Title

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Journal

UC Berkeley CSHE, 11(18)

Author

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Publication Date

2018-09-26

Research & Occasional Paper Series: CSHE.11.18

CSHE | Center for Studies in Higher Education
UNIVERSITY OF CALIFORNIA, BERKELEY
http://cshe.berkeley.edu/

THE EFFECT OF SELECTIVE PUBLIC RESEARCH UNIVERSITY ENROLLMENT: EVIDENCE FROM CALIFORNIA*

September 2018

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ABSTRACT

What are the benefits and costs of attending a selective public research university instead of a less-selective university or college? This study examines the 2001-2011 Eligibility in the Local Context (ELC) program, which guaranteed University of California admission to students in the top four percent of California high school classes. Employing a regression discontinuity design, I estimate that ELC pulled 8 percent of marginally-admitted students into four ``Absorbing'' UC campuses from less-competitive public institutions in California. Those ELC compliers had lower SAT scores and family incomes than their eventual peers; almost half were under-represented minorities (URM), and 65 percent came from the state's bottom SAT quartile of high schools. Nevertheless, marginally eligible students became more than 20 percentage points more likely to earn a university degree within 5 years, though URM and less-prepared students became less likely to earn STEM degrees. Students' net expected earnings conditional on university completion, major, and gender substantially increased across subgroups, and linked state employment records suggest an increase in URM students' average early-career earnings.

Keywords: Returns to Education, University Selectivity, Heterogeneous Student Outcomes

* Thanks to the University of California Office of the President's Institutional Research and Academic Planning Group (and particularly Tongshan Chang, Chris Furgiuele, Charles Masten, and Han Mi Yoon-Wu), Henry Brady, David Card, Brad DeLong, Enrico Moretti, Martha Olney, Jesse Rothstein, Zoë Steier, and Chris Walters, and to seminar participants at UC Berkeley and UC Irvine for helpful comments. The author was employed by the University of California in a research capacity throughout the period during which this study was conducted, and acknowledges financial support from the UC Humanities Research Institute and UC Berkeley's Center for Studies in Higher Education and Institute for Research in Labor Economics. Wage and industry of employment estimates were described by an AsPredicted pre-registration plan prior to UC's data acquisition, #12514, at the recommendation of the Berkeley Initiative for Transparency in the Social Sciences. This study has been reviewed by the UC Berkeley Committee for Protection of Human Subjects, Protocol ID 2018-06-11163. Any errors that remain are my own.

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Almost four million young Americans graduated high school in the spring of 2018, and about 70 percent of them will enroll at a postsecondary institution the following fall.[1] Three-quarters of those students will enroll at public institutions, most of which are research-oriented universities, teaching-oriented colleges and universities, or local community colleges. Within and across these sectors, schools differ across many dimensions, including educational quality, student service provision, location, cost, and student body composition.

While a long literature has estimated large positive average wage returns of a university education (Card, 1999; Autor, 2014), prospective students have much less information about the outcomes associated with the wide variety of institutions that they could attend. As a result of minimal university record centralization, relevant data is limited in availability for both scholars and students. Causal estimation of outcomes associated with attending specific schools is also frustrated by selection: since most institutions explicitly select their admitted students, differential outcomes may reflect admission departments' prowess rather than educational impact.

Many students resort to composite university rankings like those published by US News and World Report (Luca and Smith, 2013), which (among public institutions) tend to favor research universities over teaching universities and universities over colleges, but there is disagreement about whether marginal students would be better-served attending 'higher-ranked' institutions (Arcidiacono and Lovenheim, 2016; Arcidiacono, Aucejo, and Hotz, 2016; Andrews, Imberman, and Lovenheim, 2016; Cohodes and Goodman, 2014) or at community colleges (Goodman, Hurwitz, and Smith, 2017). The federal government is moving towards increasing access to short-run average postgraduate earnings statistics by university and major, already available in at least eight states and from the private firm PayScale, but interpretation of such statistics is plagued by supply- and demand-side selection, poor data quality, and difficulty in extrapolation (Bleemer, 2019).[2]

This study implements a regression discontinuity design (Hahn, Todd, and van der Klaauw, 2001) using detailed administrative data from the University of California (UC) system to estimate marginal treatment effects for students attending certain selective UC campuses as a result of UC's

[1] See the National Center for Education Statistics' 2016 Digest of Educational Statistics, available at https://nces.ed.gov/programs/digest/d16/.

[2] For the federal government's intention to increase access to average wage statistics, see "Will Majoring in Psychology make you Better Off? The Government Wants to Know", by Michelle Hackman, Josh Mitchell, and Douglas Belkin, *WSJ*, 1 August 2018. States with available wages by university and major statistics include Arkansas, California, Colorado, Minnesota, Tennessee, Texas, Virginia, and Washington ("Choosing a College Major", by Jeffrey J. Selingo, *NYT*, 3 Nov. 2017).

2001-2011 Eligibility in the Local Context (ELC) program. The ELC program guaranteed UC admission to students with grades in the top four percent of most California high schools' graduating classes, substantially increasing many potential applicants' likelihood of admission to several UC campuses. Linking the universe of UC applicants to enrollment and graduation records from the National Student Clearinghouse, which cover college-going decisions at nearly all postsecondary institutions in the United States, the resulting analysis provides reduced-form estimates of the impact of enrolling at a more competitive research university on students' graduation likelihood, number of years to degree, and major choice, along with characterizations of the universities where these students enroll and earn degrees. The study concludes with an investigation of the net labor market outcomes faced by students pulled into more-competitive universities.

A growing literature examines heterogeneity in the returns to university attendance. Several recent studies have examined wage returns by field of study, for which average wage gaps rival those by college attendance (Altonji, Blom, and Meghir, 2012; Altonji, Arcidiacono, and Maurel, 2016); Kirkeboen, Leuven, and Mogstad (2016), for example, find that early-career wages for marginal STEM majors are triple those of the counterfactual in which they majored in the humanities. However, following a series of studies by Dale and Krueger (2002, 2014) which found no evidence of differential average wage returns by university selectivity, fewer studies have estimated educational returns across universities, despite similarly-large cross-institution differences in average post-graduate wages (even conditional on family income, as shown in Chetty et al. (2017)).[3]

Two previous studies have identified treatment effects of public research universities. Hoekstra (2009) finds that attending a state's "flagship" public university positively impacts marginal white male students' early-career wages, while Zimmerman (2014) finds that attending a low-selectivity public research university increases marginal enrollees' early wages. Both studies exploit fuzzy admissions discontinuities fixed at a function of applicants' test scores and high school grades, and neither estimates educational effects (like graduation or major selection). In contrast, because the ELC program was uniformly implemented by percentile across all California high schools (with separate discontinuities at each school), it enables identification of treatment effects for students

[3]Cohodes and Goodman (2014) find that Massachusetts students who attend less-competitive undergraduate institutions are less likely to earn college degrees. Hastings, Nielsen, and Zimmerman (2018) find evidence of heterogeneous outcomes by university in the Chilean context. One recent study (Canaan and Mouganie, 2018) estimates that one group of marginal students who attend universities with 'better' peers have higher wages, but cannot reject that those higher wages are instead the result of their independently-increased likelihood of selecting STEM majors.

with heterogeneous observed college readiness levels (as measured by SAT scores and grades).[4]

This study examines three questions about the ELC program, focusing on the program's impact on students near their high schools' ELC grade thresholds (above which they were guaranteed UC admission). First, how did the program change the enrollment dynamics of eligible students? I show that about 8 percent of marginal ELC-eligible students were pushed from a variety of less-competitive public universities and community colleges into four University of California campuses: Davis, San Diego, Irvine, and (to a lesser extent) Santa Barbara. Almost forty percent of those students would have otherwise attended a low-selectivity California State University campus, while most of the remaining compliers would have otherwise attended a less-selective University of California campus or have not enrolled at a university at all (with many enrolling at a two-year community college instead). As a result, marginal ELC-eligible students attended more selective and competitive universities, with higher average SAT scores and graduation rates and lower admissions rates, but these universities also had higher net costs and a greater proportion of their student bodies studying demanding STEM fields.[5]

Second, which students were impacted by ELC eligibility? The likelihood of admission to the four "Absorbing" UC campuses increased most for students at lower-performing high schools, with fourth-percentile students from higher-performing schools already very likely to be admitted by those campuses. As a result, about two-thirds of marginal ELC compliers–those who switched into Absorbing UC campuses–came from schools in the bottom quartile of California high schools as ranked by the SAT scores of students near the school's ELC threshold. When compared to their eventual peers at the Absorbing UC campuses, ELC compliers were far more likely to be from an under-represented minority group (46 percent versus 20 percent), to be female (72 percent versus 56 percent), and to have attended a rural California high school (14 percent versus 6 percent). Compliers had lower SAT scores by 260 points (on a base of 2400), almost a full standard deviation difference, and had substantially lower average reported family incomes than their eventual peers.

The ELC program, then, had the primary effect of switching a large number of less-prepared,

[4]For example, while the mean SAT score for students near the ELC threshold was a 1855 across all California high schools (on a 2400 point scale), high schools in the bottom quartile of SAT scores had a mean score of 1540 (see below for more details). Nevertheless, the same proportion of students at every California high school was guaranteed UC admission, generating discontinuities across a spectrum of observed student preparedness.

[5]I define STEM to include all natural and biological science and engineering majors as well as some professional majors (e.g. Agriculture and Architecture), following US Department of Homeland Security (2016).

lower-income high school students into more-competitive universities following graduation. How were these marginal students impacted by this substantial and quasi-random change in their post-graduate enrollment? ELC eligibility substantially increased students' likelihood of earning a university degree within 5 years, with graduation rates increasing by 25 percentage points per student who switched into an Absorbing UC campus. These students also earned their degrees faster–by more than a third of a year per complier–conditional on finishing their degrees any time in the six years following high school graduation. Students from the bottom SAT quartile of high schools were even more impacted, becoming 30 percentage points more likely to earn a university degree and finishing that degree in 0.7 fewer years per student. However, while compliers became more likely to ultimately major in their preferred field of study (as stated on their UC application), ELC-complying students with lower observed levels of college preparation become less likely to earn degrees in remunerative STEM fields, in many cases as a result of students who had intended to study a STEM discipline instead choosing an alternative major. Moreover, compliers attended more distant (by 82 miles per student) and more costly (by $2,200 per year per student) universities, though they earned their degrees from more-competitive schools.

I employ two strategies in order to estimate the net labor market effect of marginal ELC-eligible students' increased likelihood of graduation but decreased likelihood (among less-prepared students) of earning STEM degrees. First, I estimate expected age-40 employment status and earnings for each UC applicant conditional on their college completion, major selection, and gender using the American Community Survey. ELC eligibility–and the subsequent tendency to attend a more competitive university–substantially decreases students' expected likelihood of age-40 unemployment, by 1.8 percentage points per student, and increases employed students' expected wages by 18 percentage points of a high school graduate's wages per student. These benefits primarily accrued to male students; while female students' expected likelihood of unemployment declined (significant at the 10% level), there was no measurable impact on their expected future wages. The true benefits likely exceeded these estimates, since compliers also received degrees from more-selective four-year universities that likely provided greater labor market opportunities to their graduates, which is not captured by the ACS simulation exercise.

