC Eligibility Threshold



Note: This figure shows that ELC eligibility had no effect on extensive-margin labor supply in California and had an effect on log wages more noisily estimated than on dollars, though excluding individuals at exactly the eligibility threshold yields clearly positive estimates in log dollars (see Table A-8). Regression discontinuity plots of applicants' measured outcomes by their ELC GPA rank distance from their high school's ELC eligibility threshold, among applicants from the bottom half (B50) or quartile (B25) of high schools by leave-year-out average SAT score. Points are binned averages; lines are cubic fits. Beta estimates and 95-percent confidence intervals (clustered by school-year) are from cubic regression discontinuity models following Equation 2 for the B50 and B25 samples. Number of years employed is the unconditional number of years in which the student had positive wages 10 ot 11 years after high school graduation (between 0 and 2); average annual log wages are measured in those same years and exclude zeroes. See Appendix A for details on variable definition and data construction. Source: UC Corporate Student System and the California Employment Development Department (Bleemer, 2018).

Figure A-12: Local Effect of ELC Eligibility on UC Applicants' Institutional Value-Added by Late-20s Annual Wage, **Conditional on Positive Wages**



Note: This figure shows that the conditioning on late-20s California employment does not meaningfully affect the observed change in institutional value-added observed at the ELC eligibility threshold. UC applicants' first enrollment institution's estimated late-20s wage value-added by their ELC GPA rank distance from their high school's ELC eligibility threshold, among applicants **with positive late-20s California wages** from the bottom half (B50) or quartile (B25) of California high schools by leave-year-out average SAT. Points are binned averages; lines are cubic fits. Beta estimates and 95-percent confidence intervals (clustered by school-year) are from cubic regression discontinuity models following Equation 2 for each sample. Institutional value-added estimates are produced by linear regression across all 2001-2011 UC applications (holding out the main estimation sample) of California covered wages 10-11 years after high school graduation on either (a) fifth-order polynomials in SAT score and parental income and ethnicity indicators, following Chetty et al. (2020), or (b) application-admission portfolio indicators for the nine undergraduate UC campuses, following Mountjoy and Hickman (2020). I estimate the university fixed effects relative to CSU Long Beach and then define value-added by the sum of the estimated coefficient (0 for Long Beach) and the mean late-20s wages of CSU Long Beach enrollees, facilitating comparability with Figure 7. Standard errors are not adjusted for variation in the value-added coefficients. Source: UC Corporate Student System, National Student Clearinghouse, and the California Employment Development Department (Bleemer, 2018).

Table A-1: Characteristics of Near-Threshold ELC **Application** Compliers

Panel A: Student Characteristics

	Female (%)	URM (%)	Rural (%)	SAT Score	HS GPA	Avg. ZIP Income ($)	Below-Med. ZIP Inc. (%)
All	64.6	32.1	20.2	1083	3.92	66,000	68.9
	(4.8)	(5.0)	(3.5)	(19)	(0.03)	(2,829)	(4.4)
B50	67.3	38.4	21.4	1019	3.80	55,627	78.0
	(6.1)	(6.2)	(4.3)	(20)	(0.03)	(2,047)	(4.3)
B25	55.1	57.6	15.8	955	3.70	46,185	94.1
	(9.4)	(9.6)	(5.8)	(29)	(0.05)	(2,608)	(4.1)
Below-Thresh. Mean[1]	62.9	25.0	14.6	1156		80,688.0	50.3
App Mean[2]	56.2	26.6	4.9	1160	3.67	95,110	57.4

Panel B: High School SAT Quartiles

	1st	2nd	3rd	4th
All	31.4	36.0	18.3	14.3
	(3.8)	(3.8)	(3.6)	(2.9)
Below-Thresh. Mean[1]	23.2	25.4	25.5	25.9
Abs. Mean[1]	15.8	16.6	22.4	43.4

Note: This table shows that the barely above-threshold high school seniors who applied to UC as a result of their ELC eligibility tended to be somewhat negatively selected relative to both the typical UC applicant and relative to the full pool of near-threshold students, implying that positive selection into UC application is an unlikely explanation for above-threshold students' improved educational and labor market outcomes. Estimated characteristics of near-threshold ELC application compliers, or the barely above-threshold high school seniors who only applied to any University of California campus as a result of their ELC eligibility, estimated following Abadie (2002) with Equation 2. Standard errors in parentheses are clustered by school-year. See the text for definition of high school quartiles and Appendix A for data definitions. Median California household income is the annual California median (US Census). [1]The average characteristics of California high school seniors immediately below their schools' ELC eligibility threshold, estimated as where the below-threshold polynomial intersects with the threshold. [2]The average characteristic of all California-resident freshman UC applicants.