Second, I measure applicants' early-career wages using annually-aggregated earnings data collected by the California Employment Development Department, which are maintained for the administration of unemployment insurance (UI). Earnings from outside California and from the federal government are unavailable, and the recent implementation of ELC means that earnings more than eight years after high school graduation (when they are about 26 years old) are available for fewer than 35 percent of the sample, enlarging standard errors.[6] Nevertheless, California-UI-covered eight-years-after annual earnings substantially increase as a result of ELC eligibility (p=0.14), especially for URM students (p=0.04), though the estimates are highly sensitive to specification. Earnings estimates for later years will steadily become available over time. Using any reasonable discount rate, these salary increases more than offset the higher enrollment costs faced by ELC-eligible students.

Estimation of the marginal treatment effect of ELC is challenged by possible sample selection among eligible applicants, bunching around the ELC threshold at discontinuous grade point levels due to a peculiarity in UC's threshold-selection rule, and the large number of potential pairwise switches across UC campuses caused by ELC eligibility. I discuss each of these challenges below.

The results presented in this preliminary analysis are best understood as the treatment effect of attending a weighted bundle of four "Absorbing" UC campuses relative to the weighted bundle of alternative institutions that the compliers would have attended if not for their ELC eligibility.[7] There may also be substantial heterogeneity in outcomes across those institutions. Future analysis will exploit additional heterogeneity in applicant characteristics–in particular, variation in residential geography, local high school enrollment patterns, and the set of UC campuses to which each applicant applied–to identify campus-specific treatment effects.

Section 1 of this study describes the circumstances of the University of California's decision to implement the ELC program in 2001, the implementation of the program, and the program's effective cessation in 2011. Section 2 discusses the data used to estimate the program's impact, and Section 3 describes the empirical methodology employed in the analysis below, including a discussion of the estimation challenges that arise from features of ELC's implementation. Section 4 presents and discusses the primary regression discontinuity estimates answering the three questions presented above. Section 5 concludes.

[6]Chetty et al. (2017) show that average wages by university selectivity do not begin to diverge until age 27, and do not reach their equilibrium gap until age 32.

[7]The effective weights characterizing these bundles are estimated in Tables 3 and 5.

1 Background

The late 1990s were a tumultuous period for admissions to the University of California. Following public and political pressure, UC's Regents ended the university's decades-old affirmative action admission program effective January 1997, leading to large declines in the proportion of under-represented minority (URM) applicants admitted to most UC campuses.[8] The university and the California state government implemented a number of costly school-specific outreach programs to increase enrollment from majority-URM high schools and communities, but the programs had ended by the early 2000s with little evidence of success.[9] Meanwhile, while the Regents rescinded their affirmative action prohibition in 2001, a statewide ballot proposition passed in 1996 maintained the ban on affirmative action admissions policies across the California public higher education system.

The University of California introduced the Eligibility in the Local Context program in 2001 as a partial replacement for its previous affirmative action programs.[10] Students at participating California high schools—which by 2003 included 96 percent of public high schools and 80 percent of private high schools in the state—were guaranteed admission to at least one UC campus if their grades were in the top four percent of their class.[11] Class rank was determined directly by UC; high schools submitted the top 10 percent of their students' transcripts to UC Office of the President's Admissions Operations team, which calculated UC-specific semesterly 'ELC grade point averages (GPAs)' on a four-point scale using certain eligibility-relevant courses: two years of English and Mathematics, one year of History, Lab Science, and Non-English Language, and four other UC-approved courses (Atkinson and Pelfrey, 2004).[12] ELC GPAs were then weighted, with students receiving an additional GPA point for each honors-designated course in their junior year (such that

[8]For example, the average likelihood of URM applicants' admissions at UC Berkeley fell from about 40 percent for the 1995-1997 freshmen cohorts to about 14 percent for the 1998-2000 cohorts, conditional on applicants' high school, gender, and scores/grades (Bleemer, 2018a).

[9]Despite the growing population of high-school-aged Hispanic students in California, the proportion of incoming Black and Hispanic students at UC declined by more than 13 percent, or 2 percentage points, in the three years following the Regents' SP1 policy eliminating affirmative action. UC's outreach programs wound down primarily as a result of severe financial restrictions following the 'dot-com' recession of the early 2000s Douglass and Bleemer (2018).

[10]The ELC program brought far fewer Black and Hispanic students into UC than the previous affirmative action policy, but did effectively replace affirmative action as a means for increasing student ethnic diversity at those campuses where affirmative action had previously had less of an impact on university admissions (Bleemer, 2018a).

[11]Cullen, Long, and Reback (2013) find that students switching high schools in order to 'game' this kind of high-school-percentile admissions policy was relatively uncommon in Texas, which has admitted the top ten percent of students from each Texas high school to all University of Texas campuses since 1998.

[12]Students or their parents could opt out of their high school's providing their transcript to UC at their discretion.

many ELC GPAs were higher than the traditional 4.0 upper bound), and rounded to the nearest hundredth. The 40th percentile ELC GPA at each high school was selected as the school's "ELC threshold" in that year, above which students were deemed ELC-eligible.

Students whose ELC GPA satisfied the four percent threshold ('ELC-eligible' students) received a letter signed by the University of California's President informing them of their eligibility, along with the guarantee of admission to UC (but no information about which of UC's nine undergraduate campuses they would be able to attend). Administratively, each of the campuses–located at Berkeley, UCLA, Santa Barbara, Davis, San Diego, Irvine, Riverside, Santa Cruz, and Merced (founded in 2005)–was informed which students had been deemed ELC-eligible and permitted to make independent admissions decision for each student. Below-threshold students with satisfactory grades also received letters encouraging them to apply to UC, but their admission was not guaranteed.

Under the 1960 California Master Plan for Higher Education, the University of California is charged with providing postsecondary education to the top 12.5 percent of California high school graduates, but the Master Plan provides no guidance on how to measure or identify those students (Douglass, 2007). Advocates for the ELC program argued that the program would improve access to the UC system for students at lower-performing and rural high schools, making them "locally-eligible" for UC admission despite their lower standardized test scores than students at higher-performing schools. Due to substantial ethnic segregation across California communities, these high schools also tended to be disproportionately Hispanic, so the ELC program was also expected to increase the number of under-represented minority (URM) students admitted to UC, partially replacing the previous affirmative action program.

Though no comprehensive analysis of the ELC program was conducted following a short-run program evaluation in 2002, it was broadly viewed as having succeeded in fulfilling its aims of increasing admitted students' ethnic and geographic diversity.[13] For this reason, the program was expanded in the 2012-2013 admissions year to the top 9 percent of each high school class (from the top 4 percent), which continues to the present, but UC's campuses substantially changed their policies regarding the admission of this broader pool of applicants. A future study may more com-

[13] University of California (2002) estimates that ELC had a small positive effect on eligible students' likelihood of applying to UC, disproportionately impacting underrepresented minority students from rural high schools. Aggregate-level analysis of Texas's similar Top Ten program, which admitted the top ten percent of students from each Texas high school to all University of Texas campuses, has shown an increase in the number of rural and small-town students as well as the number of poor and underrepresented minority students (Long, Saenz, and Tienda, 2010).

prehensively analyze the post-2011 ELC program, but those years are presently omitted.

2 Data

This study relies on four primary data sources. The first, collected contemporaneously for administrative use by the UC Office of the President, covers all applicants to any of the nine undergraduate University of California campuses since 1994. Each record contains the applicant's Census block at the time of application, high school attended (along with codes indicating the school's location and public/private status), gender, self-reported ethnicity (15 categories), and intended major.[14] For those applying to enter UC as freshmen, SAT and ACT scores and grade point average measures are available. Indicators show to which UC campuses each applicant applied and to which they were admitted.

These data also include eligibility information for the ELC program. ELC GPAs, calculated by the UC Office of the President for students whose transcripts were submitted by their high schools, are available from 2003 to 2011. Between 2001 and 2011, such students were categorized into three observed groups: ELC-eligible, "Qualified on Track", or ELC-ineligible.[15]

Estimates involving reported family income data for applicants are reproduced from a parallel institutional report published by the University of California Bleemer (2018b). Family incomes is not reported by applicants who do not apply for federal, state, or institutional financial aid, most of whom likely have high family incomes.

I do not directly observe the high-school-specific ELC threshold used to determine students' ELC eligibility, instead only observing the ELC eligibility status (and ELC GPA) of those students who choose to apply to at least one University of California campus. Estimating a support vector machine independently for each California high school and year, I take the mean of all possible thresholds that minimize a linear penalty function across the school's UC applicants as that school's ELC threshold in that year.[16] A small number of students (1.3% Type 1 Error and 2.8% Type 2 Error among those within 0.3 ELC GPA points of their high school's approximated threshold) are

[14]Census blocks are determined by geolocating applicants' home addresses; seven percent of applicants' addresses cannot be geolocated, in some cases by post office boxes are provided instead of street addresses.

[15]Qualified on Track students were contacted prior to applying to UC and told that their high school performance likely merited UC admission, but were not provided any increased likelihood of admission.

[16]Results using the median value as the school's threshold are qualitatively and quantitatively similar to those presented below, and are available from the author.

misclassified by the threshold, due to data errors or overriding decisions made by UC administrators based on students' high school transcripts (mostly cases in which students failed to take or pass all 11 courses required for ELC eligibility).

In practice, these approximated ELC thresholds yield sharp discontinuities in some UC campuses' admissions decisions. Figure 1 shows discontinuity plots for students with ELC GPA's within 0.3 of their high school's threshold in their year of application, fitting fifth-order polynomials on either side of the threshold. Plots are shown for each of the nine undergraduate UC campuses. While Berkeley and UCLA provide no increase in admissions likelihood for ELC-eligible applicants, applicants become substantially more likely to be admitted to Davis, San Diego, Irvine, and (to a lesser extent) Santa Barbara. For this reason, UC Berkeley and UCLA are referred to below as the "Unimpacted UC campuses", while the Davis, Irvine, Santa Barbara, and San Diego campuses are called "Absorbing UC Campuses". The less-selective Riverside, Santa Cruz, and Merced campuses already near-guaranteed admission to students around the fourth percentile of their high school classes by ELC GPA, and I show below that these campuses actually tended to *lose* marginal ELC-eligible students (as they switched to the Absorbing UC campuses); I refer to these latter three campuses as "Dispersing UC campuses".

Quarterly earnings data from the California Employment Development Department, which maintains records for unemployment insurance administration, are also reproduced from Bleemer (2018b), which enables reporting on observed earnings between 6 and 9 years after applicants graduated high school.[17] The earnings data were linked by reported social security numbers, and are missing for workers outside California and federal government employees. Quarters with lower than half-time minimum wage earnings are omitted, and annual wages are measured as the sum of quarterly wages in that year. About 55 percent of applicants in the sample have positive earnings in each of 6-9 years after high school graduation.

The second dataset, from the National Student Clearinghouse's StudentTracker database, contains enrollment and graduation information across nearly all US two- and four-year colleges and universities for all students in the UC application dataset. In particular, it contains semesterly enrollment records (including institution name and location) and graduation records (including institution name and location, degrees and majors earned, and year of graduation) for all postsecondary degree-

[17]The most recent earnings available are the last quarter of 2017; as a result, every year more than 6 years after graduation omits one class of students from the sample.

granting institutions that accept federal Title IV funding, a near-universal set. The UC Office of the President links these records to the UC applications by first and last name, middle initial, and birth date (allowing for common nicknames and typos). 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. Enrollment coverage has been greater than 90 percent in California since 2003, the earliest year used in this study, and is near-comprehensive for public institutions (Dynarski, Hemelt, and Hyman, 2015).