Source: UC Corporate Student System, NCES, and IRS SOI.

Table A-2: Baseline Characteristic Balance at ELC Eligibility Threshold

	Female (%)	URM (%)	HS GPA	Avg. ZIP Inc. ($)	Parent Inc. ($)	Parent Has BA (%)	Predicted Values[1]		SAT Score	Months Since SAT	Apply to UC (%)
							BA (%)	Wages ($)			
Panel A: All Top CA High School Students											
All	-0.1	0.5	-0.000	165	-1,063	-1.0	-0.07	30	-2.9	0.09	6.5
	(0.6)	(0.5)	(0.002)	(268)	(1,121)	(1.0)	(0.10)	(148)	(1.9)	(0.05)	(0.5)
B50	-0.3	0.0	0.006	101	-284	-0.3	-0.05	185	-0.8	0.08	8.7
	(0.9)	(0.9)	(0.004)	(261)	(1,398)	(1.4)	(0.16)	(204)	(2.8)	(0.06)	(0.8)
B25	2.0	0.9	0.006	513	-1,871	-0.7	0.17	-93	-4.5	0.06	8.9
	(1.3)	(1.3)	(0.006)	(312)	(1,770)	(1.8)	(0.24)	(284)	(4.2)	(0.09)	(1.2)
B50 Mean[2]	62.0	41.9	3.81	57,800	69,500	63.8	67.3	72,700	1042	4.24	59.1
Panel B: Only UC Applicants											
All	0.1	0.8	-0.004	-139	773	-1.1	-0.15	-102	-6.5	0.12	
	(0.7)	(0.6)	(0.003)	(331)	(1,395)	(0.6)	(0.11)	(170)	(2.1)	(0.05)	
B50	0.3	-0.0	0.001	-181	1,044	-1.4	-0.14	-51	-7.0	0.17	
	(1.1)	(1.1)	(0.005)	(355)	(1,409)	(1.0)	(0.19)	(250)	(3.4)	(0.07)	
B25	2.2	1.5	-0.005	232	317	-0.5	-0.13	-400	-9.4	0.18	
	(1.7)	(1.6)	(0.008)	(401)	(1,586)	(1.3)	(0.28)	(349)	(5.1)	(0.10)	
B50 Mean[2]	60.6	41.8	3.89	59,000	74,500	67.1	67.51	73,400	1076	4.02	

Note: This table shows baseline sample balance across the ELC eligibility threshold on high school students' characteristics determined prior to being informed of their ELC eligibility, but shows that students responded to eligibility by being somewhat less likely to retake the SAT and more likely to apply to UC, leading to some evidence of negative selection at the eligibility threshold among UC applicants. Reported coefficients are estimated changes in various applicant characteristics across the ELC eligibility threshold, over all top California high school students and among those who apply to a UC campus. Estimates are from cubic regression discontinuity models over UC applicants within 15 ELC GPA ranks of their high school's ELC eligibility threshold following Equation 2 with standard errors in parentheses clustered by school-year, restricting the sample to all students or students from the bottom half (B50) or quarter (B25) of high schools by leave-year-out average SAT score. Models omit all covariates. See Appendix A for details on variable definition and data construction; parent income and education are measured in College Board (Panel A) and UC applications (Panel B). [1]Dependent variable is the predicted values from an OLS regression (from a 25% hold-out training sample) of either five-year NSC graduation or Late-20s average California covered wages on gender-ethnicity indicators, parental income, first-generation indicator, and average ZIP code income. [2]The estimated baseline (ELC-ineligible) mean characteristic of barely below-threshold UC applicants; namely, where the below-threshold polynomial intersects with the eligibility threshold.

Source: UC Corporate Student System, College Board, IRS SOI, and the California Employment Development Department (Bleemer, 2018).

Table A-3: Impact of ELC on Admissions and Enrollment for Barely ELC-Eligible Applicants by Campus

	Application (%)				Conditional Admission (%)				Enrollment (%)			
	All		B50		All		B50		All		B50	
	Baseline	β	Baseline	β	Baseline	β	Baseline	β	Baseline	β	Baseline	β
More-Selective Campuses												
Berkeley	42.4	2.1	28.7	3.6	36.3	0.8	17.8	0.8	8.1	0.7	3.3	1.1
		(0.6)		(0.8)		(0.8)		(1.3)		(0.3)		(0.4)
UCLA	49.1	3.0	37.1	4.5	39.8	0.7	20.7	2.0	7.9	0.4	4.4	1.0
		(0.6)		(0.8)		(0.8)		(1.2)		(0.3)		(0.4)
Absorbing Campuses												
Davis	32.4	4.5	25.8	5.8	78.0	21.4	65.5	32.6	4.9	3.2	5.0	4.1
		(0.6)		(0.8)		(0.7)		(1.4)		(0.3)		(0.4)
San Diego	43.1	4.6	30.0	5.3	64.8	14.5	46.9	18.1	5.6	3.0	4.3	2.7
		(0.6)		(0.8)		(0.8)		(1.5)		(0.3)		(0.4)
Santa Barbara	32.6	3.9	26.7	5.0	90.5	6.2	83.5	11.2	5.1	-0.2	5.2	0.3
		(0.6)		(0.8)		(0.6)		(1.2)		(0.3)		(0.4)
Irvine	32.9	6.0	30.1	8.4	78.3	18.0	60.1	32.4	4.5	1.4	4.7	3.1
		(0.6)		(0.8)		(0.7)		(1.3)		(0.3)		(0.4)
Less-Selective Campuses												
Riverside	16.2	-2.0	21.5	-1.7	97.0	2.0	95.8	2.6	2.1	-0.3	3.4	-0.3
		(0.4)		(0.7)		(0.5)		(0.8)		(0.2)		(0.3)
Santa Cruz	15.7	-1.8	14.1	-0.9	97.4	1.4	94.8	3.2	1.5	-0.3	1.8	-0.7
		(0.4)		(0.6)		(0.5)		(1.1)		(0.2)		(0.2)
Merced	7.1	-2.0	9.6	-2.3	94.0	-1.1	93.1	-1.8	0.4	-0.2	0.7	-0.3
		(0.3)		(0.5)		(0.7)		(1.0)		(0.1)		(0.2)

Note: This table presents the impact of near-threshold ELC eligibility on each UC campus's admissions and enrollment, showing that the Absorbing UC campuses provided large admissions advantages to eligible students (especially those from less-competitive high schools) that translated into increased likelihood of enrollment, while the more-selective campuses slightly gained enrollment through both application and admission channels. Reported coefficients are the estimated baseline (ELC-ineligible) proportion of students just below their high school's ELC eligibility threshold who applied to, were admitted to (conditional on applying), or enrolled at each UC campus, and the estimated change in application, conditional admission, and enrollment for barely ELC-eligible applicants (β), overall and for students from the bottom half (B50) of California high schools by leave-year-out SAT scores. Values in percentages. Estimates are from cubic regression discontinuity models over UC applicants within 15 ELC GPA ranks of their high school's ELC eligibility threshold following Equation 2 with standard errors in parentheses clustered by school-year; baselines are estimated as where the below-threshold polynomial intersects with the eligibility threshold.

Source: UC Corporate Student System and National Student Clearinghouse.

Table A-4: Local Effect of ELC Eligibility on Characteristics of Degree-Providing Institution