The third dataset contains university-level descriptive statistics collected in the Integrated Postsecondary Education Data System (IPEDS), a project of the US Department of Education's National Center for Education Statistics. All still-operating universities in the National Student Clearinghouse data were matched by name to the IPEDS database. IPEDS data include universities' annual admissions rate, four- and six-year graduation rates, incoming students' average SAT scores, sticker price of tuition, and estimated net cost of attendance for students with family incomes between $48,000 and $75,000.[18] The proportion of graduates who choose STEM or engineering fields of study at each university is available for a single year, 2008.

Finally, the fourth dataset includes the complete sample of 2009-2013 American Community Survey respondents with high school degrees between the ages of 28 and 52 (Ruggles et al., 2018). Age, gender, race, educational attainment, undergraduate major (conditional on graduation), and contemporary employment status, personal income, and family income are observed. These data are used to construct expected labor market indices by educational attainment and undergraduate major to test changes in expected labor market outcomes among ELC-eligible students.

All four-year colleges in California in the NSC dataset are geolocated, and as-the-crow-flies distances between each student and the college at which they enrolled are calculated using the geodesic method. Finally, every public and private California high school is geolocated using street addresses available from the California Department of Education (with 98 percent success across students) and is categorized as either rural (outside of any Census Urbanized Area, which have at least 50,000 residents), urban (inside a Census Principal City, which have at least 250,000 residents), or suburban

[18] 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.

(otherwise) using shapefiles available from the National Center for Education Statistics.[19]

Table 1 displays summary statistics for applicants to the University of California. The first column presents demographic characteristics, academic achievement measures, and enrollment decisions for all California-resident freshman applicants to any UC campus between 2003 and 2011, while the second presents comparable statistics for students within 0.3 ELC GPA points of their high school's ELC threshold. The latter students, as one would expect, are academically higher-performing than the average applicant; they are also more likely to be female and less likely to be Black or Hispanic.[20] The bottom half of the table shows that these students are more likely than the average applicant to attend the Unimpacted and Absorbing UC campuses, but less likely to attend the Dispersing UC campuses.

The last four columns of Table 1 show summary statistics by quartile of ELC-participating California high schools, ranked by the average SAT scores of UC applicants from that high-school-year near the ELC threshold.[21] Because the ELC program admitted four percent of *every* high school's students, there is reason to expect that its impact will be larger at lower-performing high schools, where the fourth-percentile student has fewer or lower-quality outside university options. Indeed, students at the bottom quartile of high schools have lower SAT scores by 550 points and are far more likely to attend less competitive state colleges–and less likely to attend UC's flagship Berkeley and UCLA campuses–than students in the top quartile. Bottom quartile students are also much more likely to be URM.

3 Empirical Methodology

This study primarily implements standard fuzzy regression discontinuity estimation (Hahn, Todd, and van der Klaauw, 2001).[22] Following Calonico, Cattaneo, and Titiunik (2014), I estimate local

[19]See the CDE Public Schools and Districts Data Files, the CDE's Private School Directory, and the NCES's School Locale Definitions.

[20]Because the number of Black students near the ELC threshold is so low, most of the estimates below group Hispanic and Black students as "under-represented minorities", or "URM". Native American and Pacific Islander students are also included in the URM group, but make up a small fraction of URM students.

[21] For the purpose of calculating quartiles, high schools are ranked by the average ELC GPA of applicants within 0.3 GPA points of their school's ELC threshold in a given year and weighted by their number of students within 0.3 GPA points of the threshold, resulting in quartiles with the same number of *students*, not high schools.

[22]For a similar estimation strategy in the context of Texas's Top Ten program, using a sample of survey data and focusing only on student's one-year enrollment, see Niu and Tienda (2010).

linear regressions of the form:

$$Y_{it} = \alpha + ELC_{it}\beta + GPA'_{it}\gamma \begin{pmatrix} ELC_{it} & 0 \\ 0 & 1 - ELC_{it} \end{pmatrix} + X'_{it}\delta + \epsilon_{it} \tag{1}$$

where Y_{it} is an outcome for student i who applied to the UC system in year t, ELC is an indicator for i having an ELC GPA above their high school's ELC threshold in t, GPA_{it} is the difference between i's ELC GPA and the approximated ELC threshold at their high school in t, and X_{it} denotes a set of control variables included to absorb spurious variation (in most specifications, controls include year dummies, gender-ethnicity interacted dummies, and a fifth-order polynomial of SAT score).[23] Because the threshold is (slightly) fuzzy, the estimated β coefficients are then normalized by the β coefficient from a similar regression estimate replacing Y_{it} with i's true ELC eligibility. Each bandwidth is selected optimally and bias-corrected standard errors are estimated robustly (and thus conservatively), each again following Calonico, Cattaneo, and Titiunik (2014) and implemented using the *rdrobust* package in R (Calonico, Cattaneo, and Titiunik, 2015).

Because the University of California's rule for calculating ELC GPAs and ELC eligibility differed from how high schools themselves calculated class rank, there is little concern of students artificially altering their high school grades in order to achieve ELC eligibility. Two primary identification concerns, common in the context of regression discontinuity research designs, remain. First, students were informed of their ELC eligibility prior to applying to UC, but the available data only cover students who actually applied to at least one University of California campus. If ELC eligibility differentially impacted students' propensity to apply to UC, the resulting selection bias could provide an alternative explanation for the estimates presented below. For example, the finding that ELC-eligible students were more likely to attend an Absorbing UC campus, which I argue results from applicants' increased likelihood of admission to those campuses given ELC eligibility, could be alternatively explained by the increased application propensity of students already likely to attend Absorbing UC campuses. Though selection is likely to be of minor concern in this case, since students who apply to *any* of the nine University of California campuses are observed (see Antonovics and Backes (2013)), and since many students below the ELC threshold also received

[23] Controls are omitted when they are collinear with the outcome variable, like when Y_{it} is the applicant's SAT score. Nearly all of the results presented below are quantitatively, qualitatively, and statistically unchanged if these controls are omitted.

official letters encouraging their application to UC, it may nevertheless bias the estimates presented below in unknown directions.

In many regression discontinuity settings, such a concern could be dispelled by a McCrary (2008) test, which estimates whether the underlying data's density increases above the discontinuous ELC GPA threshold. Unfortunately, such a test is invalid in this setting. As mentioned above, the ELC GPAs used to calculate students' ELC eligibility were rounded to the nearest hundredth, and were already lumpy given the relatively small number of available weighted grade point averages that can be calculated from 22 semester-course grades. Panel (a) of Figure 2 shows the distribution of ELC GPAs around 4.0. Because of this lumpiness, when UC administrators determined each school's annual ELC threshold (by selecting the 40th percentile of ELC GPAs calculated from the top 10 percent of students from each school), they were likely to select dense GPAs to be the school's threshold, effectively extending ELC eligibility to greater than four percent of each high school's student body (because of a relatively-large number of 'ties' at the threshold). As a result, Panel (b) of Figure 2 shows a substantial mass point of applicants with ELC GPA's just above their high school's threshold, likely arising not from selection into application but instead from the threshold-setting mechanism used by UC.

In order to demonstrate the effect of the threshold-setting mechanism, I simulate data using the true distribution of high school sizes and ELC GPAs in the absence of application selection. First, I draw 1,000 high school sizes out of the distribution of the number of applicants with ELC GPAs from each school in the sample.[24] For each simulated high school, I draw ELC GPAs for its students from the distribution of ELC GPAs in the sample. The ELC threshold is set at the 40th percentile of ELC GPAs at each school. Panel (c) of Figure 2 shows the resulting distribution of distances to simulated students' respective thresholds. As in the actual distribution, there is a large mass point just above the ELC threshold, resulting from the large number of schools' thresholds being set just below mass points. Indeed, the synthetic mass above the threshold is much larger and narrower than that observed in the data, likely the result of noise in approximating the actual high school thresholds. Unfortunately, because this noise cannot be replicated in the synthetic sample (since it results from administrative decisions rescinding or awarding certain students ELC eligibility for unobserved reasons), and because of the likely presence of ELC GPA autocorrelation within

[24] In order to accurately estimate schools' 40th percentile thresholds, I omit schools with fewer than 10 applicants with ELC GPAs in a given year.

each high school (which also cannot be replicated synthetically), this synthetic exercise explains the inapplicability of the McCrary test without providing a workable alternative.

Instead, I turn to estimates of observable baseline characteristic balance as evidence against substantial selection of high-performing students into the UC application pool above the ELC threshold. Table 2 estimates the baseline characteristic balance of UC applicants around their high schools' ELC thresholds, treating applicants' permanent characteristics as outcomes in Equation (1). Each row corresponds to a demographic subsample of the data. Because the data only cover California high school students who apply to the University of California, evidence of non-balanced characteristics would suggest that students' likelihood of applying to UC after being informed of their ELC eligibility varies by observable characteristics. Indeed, the first row of Table 2 shows that the proportion of Asian applicants falls 2.3 percentage points at the ELC threshold (implying that the other ethnic groups are somewhat more responsive in applying to UC), though there are no meaningful differences in student gender around the threshold. As a result, the outcome regressions below condition on ethnicity by gender to account for potential demographic differences that could influence the observed changes in outcome.

The last column of Table 2 shows that ELC-eligible students have somewhat lower SAT scores (by almost 10 points, significant at 5 percent) than their below-threshold peers, suggesting that higher observable college readiness cannot explain the improved graduation and labor market outcomes discussed below. However, ELC eligible applicants have slightly higher family incomes–by \$3,900 (p=0.07)–than their ineligible peers.[25] The last four rows of the table show that this income difference is concentrated among students in the top quartile of high schools as ranked by SAT score, whose enrollment will be shown to be largely unaffected by ELC eligibility. It appears that higher-income students at top California high schools took ELC eligibility as an opportunity to apply to UC campuses as "backup" options, but did not actually change their enrollment behavior as a result.[26] The proportion of students without reported incomes–who tend to be high-income, since their omitted income implies their decision to not apply for financial aid–is also statistically insignificant (and slightly negative for most groups), suggesting little change in the proportion of high-income students applying to UC. For students in the bottom two high school SAT quartiles, who are shown below to make up more than 90 percent of ELC program compliers, positive selection on income or

[25] All income-related estimates are reproduced from Bleemer (2018b).
[26] See footnote 21 for details on calculating high school SAT quartiles.

SAT score cannot explain the observed differential outcomes.

The histogram of ELC GPAs in Panel (a) of Figure 2 also suggests a second threat to the proposed research design in the apparent non-continuity of the running variable. The large mass point at 4.00 GPA, for example, could indicate that students at that GPA level are qualitatively different academic performers than those with slightly lower GPAs, perhaps because GPAs above 4.00 are effectively censored for students not taking honors-level classes (since even the best students are unable to earn more than 4.00 GPA points in such courses). Similar, though empirically-lesser, concerns exist at many other mass points. Because UC's ELC threshold-setting rule tended to set thresholds just below these mass points, such qualitative differences could bias the estimates below, likely in a positive direction (since mass points tend to be censored from above, suggesting that students at mass points are higher-performing than their GPA evinces).