	Five-Year Grad. Rate	Avg. SAT	Annual Expenditure per Student Instruction	Research	Student Serv.	Sticker Price	Est. Net Price[1]
B50 Sample							
Baseline	56.6	1,604	12,271	3,714	2,799	23,012	12,670
β	1.7 (0.4)	21 (4)	1,057 (247)	1,794 (262)	-0 (39)	139 (277)	19 (263)
IV: Enroll at Sel. UC	14.4 (3.1)	175 (29)	8,917 (1,903)	15,135 (1,812)	-3 (327)	1,195 (2,402)	130 (1,750)
# Obs.	69,960	69,952	69,540	69,540	69,540	67,666	25,031
B25 Sample							
Baseline	50.7	1,566	10,095	3,363	2,218	20,604	10,069
β	2.6 (0.7)	25 (7)	1,417 (373)	1,660 (395)	81 (57)	475 (400)	186 (318)
IV: Enroll at Sel. UC	18.6 (4.1)	180 (37)	10,154 (2,309)	11,899 (2,201)	583 (417)	3,542 (3,040)	962 (1,634)
# Obs.	30,788	30,786	30,551	30,551	30,551	29,488	11,247
Source:	NSC/UC	NSC/UC	IPEDS	IPEDS	IPEDS	IPEDS	IPEDS/UC

Note: This table shows that ELC caused barely-eligible applicants to earn degrees from more-selective institutions using a host of selectivity measures (conditional on degree attainment), but not more expensive institutions for students in their income brackets. Reported coefficients are the estimated characteristics of the institution where applicants earned their Bachelor's degree (conditional on degree attainment) at the barely ELC-ineligible baseline, the change in those characteristics across the ELC eligibility threshold (β), and the estimated change in those characteristics for selective UC enrollment compliers estimated using ELC eligibility as an instrumental variable. Estimates are from cubic regression discontinuity models over UC applicants within 15 ELC GPA ranks of their high school's ELC eligibility threshold following Equation 2 with standard errors in parentheses clustered by school-year, restricting the sample to students from the bottom half (B50) or quarter (B25) of CA high schools by leave-year-out SAT score. Baseline estimates estimated for below-threshold enrollment compliers following Abadie (2002). All dollars are reported in CPI-adjusted 2021 dollars. See Appendix A for variable definitions and Appendix C for five-year graduation rates. [1]Net price is only available after 2007 and includes tuition and fees, expected room and board, books and supplies, and other expenses net of federal, state, local, or institutional grant aid; calculated as the average net price at that institution-year for students in the applicant's own family income bin.

Source: UC Corporate Student System, National Student Clearinghouse, and IPEDS.

Table A-5: Baseline Changes in Reported Intended Major

	Undec.	Art	Hum.	Soc. Sci.	Nat. Sci.	Engin.	Profess.	Bus.	STEM[1]
B50 Sample									
Baseline	19.8	3.2	8.7	19.4	35.4	18.9	7.4	7.0	55.4
β	-0.3	-0.3	-0.3	-0.1	0.4	0.1	-0.3	0.6	0.5
	(0.9)	(0.4)	(0.7)	(0.9)	(1.2)	(0.9)	(0.6)	(0.6)	(1.2)
B25 Sample									
Baseline	21.7	3.0	9.5	22.9	32.3	18.1	6.8	7.3	51.2
β	-1.5	-0.2	-0.5	0.3	-0.1	0.2	-0.1	0.2	0.5
	(1.4)	(0.6)	(1.0)	(1.5)	(1.7)	(1.3)	(0.8)	(0.9)	(1.8)

Note: This table shows that barely ELC-eligible UC applicants' reported intended college majors were largely unimpacted by their ELC eligibility. Reported coefficients are the estimated distribution of intended majors reported on UC applications by barely-eligible ELC enrollment compliers (estimated following Abadie (2002) with Absorbing or more-selective UC campus enrollment as the endogenous variable), and the change in those characteristics across the ELC eligibility threshold ($\hat{\beta}$) estimated following Equation 2. If an applicant reports different intended majors to different UC campuses, the dependent variable is defined as the share of campuses to which they reported a major in that discipline (or undeclared). Estimates are from cubic regression discontinuity models over UC applicants within 15 ELC GPA ranks of their high school's ELC eligibility threshold following Equation 2 with standard errors in parentheses clustered by school-year, restricting the sample to students from the bottom half (B50) or quarter (B25) of CA high schools by leave-year-out SAT score. [1]STEM includes all Natural Science and Engineering majors as well as some Professional majors (e.g. Agriculture and Architecture); see U.S. Department of Homeland Security (2016).

Source: UC Corporate Student System.