I test the continuity of the running variable at the 4.00 mass point using the methodology (and code) of Caetano (2015), which estimates the degree of non-continuity at mass points by comparing conditional regression estimates at the mass point to those of local linear regressions around the mass point. The tests include the same controls as in Equation 1 as well as third-order polynomials in distance to the ELC threshold above and below the threshold, and provide bounds on the bias induced by the running variable's non-continuities. I will discuss those bounds, which are precisely estimated and statistically-significantly different from 0 but also very narrow, along with the corresponding enrollment dynamics results in the next section. Moreover, in order to preserve the robustness of the estimates below, I omit all students from high schools with ELC thresholds between 3.96 and 4.00, the location of the largest discontinuity in the running variable.[27] Estimates including these students are little-changed and are available from the author.

4 Results

This section is broken into three subsections, each answering one of the three questions posed in the Introduction.

[27]The 0.04 GPA range was selected in order to ensure the inclusion of high schools with true 4.00 thresholds but slightly lower estimated thresholds. Estimated thresholds are unlikely to be higher than 4.00, in most cases being the mean between the lowest ELC-eligible GPA (likely 4.00) and the highest ineligible GPA (likely slightly lower).

4.1 Enrollment Dynamics

Table 3 shows how the ELC program impacted admission and enrollment at each of the nine undergraduate UC campuses, presenting estimates of both α (below-threshold constant intercept) and β (local treatment effect) in Equation (1) when admission or enrollment to each campus is treated as the outcome, overall and for several subsamples. Admission is measured in the UC administrative data, while enrollment is observed in the NSC data in the Fall semester following initial UC application. Berkeley and UCLA admitted only about 45 percent of marginal applicants and provided no admissions advantage to ELC-eligible students; as a result, their enrollments were unaffected by the policy at the margin. The four Absorbing UC campuses, on the other hand, each gave large admissions advantages to ELC-eligible applicants, who became between 6 and 20 percentage points more likely to be admitted to each school. Students from bottom SAT quartile high schools received even larger admission advantages, ranging from 16 percentage points at Santa Barbara to 43 percentage points at Irvine. Moreover, ELC-eligible students became substantially more likely to enroll at three of the campuses, by up to 4 percentage points overall and by 2-8 percentage points among students from bottom-quartile high schools (nearly doubling such students' enrollment likelihood at those universities). Santa Barbara's net enrollment changes were statistically insignificant, likely because a small number of students were absorbed from other schools while a similar number were pulled from Santa Barbara into the other Absorbing UC campuses.

Riverside, Santa Cruz, and Merced, on the other hand, were already admitting more than 96 percent of marginal ineligible applicants, leaving little room for policy reaction. Indeed, admissions rates at the Dispersing UC campuses are largely unchanged at the ELC threshold, even among students from bottom SAT quartile high schools. Enrollment rates at each of these universities actually fall among ELC-eligible students, who choose instead to attend the Absorbing UC campuses; among students from bottom SAT quartile high schools, total enrollment falls by 5.5 percentage points from a baseline of 13.9 percent.

Tables 4 and 5 summarize the enrollment effects at the UC campuses along with effects for non-UC enrollment.[28] Coefficients are estimated using Equation (1) with indicator outcomes for enrollment in the Fall semester following UC application (as observed in NSC); Table 4 shows the

[28] Just as students were could not know their own ELC eligibility prior to being informed by UC, no other universities had sufficient information to infer their applicants' ELC eligibility, implying that any enrollment changes resulted from changes in students' *UC* admission and enrollment.

intersection of the below-threshold local linear fit with the ELC threshold (α), while Table 5 shows the β coefficients associated with marginal ELC eligibility. The rows of each table estimate Equation (1) for various subsamples of the data. Table 4 shows that, at baseline, between 10 and 12 percent of marginal ELC students would have attended each of the California State University (CSU) system (California's second tier of four-year public universities), private universities in California, and universities outside the state, with 4 percent attending community college and 7 percent not enrolling in any postsecondary degree program immediately following high school.[29] The remainder–about 56 percent–would have attended UC, mostly split between the Unimpacted and Absorbing UC campuses (with 5 percent at Dispersing UC campuses). These baselines are similar among male and female applicants, though URM applicants and applicants from the bottom SAT quartile of high schools were somewhat more likely to attend Dispersing UC campuses and CSUs.

Table 5 reproduces the finding that about 7.8 percentage points of marginal ELC-eligible applicants are caused to attend Absorbing UC campuses by their eligibility. The table shows that the plurality of these students were pulled from the CSU campuses (2.9 percent), with 1.9 percent from Dispersing UC campuses and 1.0 percent from community colleges.[30] The program has no measurable impact on out-of-state or private university enrollment, suggesting that students choosing these higher-cost postsecondary options were not swayed by UC's admissions offer. URM students and students from bottom SAT quartile high schools became 13.3 and 18.8 percentage points more likely to attend Absorbing UC campuses, respectively, and were mostly pulled from Dispersing UC campuses and CSUs, though some would have otherwise enrolled at community colleges. None of the enrollment decisions of students from top-quartile high schools were measurably impacted by the ELC policy, likely because such students would have been admitted to each of the Absorbing UC campuses whether they were ELC-eligible or not.

As noted in the previous section, non-continuities in the ELC GPA running variable at popular high school grade point averages could bias these estimates, likely upwardly-biasing the compet-

[29] Students who take gap years following high school are categorized here as non-enrollees, as are the fewer than 10 percent of students who mask their non-UC student records, making them unobserved in the National Student Clearinghouse enrollment records.

[30] My findings suggest that the ELC program differed sharply from the Texas Top Ten program studied by Daugherty, Martorell, and McFarlin Jr. (2014), who find that one urban school district's students pulled into Texas's flagship public universities by the state's Top Ten program tended to come from similar-quality private universities. Those authors also find suggestive evidence that Top Ten admissions had little effect at more-disadvantaged high schools; as shown below, this was not the case for California's ELC program.

itiveness of the universities attended by ELC-eligible students. Table A-1 presents bounds on the non-continuity bias present in the enrollment statistics presented in Table 5.[31] These bounds are themselves upper bounds on the degree of bias, since most high schools' ELC thresholds are not set at ELC GPA mass points and since high schools with thresholds near 4.00 are omitted from the sample. For example, the Caetano bound on the increased likelihood of Absorbing UC campus enrollment among students from bottom SAT quartile high schools is 1.44 percent (s.e. 0.39), or eight percent of the estimated increased likelihood (18.8 percent). I conclude that non-continuity bias is unlikely to meaningfully impair interpretation of the estimates presented in this study.

Table 6 summarizes ELC students' enrollment decisions by characterizing the first universities attended by each UC applicant (within six years of high school graduation), including community college students who ultimately enrolled at a four-year university, using university statistics from IPEDS. This table and the outcome tables presented in Section 4.3 report not only the raw estimates of changes across the ELC threshold (as estimated in Equation (1)), along with standard errors, but also the scaled-up effect per student who attended an Absorbing UC campus because of the ELC program. For example, if the 2.8 percentage point decrease in the admission rate of universities attended by students from the bottom SAT quartile of California high schools, estimated across each high school's ELC threshold, is wholly attributable to the estimated 20.4 percent of such students who enroll at an Absorbing UC campus conditional on eventually enrolling at a four-year university, then the scaled-up university admissions rate per student pulled into an Absorbing UC campus fell by 2.8/0.204=13.6 percentage points.[32]

Returning to Table 6, marginal ELC-eligible applicants enroll at universities with higher average SAT scores (significant at 10 percent) by 135 points per Absorbing UC campus enrollee and higher six year graduation rates by 13 percent per enrollee. These universities also have a higher proportion of both male and female students studying in STEM fields; while at baseline they would

[31] Bandwidths are optimally chosen following Calonico, Cattaneo, and Titiunik (2014), identical to those in Table 5, and range from 0.08 to 0.11 GPA points.

[32] Even if both β coefficients–measured outcome and Absorbing UC campus enrollment–are identified, this estimation assumes monotonicity of the ELC treatment effect into Absorbing UC campuses. Monotonicity, which requires that ELC eligibility does not decrease any student's likelihood of attending an Absorbing UC campus, is justified by Table 3, which shows that students became uniformly more likely to be admitted to Absorbing UC campuses but experienced no other meaningful changes in their admissions likelihood at other UC campuses (or at any other university, given the lack of knowledge about students' ELC eligibility). While I proceed below assuming that the observed results are driven by transitions into Absorbing UC campuses, future analysis will further disaggregate students' university attendance decisions and more carefully isolate the impact of each Absorbing UC campus on student outcomes.

have attended universities with 32 percent of male and 19 percent of female students in STEM, ELC compliers ended up studying at universities where 47 (34) percent of male (female) students studied STEM, a near-doubling of STEM's popularity among female students. They also attended universities with higher net costs of attendance for middle-income students, by $2,200 per year, likely a result of the high cost of living around University of California campuses. Marginal ELC-eligible students from the bottom SAT quartile of high schools faced an even larger increase in measurable competitiveness in the universities they attended: their universities had lower admissions rates by 16 percentage points, higher six year graduation rates by 22 percentage points, and higher average SAT scores by 240 points per Absorbing UC enrollee.

4.2 Complier Analysis

The primary enrollment effect of the ELC program was to increase enrollment at Absorbing UC campuses (Davis, San Diego, Santa Barbara, and Irvine). To estimate the characteristics of these ELC 'compliers'–that is, Absorbing UC campus enrollees who would not have attended those campuses if not for their ELC eligibility–I estimate the following two-stage least-squares model:

$$Absorb_{it} = \alpha_t' + ELC_{it}\beta' + f(GPA_{it})'\gamma' \begin{pmatrix} ELC_{it} & 0 \\ 0 & 1 - ELC_{it} \end{pmatrix} + \epsilon_{it}' \tag{2}$$

$$Absorb_{it} * Z_i = \alpha_t + \hat{Absorb}_{it}\beta + f(GPA_{it})'\gamma \begin{pmatrix} ELC_{it} & 0 \\ 0 & 1 - ELC_{it} \end{pmatrix} + \epsilon_{it} \tag{3}$$

where Z_i is a permanent characteristic of i, $Absorb_{it}$ is an indicator for enrolling at an Absorbing UC campus, f is a third-order polynomial expansion, and α_t are year dummies (Abadie, 2002). Robust IV standard errors are estimated.

Table 7 presents β estimates and traditional 2SLS standard errors from Equations (2) and (3) for a series of fixed applicant characteristics, overall and by demographic subsample. The last line of each Panel shows the mean characteristic of 2003-2011 California-resident freshman enrollees at the four Absorbing UC campuses, allowing comparison between ELC compliers and their eventual peers. Panel A, which presents compliers' demographic and geographic characteristics, shows that more than two-thirds of compliers were female, compared to 56 percent of all students at Absorbing UC campuses. Compliers were more than twice as likely as their future peers to be URM (46 vs. 20

percent), thereby fulfilling ELC's goal of increasing ethnic diversity among UC campuses' student bodies. Interestingly, only 23 percent of students near their high schools' ELC thresholds were URM, but high schools with lower average SAT scores both had more URM students and were more impacted by the ELC program; as Panel B shows, about 60 percent of compliers came from the bottom SAT quartile of high schools, including 87 percent of the URM compliers.[33]

ELC was intended to improve the geographic diversity of UC's student body as well as ethnic diversity, and the third column of Table 7 suggests that it was successful in that regard as well. Only 6.0 percent of California-resident students at Absorbing UC campuses had attended high schools in rural areas, defined as any high school outside of all Census Urbanized Areas (which have resident populations greater than 50,000). However, the proportion of ELC compliers who attended rural high schools was more than double that number, at 13.5 percent. The proportion of suburban ELC-compliers was equal to that of Absorbing UC campus's students (46 percent), while ELC compliers were less likely to come from urban high schools (39 vs. 48 percent).

The ELC program was also responsible for increasing the proportion of public high school students at the Absorbing UC campuses, with 99.3 percent of compliers coming from such schools (relative to 89.1 percent of students overall), and for pulling students to Absorbing UC campuses with lower average SAT scores than their peers by almost a full standard deviation: 1540 out of 2400, 256 points lower than average (and the 54th percentile nationwide).[34] Moreover, the average family income of ELC compliers was substantially (but insignificantly) lower than that of their eventual peers, with an average of $73,000 among families that reported incomes to UC compared to $87,000 among their peers.[35] Distributional analysis (again following Abadie (2002)) shows that 80 percent of compliers had family incomes below Absorbing UC campuses' average, with 58 below Absorbing UC campuses' median observed income of $60,000. Only 13 percent of ELC compliers failed to report incomes relative to 18 percent among their Absorbing UC campus peers, providing further evidence of their lower-income status (though the difference is statistically insignificant). In general, compliers from the bottom SAT quartile of high schools are even more disadvantaged than those from the second quartile, with significantly and substantially lower SAT scores (1411 average,

[33]Panel B also shows that the proportion of students from the top two quartiles of high schools by SAT was negligible, for which reason demographic characteristics for those subgroups are noisily estimated and omitted from Panel A.

[34]These average compliers have much higher SAT scores than those studied by Zimmerman (2014), in which setting the compliers had mean SAT scores at the 21st percentile nationwide. Percentile data from 2007 (College Board, 2007).

[35]All results related to students' family income are reproduced from Bleemer (2018b).

the 37th percentile) and parental incomes ($49,000, 8 percent missing).

Panel C of Table 7 shows the distribution of ELC compliers' intended majors, as reported on their UC application.[36] While students choose their intended major after learning their own ELC eligibility, Appendix Table A-2 shows that applicants' intended major selection was little-changed across the ELC eligibility threshold (except for a slight decline in their likelihood of intending to major in the Arts), suggesting that intended majors can be treated as fixed characteristics of the applicants. Panel C shows that the intended majors of ELC compliers were similarly distributed to those of their eventual peers at the Absorbing UC campuses, though the compliers were somewhat less likely to intend to study in the Arts and Humanities. ELC compliers were no less likely than their eventual peers to intend to study STEM fields (64 vs. 63 percent), though compliers from the bottom SAT quartile of high schools were somewhat less likely to intend to study STEM (51 percent).

4.3 Short- and Medium-Term Outcomes

The Eligibility in the Local Context admissions program tended to move public high school graduates with lower-than-average SAT scores into the four Absorbing UC campuses and away from less-selective alternatives like the CSU system and the Dispersing UC campuses, increasing the average competitiveness of their postsecondary institutions. On the one hand, attending a more-competitive university could improve students' learning and increase the availability of student services; on the other hand, these observably less-prepared students (as measured by SAT score) may struggle to complete the more rigorous coursework associated with such undergraduate institutions. This latter narrative has ambiguous labor market implications: even if compliers select less demanding majors but graduate with equal likelihood from more-competitive institutions, it is unclear whether their postgraduate wages would be higher or lower relative to their counterfactual enrollment.

Table 8 displays a series of short- and medium-term university-related outcomes for ELC compliers, estimated using Equation (1). The first column, reiterating a finding from Table 5, shows that an additional 1.5 percentage points of marginal ELC-eligible applicants immediately enroll at a four-year university, pulled on average into Absorbing UC campuses and away from either com-

[36] Applicants are defined as intending a major if they reported to *any* UC campus that they intended to earn a major in that category.

munity colleges or non-enrollment. This impact is largest students from the bottom SAT quartile of high schools.

The second column of Table 8 shows that ELC pushed students to attend universities more distant from home than they would have otherwise attended (significant at the 10 percent level), by about 82 additional miles per Absorbing UC campus enrollee. This increased distance will further increase the cost of attending the more competitive universities that ELC compliers are pushed into; not only are their expected net costs higher by $2,200 per year, as shown in Table 6, but their travel costs to and from university are likely higher, and they may be less likely to live in family-subsidized housing while enrolled. Indeed, ELC eligibility causes a 1.7 percent decreased likelihood of attending college within 10 miles of the student's residential address at the time of their UC application (s.e. 0.08), implying a decline in Absorbing UC enrollees' likelihood of attending college within 10 miles of home by more than 8 percentage points.[37]

Turning to the most substantial of those benefits, the third column of Table 8 presents the effect of ELC eligibility on applicants' likelihood of earning a college degree within five years of applying to UC, as measured in NSC. ELC-eligible students are 1.93 percentage points more likely to have earned a four-year degree on average, scaling up to the implication that 25 percentage point of applicants pulled into Absorbing UC campuses earned university degrees within 5 years *but wouldn't have in the absence of the ELC program*. While this effect may seem large, it is comparable to the difference in graduation rates between the Absorbing UC campuses (80-85 percent) and students' counterfactual schools (around 70 percent at the Dispersing UC campuses and 50 percent at CSU campuses).[38] URM students and students from the bottom SAT quartile of high schools obtain even larger 30 percentage point increases in graduation rates, providing evidence against ability 'mismatch' that could diminish educational attainment (in terms of degree receipt) as a result of attending a more competitive university.

ELC-eligible students not only earned more degrees than their ineligible peers, but conditional on earning a degree, they earned them in fewer years. The first column of Table 9, which presents

[37] In both distance measures, students who attend university outside of California (or don't attend any university at all) are omitted. Community college students are omitted from the distance measure but are assumed to attend a school within 10 miles of their residential address.

[38] Cohodes and Goodman (2014) also find that students who attend more-competitive universities with higher graduation rates are themselves more likely to earn university degrees, while Goodman, Hurwitz, and Smith (2017) find that students who enroll at community colleges are less likely to ultimately earn four-year degrees.

outcomes of ELC eligibility conditional on graduation, shows that ELC-eligible students who earn college degrees within six years of graduating high school tended to earn their degrees faster than their ineligible peers (by about 0.03 years overall), suggesting that about one in three compliers finished their degree one year faster than they would have otherwise. The effect is even larger for URM students and those from bottom SAT quartile high schools, who earn their degrees in 0.1 to 0.12 fewer years on average (implying that URM compliers earn their degrees almost a full year faster at Absorbing UC campuses). As a result of both direct tuition and fee savings as well as the decreased opportunity cost of university attendance–allowing students to enter the labor market earlier–the increased speed with which these students complete their degrees alone likely more than offsets the higher net prices and travel costs students face attending Absorbing UC campuses.

Turning to major selection, the second column of Table 9 shows that marginal ELC-eligible applicants are more likely to earn a degree in their intended field of study (conditional on earning an undergraduate degree) by 2.5 percentage points (significant at 10 percent), or almost 35 percentage points per complier. Appendix Table A-5 shows the unconditional changes in the likelihoods of each applicant earning their intended major, showing that this increased likelihood is the result of applicants intending to earn Humanities and Social Science majors becoming much more likely to actually earn those majors, with an increase (significant at the 10 percent level) in the likelihood of intended professional majors to earn degrees in those fields as well.

The fourth column of Table 8 focus on changes in students' (unconditional) likelihood of earning STEM majors.[39] While there is no aggregate measurable effect of ELC eligibility on students' likelihood of earning STEM majors, URM students and students from the bottom SAT quartile of high schools are significantly and substantially less likely to earn STEM degrees (despite their increased likelihood of earning a degree at all). Indeed, Appendix Table A-5 shows that ELC-eligible intended STEM majors become more likely to earn college degrees within five years (significant at 10 percent), suggesting lower drop-out rates even among applicants interested in ambitious fields of study, but those from bottom SAT quartile high schools tend to switch out of STEM into the Social Sciences if they attend Absorbing UC campuses. Columns 6 and 7 also show that the decline in the likelihood of earning a STEM degree appears concentrated among female students, though

[39] Students are defined as studying STEM if their stated major is included on a US federal 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)" (US Department of Homeland Security, 2016).

the difference across genders is not statistically significant. Table 6 shows that ELC compliers attend universities with substantially higher proportions of STEM degree-earners, especially among women, suggesting that the ELC compliers may face greater competition for those fields of study.

ELC eligibility, and the corresponding increased likelihood of attending an Absorbing UC campus, appears to increase and speed up students' likelihood of graduating from a university, but also pushes URM and less-prepared students out of STEM majors.[40] I employ two methodologies in order to estimate the net labor market effect of ELC eligibility, estimating the effect on simulated middle-career income before turning to imperfectly-observed early-career earnings.

First, in order to estimate the inferred labor market effect of attending a more-competitive university, I assign each applicant to an estimated expected likelihood of employment and expected income (conditional on employment) based on their university completion and major choice (five years after high school graduation) and test how these expected outcomes change as a result of ELC compliance. Simulated labor market outcomes are estimated using the following linear regression model of age-40 employment outcomes on gender interacted with indicators for completing some college, completing an Associate's degree, or completing a Bachelor's degree by major:

$$\log(Wage_{it}) = \alpha_t + U_i * F_i\beta_1 + U_i * (1 - F_i)\beta_2 + X_i + \epsilon \quad (4)$$

where $Wage_{it}$ measures i's reported employment status, log income, or log family income; U_i are university completion or field of study indicators; F_i indicates whether i is female; and X_i includes ethnicity and age dummies (the sample spans ages 38-42).[41] The model is estimated using data from the 2009-2013 American Community Survey (ACS), employing weighted least squares with ACS person-level weights (see Appendix Table A-4).[42] Because the model simulates wages by degree and gender but not by university competitiveness, estimates using these simulated employment outcomes may understate employment gains available to ELC-eligible students, since they tend to earn their degrees from more-competitive universities (Appendix Table A-3).

[40] While graduates with STEM majors tend to have higher average earnings than those with majors in the Humanities and Social Sciences, the degrees are not strictly ranked; many STEM majors have lower average post-graduate earnings than, for example, Nursing and Economics.

[41] Employed ACS respondents with 0 income are omitted.

[42] All engineering degrees are in the top 25 fields of study by average male or female income, but 11 of the 30 highest-income fields of study are not STEM, and four STEM fields are outside the top 30. Expected income and likelihood of unemployment by university completion and major are highly correlated across gender (0.89 and 0.58, respectively) and the two are highly negatively correlated with each other (-0.69 for men, -0.48 for women).

The fifth and sixth columns of Table 8 assign each UC applicant to their corresponding expected likelihood of unemployment and income, given their university completion, major choice, and gender. ELC compliers obtain a lower expected likelihood of unemployment by 1.8 percentage points, with similar magnitude across genders, ethnicities, and high school SAT quartiles. Given the estimated baseline likelihood of unemployment of 5.5 percent, this is a substantial labor market change for ELC compliers, likely the result of the substantially higher unemployment rate among non-graduates relative to graduates with *any* major. Moreover, the expected income of employed ELC compliers significant and substantially increases, by 18 percent of the base average income earned by high school graduates without any higher education, or about $5,700 per year. This increase in expected income appears concentrated among male ELC compliers, likely the result of lower STEM major selection among women (offsetting their similarly-increased likelihood of graduation), though the difference is statistically insignificant. URM and bottom-SAT-quartile students receive similar expected income benefits from ELC eligibility (between 17 and 22 percentage points).[43]

Second, I report estimates of observed postgraduate wages from the California Employment Development Department reproduced from Bleemer (2018b). Column 7 shows that earnings appear higher for ELC-eligible students eight years following high school graduation, with a reduced-form increase of 0.045 log points (which scales up to nearly 0.6 log points per Absorbing UC enrollee) that is statistically-insignificant at conventional levels (p=0.14). Wages are higher still for ELC-eligible URM students (with a scaled-up estimate of 80.6 log points, p=0.04).