Table A-6: ELC Impact on Intended Major to Earned Major Transitions, B50 Sample

	No Degree	Art	Human.	Soc. Sci.	Nat. Sci.	Engin.	Profess.	Bus.	STEM[1]	Non-STEM
Undecl.	-1.2	-0.2	-0.2	2.7	-2.5	0.5	-3.0†	3.4*	-1.1	2.3
Art	1.5	-1.8	2.7	-3.1	4.8*	0.6	-8.1†	0.4	2.5	-6.0
Human.	-0.1	-1.8	0.9	2.9	0.6	0.2	-3.1	-0.9	0.9	-1.4
Soc. Sci.	-4.3†	-0.7	-0.9	10.0**	-0.2	0.2	-0.7	-1.3	0.4	4.6†
Nat. Sci.	-3.2†	-0.1	-0.5	2.4	1.0	-0.2	-0.2	-0.1	0.7	2.2
Engin.	0.2	-0.1	-0.2	1.6	-1.5	-2.9	-0.2	2.2	-3.3	2.5
Profess.	-5.2	-1.2	-4.3*	7.9*	-0.9	-0.4	3.3	-0.2	0.1	5.1
Bus.	-0.3	0.3	0.4	1.0	-0.6	-1.0	0.3	1.0	1.4	-0.6
STEM	-2.1	-0.1	-0.7	2.8*	-0.1	-1.2	-0.2	0.8	-1.1	2.7†

Note: This table shows that barely ELC-eligible intended STEM majors tended to switch into social science majors, though the estimates are too noisy to precisely estimate any direct evidence of intended STEM majors' transition out of STEM fields (as opposed to switching out of non-attainment). Reported coefficients are the estimated change in likelihood for barely ELC-eligible applicants ($\hat{\beta}$) to earn a major by discipline within five years of graduating high school, conditional on having reported that intended major's discipline on at least one UC campus application. Estimates are from cubic regression discontinuity models over UC applicants within 15 ELC GPA ranks of their high school's ELC eligibility threshold following Equation 2 with standard errors (not shown) clustered by school-year, restricting the sample to students from the bottom half (B50) of CA high schools by leave-year-out SAT score. Degree attainment measured five years after initial enrollment. Statistical significance of hypothesis tests differing from 0: † 10 percent, * 5 percent, ** 1 percent. [1]STEM includes all Natural Science and Engineering majors as well as some Professional majors (e.g. Agriculture and Architecture); see U.S. Department of Homeland Security (2016).

Source: UC Corporate Student System and National Student Clearinghouse.

Table A-7: Impact of ELC Eligibility on Schooling and Labor Market Outcomes, Overall and for URM Applicants

	All Applicants					URM Applicants				
	Reduced Form	IV Estimates Sel. UC	IV Estimates Grad Rate	Potential Outcomes Below	Potential Outcomes Above	Reduced Form	IV Estimates Sel. UC	IV Estimates Grad Rate	Potential Outcomes Below	Potential Outcomes Above
Enroll at Sel. US Campus (%)	7.21 (0.73)		4.38 (0.70)			10.46 (1.46)		4.00 (0.85)		
Univ Five-Year Grad. Rate (%)	1.64 (0.28)	22.82 (3.66)		53.18 (3.41)	76.00 (1.48)	2.60 (0.64)	24.98 (5.32)		50.78 (5.00)	75.76 (2.07)
Grad. Within Five Years (%)	1.14 (0.62)	15.80 (8.51)	0.68 (0.35)	55.35 (6.74)	71.15 (5.75)	0.63 (1.38)	5.97 (13.04)	0.24 (0.51)	49.03 (10.44)	55.00 (8.60)
Number of Years Enrolled	-0.01 (0.02)	-0.13 (0.21)	-0.01 (0.01)	4.64 (0.17)	4.51 (0.13)	-0.03 (0.04)	-0.32 (0.35)	-0.01 (0.01)	4.78 (0.29)	4.46 (0.20)
Earn STEM Degree (%)	-0.10 (0.63)	-1.43 (8.78)	-0.06 (0.39)	36.12 (5.80)	34.68 (7.05)	-1.37 (1.02)	-13.11 (10.08)	-0.52 (0.43)	24.97 (7.08)	11.87 (7.24)
# Late-20s Years Employed	0.00 (0.01)	0.05 (0.22)	0.00 (0.01)	1.38 (0.16)	1.44 (0.16)	0.04 (0.03)	0.45 (0.29)	0.02 (0.01)	1.35 (0.22)	1.80 (0.20)
Average Late-20s CA Wages ($)	1,396 (978)	17,784 (12,685)	969 (720)	66,412 (8,957)	84,197 (9,355)	2,733 (1,491)	24,713 (14,214)	935 (557)	47,093 (11,064)	71,807 (9,049)
Average Late-20s Log CA Wages	0.009 (0.012)	0.120 (0.149)	0.006 (0.008)	10.937 (0.105)	11.057 (0.111)	0.030 (0.021)	0.273 (0.197)	0.010 (0.008)	10.751 (0.149)	11.024 (0.129)
Univ. Wage Value-Added ($)	201 (181)	2,656 (2,400)	113 (98)			932 (358)	8,468 (3,325)	322 (114)		

Note: This table shows similar patterns to the main findings in Table 6 for all UC applicants (without excluding students from higher-performing high schools where ELC was generally non-binding) and URM applicants, though the estimated magnitudes are uniformly smaller in the full sample. This table presents OLS reduced-form, 2SLS instrumental variable, and potential outcome coefficient estimates of the relationship between ELC eligibility, selective UC campus enrollment, and student educational and labor market outcomes. Estimates are from cubic regression discontinuity models over UC applicants within 15 ELC GPA ranks of their high school's ELC eligibility threshold following Equation 2 with standard errors in parentheses clustered by school-year, restricting the sample to all UC applicants or URM applicants (defined as Black, Hispanic, or Native American). The 2SLS regressions report coefficients from a single instrument, either enrollment at an Absorbing of more-selective ('selective') UC campus or the five-year graduation rate of the students' first enrollment institution (see Appendix C); potential outcomes are presented for the former instrument following Abadie (2002). 'Late-20s' employment outcomes are measured 10-11 years following high school graduation; average annual wage and log wage are conditional on having observed EDD wages. University wage value-added statistics (for the student's first enrollment institution) estimated for Late-20s wages over leave-out UC applicants following Chetty et al. (2020). See Appendix A for details on variable definition and data construction.

Source: UC Corporate Student System, National Student Clearinghouse, and the California Employment Development Department (Bleemer, 2018).

Table A-8: Impact of ELC Eligibility on Schooling and Labor Market Outcomes, Dropping Immediately Above-Threshold Students

	B50 Sample					B25 Sample				
	Reduced Form	IV Estimates Sel. UC	IV Estimates Grad Rate	Potential Outcomes Below	Potential Outcomes Above	Reduced Form	IV Estimates Sel. UC	IV Estimates Grad Rate	Potential Outcomes Below	Potential Outcomes Above
Enroll at Sel.	12.51		4.37			12.77		3.59		
US Campus (%)	(1.71)		(0.91)			(2.48)		(0.90)		
Univ Five-Year	2.87	22.86		53.78	76.64	3.57	27.84		51.43	79.28
Grad. Rate (%)	(0.72)	(4.73)		(4.28)	(2.19)	(1.11)	(6.94)		(6.29)	(3.25)
Grad. Within	4.33	34.62	1.51	39.71	74.32	4.23	33.13	1.18	27.27	60.40
Five Years (%)	(1.63)	(12.96)	(0.55)	(9.71)	(8.77)	(2.49)	(19.26)	(0.65)	(14.83)	(13.10)
Number of	-0.03	-0.22	-0.01	4.57	4.36	-0.01	-0.10	-0.00	4.54	4.43
Years Enrolled	(0.04)	(0.32)	(0.01)	(0.25)	(0.20)	(0.06)	(0.49)	(0.02)	(0.40)	(0.30)
Earn STEM	1.91	15.25	0.67	20.77	36.02	2.19	17.15	0.60	5.91	23.06
Degree (%)	(1.40)	(11.18)	(0.49)	(6.82)	(9.22)	(1.75)	(13.81)	(0.50)	(8.53)	(11.21)
# Late-20s	-0.01	-0.09	-0.00	1.51	1.42	0.03	0.21	0.01	1.52	1.73
Years Employed	(0.03)	(0.25)	(0.01)	(0.18)	(0.18)	(0.05)	(0.33)	(0.01)	(0.25)	(0.24)
Average Late-20s	4,485	29,762	1,724	58,542	88,304	3,379	19,622	937	48,619	68,241
CA Wages ($)	(1,845)	(13,101)	(904)	(8,472)	(9,689)	(2,349)	(14,132)	(725)	(9,970)	(10,052)
Average Late-20s	0.060	0.398	0.023	10.845	11.243	0.059	0.343	0.016	10.679	11.022
Log CA Wages	(0.025)	(0.178)	(0.012)	(0.115)	(0.132)	(0.035)	(0.213)	(0.011)	(0.149)	(0.150)
Univ. Wage	1,265	9,784	444			1,147	8,315	337		
Value-Added ($)	(343)	(2,762)	(116)			(502)	(3,587)	(128)		