These estimates, however, face a number of limitations. Earnings are only observed for employees covered by California unemployment insurance and 8-years-later earnings are only observed for ELC applicants prior to 2010, the combination of which includes just 41 percent of the sample (about 71,000 applicants). While there are no estimable differences, overall or by subgroup, in likelihood of appearing in the EDD earnings data across the ELC eligibility threshold, compositional changes may play an important role in the observed differences.[44] Estimates are also sensitive to specification; Table A-7 shows that wage estimates have high standard errors and vary by year following high school graduation, though the estimates remain uniformly positive for URM applicants.

[43] Appendix Table A-6 shows highly similar results for expected unemployment or income at age 30 or 50 instead of age 40 (using differently-aged ACS respondents in the first-stage coefficient estimation), as well as replacing individual income with family income (restricting only to families with non-zero annual income).

[44] Table A-7 shows that ELC-eligible applicants are more likely to appear in the earnings data 6 or 7 years after graduation, possibly a reflection of faster college graduation, as described below.

In sum, both wage estimation methodologies suggest that some UC students' decreased likelihood of earning high-return degrees is more than offset by their substantially increased likelihood of earning a university degree, in terms of expected or observed postgraduate earnings.

By pushing certain students from less-selective schools into the four Absorbing UC campuses, the ELC program benefited students in terms of their graduation rates and time to degree–especially among less-prepared students–and the increased competitiveness of their degree-granting universities. While some URM and less-prepared applicants became less likely to earn STEM degrees (which are associated with higher future income), those expected negative labor market effects appear outweighed on average by the labor market benefits of an increased likelihood of university graduation. Similarly, while students attended higher-cost universities more distant from their prior residences, these costs were likely more than offset by the tuition, fees, and opportunity costs avoided by those students as a result of their faster university graduation.

5 Conclusion

The University of California's 2003-2011 Eligibility in the Local Context program generated unique, substantial, and tractable variation in the university attendance of large numbers of California youths, pushing thousands of high school graduates into four UC campuses–Davis, Irvine, San Diego, and Santa Barbara–from less-competitive public colleges and universities in California. Students pulled into UC by ELC had lower SAT scores and family incomes, were more likely to attend lower-performing high schools, and were much more likely to be from under-represented minority groups when compared to their eventual peers, but they ended up more likely to graduate college–and graduated in fewer years–at the more-competitive institutions they attended. While students pulled into these selective UC campuses faced higher costs, and less-prepared students were less likely to earn valuable STEM majors, expected net labor market outcomes for these students appear decidedly positive. As a result, not only did the ELC program succeed in partially offsetting the declines in URM students at UC campuses following the end of its affirmative action program Bleemer (2018a), but it also provided medium- and long-run benefits to students who attended more competitive universities as a result of the program. Future research will extend the analysis above to better understand heterogeneity in (personal and social) university returns by campus and student characteristics.

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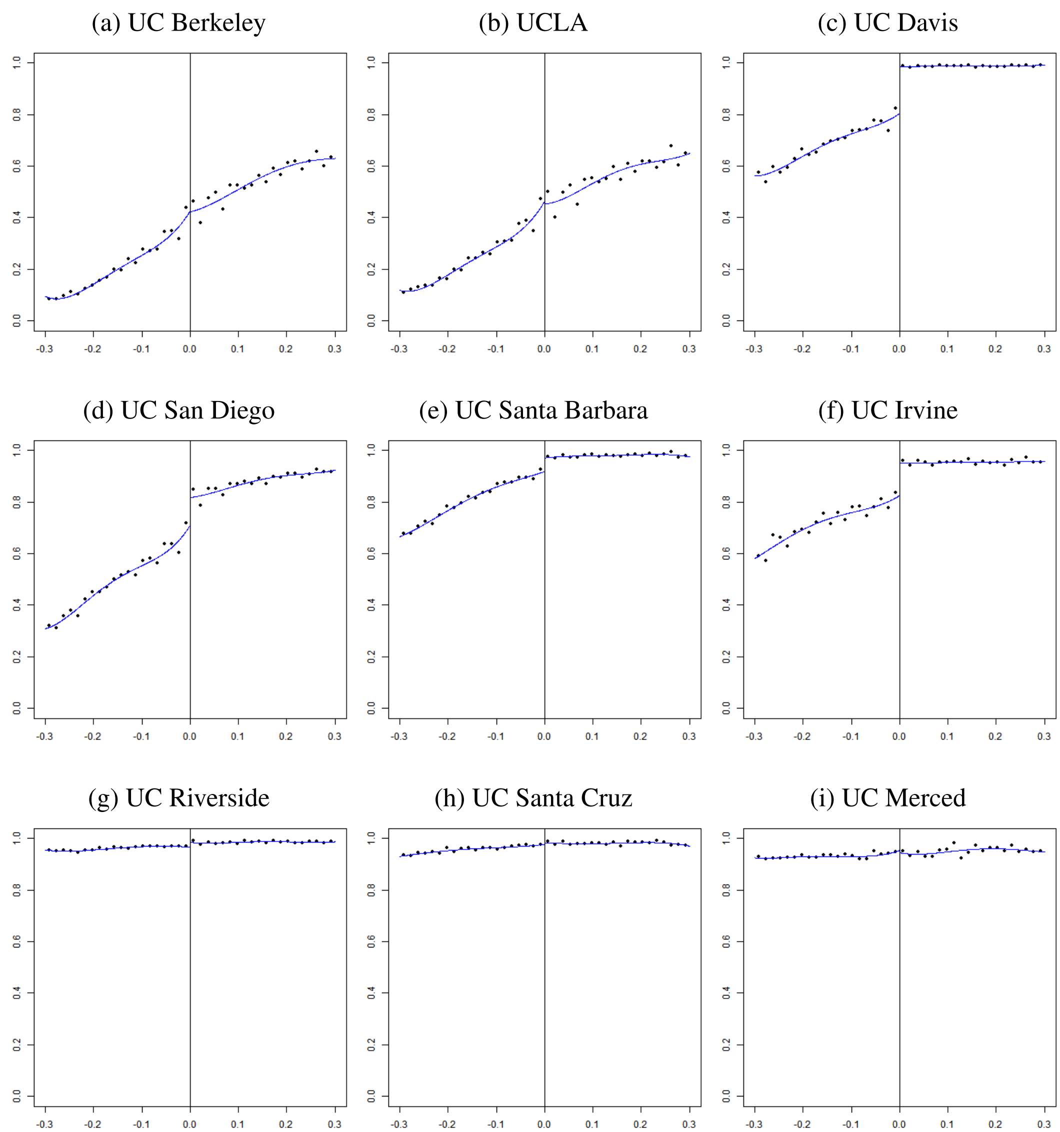
Figure 1: Change in Likelihood of Admissions at the High School ELC Cutoff, by Campus



Note: Binned averages of students' likelihood of admission to each undergraduate UC campus by ELC GPA distance to their high school's ELC threshold. Thresholds are at the fourth percentile of specially-calculated ELC GPAs by high school and are approximated by a support vector machine algorithm described in the text. Each chart includes 20 evenly-spaced bins on either side of the ELC threshold; the fit lines are fifth-order polynomials.

Table 1: Description of 2003-2011 University of California Applicants Near Their High School's ELC Eligibility Threshold

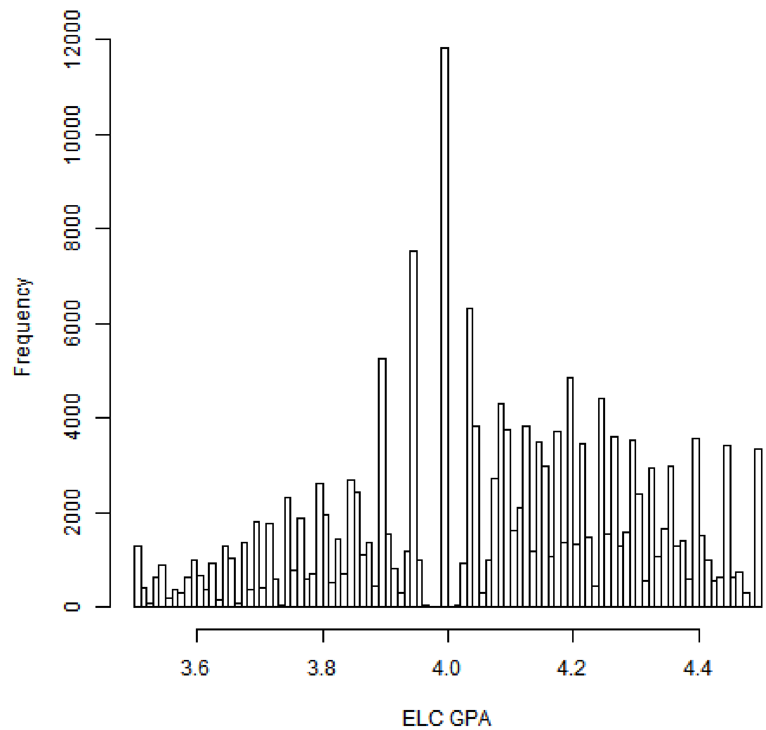
			Subgroups of Students Near ELC Threshold						High School SAT Quartiles[a]			
	CA Freshman Applicants	Near ELC Threshold	Male	Female	White	Asian	Hispanic	Black	Bottom	Second	Third	Top
% Male	43.8	38.9	100	0	40.1	40.3	36.3	29.2	35.5	38.3	39.9	41.9
% White	32.3	35.5	36.7	34.8	100	0	0	0	12.9	37	49	43.3
% Asian	32.2	32.9	34.1	32.1	0	100	0	0	25.4	34.6	31	40.6
% Hispanic	23.5	21.4	20.0	22.3	0	0	100	0	50.7	18.8	10.3	5.8
% Black	5.2	3.2	2.4	3.7	0	0	0	100	6.7	3.1	1.7	1.1
% Public High School	84.5	89.2	88.4	89.7	86.7	91.2	91.9	89.4	97.2	92.5	87	80.1
% Rural High School	3.5	4.4	4.3	4.5	6.2	2.1	5.4	3.1	5.7	6.6	4.9	0.5
SAT Score	1738	1835	1873	1811	1926	1873	1623	1657	1532	1776	1929	2097
HS GPA	3.67	4.03	4.03	4.03	4.09	4.05	3.90	3.90	3.83	4	4.1	4.19
Enrollment Rates (%)												
Unimpacted UC	11.2	22	23.2	21.2	19.5	30.2	13.7	17.9	12.6	16.1	24.2	35
Berkeley	5.5	11.1	12.1	10.4	9.5	16.4	5.7	8.7	5.2	8	12.1	19.2
UCLA	5.7	10.8	11.0	10.7	9.9	13.7	8.0	9.1	7.4	8.1	12.1	15.7
Absorbing UC	16.5	22.8	23.3	22.5	18.4	31.5	19.3	14.0	23.6	37.3	31.5	14.0
Davis	5.9	7.5	7.2	7.7	7.6	8.8	6.0	5.6	8.6	10.2	7.3	4.0
San Diego	5.0	8.3	8.8	8.0	6.7	12.0	6.3	3.8	6.8	10.1	9.6	6.6
Santa Barbara	5.2	6.7	6.4	6.8	9.0	3.0	8.6	6.4	8.0	7.9	7.3	3.5
Irvine	5.6	7.0	7.3	6.7	4.1	10.7	6.9	4.7	8.1	9.1	7.2	3.4
Dispersing UC	9.7	5.4	5.1	5.6	4.5	3.7	9.4	8.1	10.8	6.4	3.4	0.9
Riverside	4.7	2.7	2.6	2.7	1.4	2.1	5.6	5.5	6.7	3	1	0.2
Santa Cruz	4.0	2.1	1.8	2.2	2.7	1.1	2.5	1.6	2.5	2.8	2.3	0.7
Merced	1.0	0.6	0.6	0.6	0.3	0.5	1.3	1.0	1.6	0.7	0.2	0.0
CSU	15.9	11.0	10.9	11.1	12.3	7.0	15.3	12.6	17.7	13.2	9.6	3.9
Community Coll.	11.7	7.8	7.7	8.0	7.6	7.0	9.3	8.6	11.1	8.3	6.2	4.9
CA Private Univ.	7.2	8.6	8.0	9.0	10.1	6.2	8.9	11.9	4.9	7.7	10.2	11.9
Non-CA Univ.	9.6	9.2	8.9	9.4	12.8	6.5	6.0	12.3	3.1	5.9	9.5	18.5
No Enrollment	13.2	6.7	6.8	6.6	6.1	5.2	9.6	8.3	8.3	5.2	5.5	7.8
N	1,663,189	183,886	71,506	112,342	65,359	60,489	39,352	5,803	45,972	45,985	45,958	45,963