Note: This table shows somewhat-stronger relationships between ELC eligiblility and student outcomes than those shown in Table 6 when immediately above-threshold students are omitted from the sample, out of concern that they may be unusually selected due to their having unusually common GPAs (Figure A-4). This table presents OLS reduced-form, 2SLS instrumental variable, and potential outcome coefficient estimates of the relationship between ELC eligibility, selective UC campus enrollment, and student educational and labor market outcomes, **omitting students with GPAs exactly at their high school's ELC eligibility threshold**. Estimates are from cubic regression discontinuity models over UC applicants within 15 ELC GPA ranks of their high school's ELC eligibility threshold following Equation 2 with standard errors in parentheses clustered by school-year, restricting the sample to students from the bottom half (B50) or quarter (B25) of high schools by leave-year-out average SAT score. The 2SLS regressions report coefficients from a single instrument, either enrollment at an Absorbing of more-selective ('selective') UC campus or the five-year graduation rate of the students' first enrollment institution (see Appendix C); potential outcomes are presented for the former instrument following Abadie (2002). Graduating within five years is measured in NSC; number of years enrolled counts the number of academic years within seven years of graduating high school in which postsecondary enrollment is observed; and STEM degree attainment follows the DHS designation of STEM fields by CIP code. 'Late-20s' employment outcomes are measured 10-11 years following high school graduation; average annual wage and log wage are conditional on having observed EDD wages. University wage value-added statistics (for the student's first enrollment institution) estimated for Late-20s wages over leave-out UC applicants following Chetty et al. (2020). See Appendix A for details on variable definition and data construction.

Source: UC Corporate Student System, National Student Clearinghouse, and the California Employment Development Department (Bleemer, 2018).

Table A-9: Tests of Treatment Effect Linearity in University Graduation Rate

	Number of HS Quantiles				
	2	4	6	8	10
Panel A: 2SLS Over-Identification Tests on Graduation Rate					
IV β	1,440	1,359	1,542	1,248	1,228
	(679)	(553)	(615)	(483)	(453)
Sargan's S	0.00	0.23	0.23	0.28	0.61
p	0.949	0.972	0.999	1.000	1.000
Panel B: LIML Estimates on Graduation Rate					
IV β	1,770	2,132	2,226	2,095	2,226
	(462)	(432)	(421)	(382)	(395)
Panel C: 2SLS Estimates of Quadratic in Grad. Rate					
GR^2 β	9,621	14,476	-825	3,459	940
	(56,942)	(19,483)	(9,802)	(4,910)	(3,249)

Note: This table reports the results of three series of potentially-underpowered tests of whether the changes in outcomes caused by barely ELC-eligible students' Absorbing UC campus enrollment could be usefully projected onto their change in university selectivity (indexed by five-year graduation rates). Interacting ELC eligibility and the running variable terms with applicants' high school quantiles, Panel A shows that over-identification tests cannot reject linear returns to selectivity; Panel B shows that the LIML IV estimates do not shrink as the number of instruments increase; and Panel C shows that a quadratic term in graduation rate is not statistically significantly different from 0. Reported coefficients are coefficient estimates and test statistics from regressions of an indicator for applicants' Late-20s annual wages on their institution of first enrollment's NSC-calculated five-year graduation rate, instrumented by ELC eligibility interacted with high school SAT quantile indicators. Sample restricted to UC applicants in the bottom half (B50) of California high schools by near-threshold SAT score, and regressions include third-order polynomials in the ELC running variable interacted with quantile dummies along with high school and year fixed effects and standard covariates. Standard errors in parentheses clustered by school-year. See Appendix A for details on variable definition and data construction. **Panel A:** Coefficients and statistics from 2SLS regression estimation. Reported "IV β" is the second-stage term on five-year graduation rates; Sargan's S tests for over-identification and is distributed χ^2 with degrees of freedom equal to the number of high school quantiles minus 1 (p estimates model's likelihood under the null hypothesis). **Panel B:** Coefficients on graduation rate from Limited Information Maximum Likelihood estimation. **Panel C:** Coefficients on the square of graduation rate when both linear and squared rates are instrumented by ELC-interactions.

Source: UC Corporate Student System, National Student Clearinghouse, and the California Employment Development Department (Bleemer, 2018).

Table A-10: Impact of ELC Eligibility on Observed Annual California Wages

	B50 Sample						B25 Sample					
Approximate Age:	24	25	26	27	28	29	24	25	26	27	28	29
Panel A: All UC Applicants												
Non-Zero Wage Indicator (%)	1.16	1.04	0.31	0.05	-0.02	0.06	2.33	1.40	0.35	-0.08	1.25	1.63
	(1.15)	(1.14)	(1.12)	(1.12)	(1.11)	(1.17)	(1.71)	(1.67)	(1.65)	(1.63)	(1.61)	(1.69)
Average Wages ($)	552	654	1,081	1,004	1,861	2,675	614	307	1,101	1,822	916	1,387
	(740)	(819)	(918)	(1,010)	(1,119)	(1,322)	(979)	(1,082)	(1,185)	(1,296)	(1,447)	(1,714)
Average Log Wages	0.017	0.011	0.017	0.014	0.016	0.020	0.018	0.007	0.025	0.022	0.001	0.008
	(0.016)	(0.015)	(0.016)	(0.016)	(0.016)	(0.017)	(0.022)	(0.022)	(0.022)	(0.023)	(0.023)	(0.024)
# of Obs.	48,525	51,506	54,055	54,911	56,527	49,990	23,272	24,984	26,279	26,496	27,201	23,964
Panel B: Omitting At-Threshold Eligible Students												
Non-Zero Wage Indicator (%)	-2.17	-1.21	-1.28	-1.93	-1.30	-0.80	-1.58	-0.90	-0.63	-1.06	0.84	1.37
	(1.75)	(1.72)	(1.69)	(1.69)	(1.66)	(1.76)	(2.56)	(2.47)	(2.40)	(2.39)	(2.37)	(2.50)
Average Wages ($)	26	37	1,494	2,096	2,336	4,264	255	-211	2,193	4,298	1,184	2,326
	(1,149)	(1,289)	(1,401)	(1,587)	(1,750)	(2,108)	(1,505)	(1,637)	(1,814)	(2,059)	(2,202)	(2,714)
Average Log Wages	0.017	0.007	0.040	0.040	0.031	0.042	0.021	0.008	0.062	0.073	0.024	0.031
	(0.024)	(0.024)	(0.024)	(0.024)	(0.024)	(0.026)	(0.034)	(0.032)	(0.033)	(0.035)	(0.034)	(0.037)
# of Obs.	45,162	47,930	50,331	51,130	52,679	46,570	21,691	23,308	24,538	24,751	25,433	22,408

Note: This table shows that ELC eligibility appears to persistently increase wages for barely-eligible applicants as they age (from age 24 to 29), suggesting that the main estimates are unlikely to solely reflect gains in applicants' early careers. Estimated reduced-form changes ($\hat{\beta}$) in annual covered California employment and covered California wages and log wages 6-11 years after high school graduation caused by near-threshold ELC eligibility. Estimates are from cubic regression discontinuity models over UC applicants within 15 ELC GPA ranks of their high school's ELC eligibility threshold following Equation 2 with standard errors in parentheses clustered by school-year, restricting the sample to students from the bottom half (B50) or quarter (B25) of high schools by leave-year-out average SAT score. Covered wages exclude wages not covered by California unemployment insurance, including federal and self-employment. See Appendix A for details on data construction.

Source: UC Corporate Student System and the California Employment Development Department (Bleemer, 2018).