Note: Characteristics of 2003-2011 California-resident freshman UC applicants overall and within 0.3 GPA points of their high schools' ELC threshold. Thresholds are at the fourth percentile of specially-calculated ELC GPAs by high school and are approximated by a support vector machine algorithm described in the text. Enrollment is measured in the Fall semester following high school graduation. SAT score on a 2400 point scale; converted from ACT score if former unavailable. [a]California high school quartiles by SAT score of students within 0.3 GPA points of their ELC threshold.

Source: UC Corporate Student System

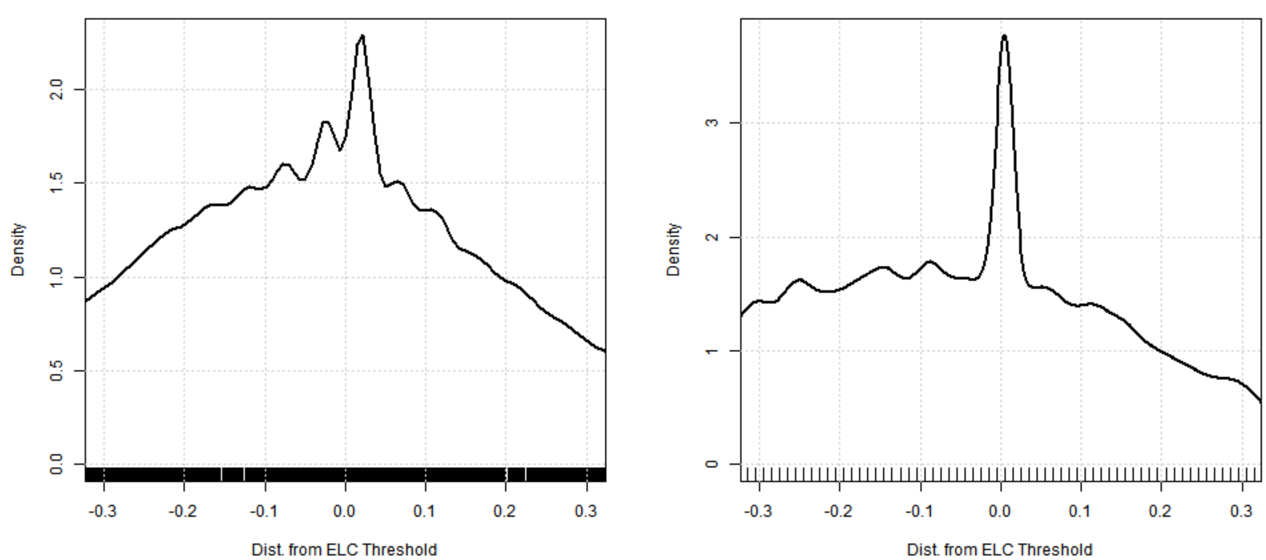
Figure 2: Distribution of ELC GPAs, Overall and Around High School Thresholds

(a) Histogram of ELC GPAs



Density of ELC GPA Distance from HS Threshold

(b) Actual (c) Synthetic



Note: (a) Histogram of observed ELC GPAs by hundredth across years. ELC GPAs only observed for California high school seniors in the top 10 percent of their class who did not allow their ELC-participating high school to share their transcript with UC, and who applied to at least one UC campus. (b) Kernel density (adaptive, mean bw=0.015) of distance to (approximated) ELC threshold for all observed ELC GPAs, if within 0.3 GPA points of the threshold. (c) Kernel density (adaptive, mean bw=0.015) of distance to ELC threshold for synthetic California high schools, calculated by (1) drawing 1000 high school applicant sizes from the distribution of number of applicants with ELC GPAs per high school (restricting to at least 10 applicants per school), (2) drawing ELC GPAs for those high schools from the observed distribution of ELC GPAs, (3) identifying the ELC threshold for each synthetic school as the 40th percentile GPA at that school, (4) calculating each synthetic student's distance to their high school's threshold.

Source: UC Corporate Student System

Table 2: Baseline Characteristic Balance around ELC GPA Threshold

	Pre-Treatment Dependent Variable						
	Female (%)	White (%)	Asian (%)	URM (%)	Family Income[1] ($)	Missing Income[1] (%)	SAT Score
All	-0.1 (1.1)	1.0 (1.0)	-2.2 (1.1)	1.0 (0.9)	3,946.0 (2,176.2)	-0.0 (0.9)	-9.6 (4.7)
Male		-1.0 (1.4)	-2.0 (1.6)	2.1 (1.3)			-11.5 (8.0)
Female		2.4 (1.2)	-3.0 (1.3)	1.1 (1.0)			-6.4 (6.0)
URM	-2.4 (2.3)						5.9 (13.5)
High School Quartiles by SAT Score							
Bottom Quartile	-1.0 (2.1)	1.5 (1.9)	-3.8 (2.2)	2.3 (2.0)	-1,819.7 (2,025.4)	-0.2 (1.1)	-11.1 (8.7)
Second Quartile	-2.5 (2.5)	0.0 (2.3)	-1.3 (2.5)	2.1 (2.2)	4,476.1 (3,863.2)	-1.4 (1.8)	-3.2 (6.8)
Third Quartile	1.1 (2.2)	1.6 (2.3)	-2.9 (2.0)	1.5 (1.5)	3,758.6 (4,297.6)	0.9 (1.9)	-16.0 (7.3)
Top Quartile	-0.3 (2.1)	1.2 (2.1)	-2.0 (2.2)	-0.2 (1.2)	11,211.9 (7,008.5)	-3.0 (2.5)	-3.2 (6.0)

Note: Beta coefficients from kernel-weighted fuzzy regression discontinuity estimation around the ELC threshold, with bias-corrected robust standard errors in parentheses (Calonico, Cattaneo, and Titiunik, 2014). Thresholds are at the fourth percentile of specially-calculated ELC GPAs by high school and are approximated by a support vector machine algorithm described in the text. ELC eligibility compliance is imperfect, so estimation is fuzzy. High school quartiles by SAT score of students within 0.3 GPA points of the ELC threshold. SAT score on a 2400 point scale; converted from ACT score if former unavailable. Applicants from high schools with approximated ELC thresholds between 3.96 and 4.00 are omitted. [1]Family income and missing income statistics from Bleemer (2018b); unavailable by gender, ethnicity, or intended major. Family income is known for students who applied for federal, state, or institutional financial aid (88 percent of applicants), likely leading to “missing income” for students from high-income families.

Source: UC Corporate Student System

Table 3: Impact of ELC on Admissions and Enrollment for Marginal Students by UC Campus

	Admission (%)				Enrollment (%)			
	All		Bottom Quart.[a]		All		Bottom Quart.	
	Baseline	β	Baseline	β	Baseline	β	Baseline	β
Unimpacted Campuses								
Berkeley	43.9	1.0	15.6	-1.0	13.4	0.6	4.7	0.1
		(1.4)		(2.7)		(0.7)		(0.9)
UCLA	45.7	0.6	19.6	-1.4	12.4	-0.5	8.6	-2.1
		(0.9)		(2.5)		(0.6)		(1.4)
Absorbing Campuses								
Davis	79.9	19.1	57.0	39.7	6.5	2.9	6.9	5.1
		(0.8)		(2.2)		(0.5)		(1.2)
San Diego	69.7	13.4	40.2	18.3	6.9	3.8	4.8	3.2
		(0.9)		(3.2)		(0.6)		(1.0)
Santa Barbara	91.4	6.5	76.4	16.0	6.3	-0.4	7.7	2.0
		(0.5)		(2.4)		(0.4)		(1.4)
Irvine	81.9	14.0	45.7	42.8	5.0	1.3	5.9	7.5
		(0.8)		(2.1)		(0.6)		(1.2)
Dispersing Campuses								
Riverside	96.7	2.0	95.3	2.4	2.5	-0.8	8.1	-2.0
		(0.6)		(1.6)		(0.3)		(1.1)
Santa Cruz	97.7	1.2	91.3	5.0	2.1	-0.6	3.6	-2.1
		(0.6)		(2.8)		(0.3)		(0.7)
Merced	97.1	-0.2	97.7	-0.6	0.8	-0.5	2.2	-1.4
		(0.8)		(1.4)		(0.2)		(0.6)

Note: The estimated baseline (ELC-ineligible) proportion of marginal students at their high school's ELC threshold admitted or enrolled at each UC campus 2003-2011 (α), and the estimated change in admission or enrollment for marginally ELC-eligible applicants (β), overall and for students from the bottom SAT quartile of high schools. Values in percentages. Enrollment is not conditional on application to that campus. Estimates from kernel-weighted fuzzy regression discontinuity models; standard errors (in parentheses) are bias-corrected and robust (Calonico, Cattaneo, and Titiunik, 2014). Applicants from high schools with approximated ELC thresholds between 3.96 and 4.00 are omitted. [a]Bottom quartile of high schools by SAT scores of students within 0.3 GPA points of the ELC threshold.

Source: UC Corporate Student System and National Student Clearinghouse

Table 4: Enrollment Behavior of Marginal Non-ELC-Eligible Students in Percentage Points

	University of California Campuses Unimpacted	Absorbing	Dispersing	CSU	Comm. Coll.	CA Priv.	Non-CA	No Coll.
All	25.9	24.6	5.3	11.2	3.6	10.0	11.4	7.4
Male	26.7	25.9	4.9	11.4	3.3	9.2	11.0	7.5
Female	25.7	25.1	5.5	10.7	3.8	10.5	11.4	7.2
URM	15.6	21.9	10.2	17.0	4.6	11.6	8.4	10.2
High School Quartiles by SAT Score								
Bottom Q.	12.4	24.8	13.7	22.1	8.7	5.9	2.9	9.1
Top Q.	41.7	11.1	0.9	1.7	0.2	12.1	22.8	9.2

Note: α (below-threshold constant intercept) coefficients from kernel-weighted fuzzy regression discontinuity estimation. High school quartiles by SAT score of students within 0.3 GPA points of the ELC threshold. Values in percentages. Enrollment measured in fall semester following high school graduation. URM includes Black, Hispanic, Native American, and Pacific Islander students. Applicants from high schools with approximated ELC thresholds between 3.96 and 4.00 are omitted.

Source: UC Corporate Student System and National Student Clearinghouse

Table 5: Percentage Impact of ELC Eligibility on Enrollment

	UC Campuses Unimpacted	Absorbing	Dispersing	CSU	Comm. Coll.	CA Priv.	Non-CA	No Coll.
All	-0.2 (0.8)	7.8 (1.0)	-1.9 (0.4)	-2.9 (0.6)	-1.0 (0.3)	-0.5 (0.5)	-0.2 (0.6)	-0.6 (0.5)
Male	-0.2 (1.3)	6.7 (1.4)	-1.6 (0.7)	-2.9 (1.0)	-0.3 (0.6)	-0.4 (0.9)	0.1 (1.1)	-1.0 (0.8)
Female	-0.4 (1.0)	7.1 (1.0)	-1.8 (0.5)	-2.9 (0.8)	-1.4 (0.4)	-0.5 (0.8)	0.1 (0.9)	-0.3 (0.6)
URM	-0.2 (1.5)	13.3 (2.1)	-3.0 (1.1)	-5.2 (1.6)	-0.9 (1.0)	-1.5 (1.3)	-0.6 (1.0)	-1.0 (1.2)
High School Quartiles by SAT Score								
Bottom Quartile	-1.2 (1.6)	18.8 (2.2)	-5.1 (1.3)	-7.1 (1.7)	-3.6 (1.1)	-0.8 (1.0)	-0.1 (0.8)	-0.6 (1.3)
Top Quartile	-0.1 (1.8)	1.2 (1.4)	-0.4 (0.4)	0.1 (0.6)	0.2 (0.2)	1.3 (1.4)	-1.7 (1.7)	0.0 (1.1)

Note: β coefficients from kernel-weighted fuzzy regression discontinuity estimation, with bias-corrected robust standard errors in parentheses (Calonico, Cattaneo, and Titiunik, 2014). High school quartiles by SAT score of students within 0.3 GPA points of the ELC threshold. Values in percentages. Enrollment measured in fall semester following high school graduation. URM includes Black, Hispanic, Native American, and Pacific Islander students. Applicants from high schools with approximated ELC thresholds between 3.96 and 4.00 are omitted.

Source: UC Corporate Student System and National Student Clearinghouse

Table 6: Change in Characteristics of ELC-Eligible Students' University of First Enrollment

		Admit Rate	Average SAT	Six Year Grad. Rate	% Male STEM	% Female STEM	Sticker Price	Net Price
Overall	α	42.8	1848.8	80.7	32.3	18.6	30141	13798
	β	-0.4	11.0	1.1	1.23	1.23	-300	182
		(0.44)	(5.66)	(0.3)	(0.33)	(0.23)	(315.13)	(58.97)
		[-5.0]	[134.6]	[13.1]	[15.1]	[15.1]	[-3686.7]	[2234.5]
Bottom	α	50.9	1712.5	74.3	31	17.4	24978	13388
HS Q.	β	-2.8	41.6	3.8	3.14	2.51	549	649
		(1.11)	(9.77)	(0.86)	(0.57)	(0.45)	(329.95)	(171.64)
		[-15.9]	[238.2]	[21.7]	[18.0]	[14.4]	[3148.3]	[3716.9]

Note: Alpha (below-threshold constant intercept) and Beta (treatment) coefficients from kernel-weighted fuzzy regression discontinuity estimation, with bias-corrected robust standard errors for the beta coefficients in parentheses (Calonico, Cattaneo, and Titiunik, 2014). Scaled estimates per new Absorbing UC student (conditional on enrollment or graduation) in brackets. Enrollment measured as first four-year college or university of enrollment between July following high school graduation and six years later. High school quartiles by SAT score of UC applicants within 0.3 GPA points of the ELC threshold. Outcome data from IPEDS and linked to NSC by college name (using a hand-coded crosswalk). The proportion of students who choose STEM fields of study was measured in 2008; all other outcomes are annual by year of initial enrollment (that is, the year following initial application to UC). Average SAT score 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. Average net price as reported for students awarded Title IV financial aid with income between $48,000 and $75,000. Applicants from high schools with approximated ELC thresholds between 3.96 and 4.00 are omitted.

Source: UC Corporate Student System, National Student Clearinghouse, and the Integrated Postsecondary Education Data System (IPEDS)

Table 7: Characteristics of ELC Compliers

Panel A: Student Characteristics

	Female (%)	URM (%)	Rural High School (%)	Public High School (%)	SAT Score	Family Income[1] ($)	Missing Fam. Income[1] (%)
All	71.5	45.9	13.5	99.3	1540	72,700	12.6
	(8.0)	(7.6)	(4.7)	(4.1)	(45)	(12,300)	(5.9)
Bottom Quartile	71.7	60.1	9.9	95.9	1411	49,100	8.0
	(6.6)	(6.8)	(4.3)	(1.8)	(26)	(6,400)	(3.3)
Second Quartile	60.7	18.9	18.4	104.1	1699	99,300	19.3
	(13.3)	(11.1)	(8.7)	(6.5)	(41)	(21,600)	(9.6)
Mean[2]	56.0	20.1	5.3	89.1	1796	87,300	18.4

Panel B: High School SAT Quartiles

	Bottom Quart.	Second Quart.	Third Quart.	Top Quart.
All	57.7	32.4	2	7.9
	(7.5)	(7.0)	(7.2)	(5.3)
Male	51.2	39.6	0.5	8.7
	(14.4)	(14.2)	(14.8)	(10.7)
Female	60.7	29.1	2.7	7.6
	(8.8)	(8.0)	(8.1)	(6.0)
URM	86.7	3.8	8.2	1.3
	(10.7)	(9.4)	(6.1)	(3.8)
Mean[2]	20.0	22.2	24.6	33.2

Panel C: Intended Majors

	Art	Hum.	Soc. Sci.	Nat. Sci.	Engin.	Profess.	Bus.	STEM
All	-2.8	7.3	20.1	39.0	24.6	15.3	10.2	63.5
	(2.9)	(4.3)	(6.0)	(7.9)	(6.6)	(4.8)	(4.3)	(8.0)
Bottom Quartile	-4.5	9.3	21.3	37.7	20.0	17.7	16.0	51.0
	(2.6)	(3.9)	(5.7)	(6.9)	(5.8)	(4.4)	(3.8)	(7.0)
Mean[2]	4.7	11.0	22.9	44.7	24.6	12.6	11.9	63.3

Note: Characteristics of ELC compliers as estimated using two-stage least squares, overall and by high school SAT quartiles, with standard errors in parentheses (Abadie, 2002). Public HS an indicator for graduating a public California high school; "Near Absorbing UC Campus" is an indicator for residing within 25 miles of UC Davis, Irvine, San Diego, or Santa Barbara. ACT scores and 1600-point SAT scores are converted to 2400-point SAT scores using contemporaneous standard formulas. Applicants from high schools with approximated ELC thresholds between 3.96 and 4.00 are omitted. [1]Family income statistics from Bleemer (2018b). Family income is known for students who applied for federal, state, or institutional financial aid (88 percent of applicants), likely leading to "missing income" for students from high-income families. [2]The true average for freshman California-resident students who first enrolled at an Absorbing UC campus between 2003 and 2011.

Source: UC Corporate Student System and National Center for Education Statistics

Table 8: Impact of ELC Eligibility on Schooling and Labor Market Outcomes

	Enrollment and Graduation Outcomes				Employment and Earnings Outcomes		
	Enroll at Univ. (%)	Dist. to Univ.[1] (mi.)	Graduation within Five Years (%)	STEM Degree (%)	Average Age-40 Unemp.[2] (%)	Average Age-40 Income[2] (100s log pts.)	8-Years-After EDD Earnings[3] (100s log pts.)
All	1.53	6.6807	1.93	-0.07	-0.14	1.41	4.49
	(0.59)	(3.48)	(0.73)	(1.04)	(0.04)	(0.66)	(3.06)
		[82.2]	[24.6]	[-0.9]	[-1.8]	[18.0]	[59.8]
Male	1.22	7.7588	1.8	0.25	-0.17	1.99	1.03
	(0.92)	(5.42)	(1.18)	(1.39)	(0.07)	(1.1)	(5.56)
		[111.0]	[27.1]	[3.8]	[-2.6]	[29.9]	[19.9]
Female	1.57	6.5842	2.01	-0.89	-0.09	0.41	4.01
	(0.75)	(4.66)	(0.97)	(1.06)	(0.05)	(0.76)	(3.32)
		[91.2]	[28.4]	[-12.6]	[-1.3]	[5.8]	[44.7]
URM	1.92	2.1475	3.97	-4.24	-0.18	2.29	10.59
	(1.36)	(6.26)	(2.03)	(2.2)	(0.09)	(1.42)	(4.83)
		[17.3]	[29.8]	[-31.8]	[-1.4]	[17.2]	[80.6]
High School Quartiles by SAT Score							
Bottom Quartile	4.22	2.0818	5.65	-4.15	-0.26	4.1	8.66
	(1.52)	(6.12)	(2.34)	(1.59)	(0.11)	(1.89)	(6.36)
		[11.9]	[30.1]	[-22.1]	[-1.4]	[21.9]	[42.1]
Second Quartile	1.29	0.7619	1.82	-1.33	-0.15	1.54	8.35
	(1.18)	(7.62)	(1.68)	(2.47)	(0.1)	(1.34)	(6.13)
		[6.0]	[18.0]	[-13.1]	[-1.5]	[15.2]	[77.1]

Note: Beta (treatment) coefficients from kernel-weighted fuzzy regression discontinuity estimation, with bias-corrected robust standard errors in parentheses (Calonico, Cattaneo, and Titiunik, 2014). Scaled estimates per new Absorbing UC student (conditional on enrollment or graduation, and by subgroup where appropriate) in brackets. Enrollment measured in fall semester following application. High school quartiles by SAT score of students within 0.3 GPA points of the ELC threshold. Applicants from high schools with approximated ELC thresholds between 3.96 and 4.00 are omitted. [1]Geodesic distance from residential Census block to university of enrollment Fall semester following UC application. Conditional on enrolling at a university in California. [2]Expected unemployment and income levels estimated from respondents of 2009-2013 American Community Survey, matched by gender and college major, Associate's Degree, some college, or no college (omitting respondents without high school degrees; see Appendix Table A-4). [3]Sum of quarterly observed earnings in California Employment Development Department database in the eighth year after graduating high school, conditional on having reported earnings (which are only available for non-federal wages earned in California). Reproduced from Bleemer (2018b).

Source: UC Corporate Student System, National Student Clearinghouse, the American Community Survey, and the California Employment Development Department

Table 9: Impact of ELC Eligibility on Outcomes Among College Graduates

	Number of Years to Degree	Intended Degree Area	STEM Degree
All	-0.0283	2.47	-0.23
	(0.0128)	(1.43)	(1.00)
	[-0.4]	[35.1]	[-3.3]
Male	-0.0432	1.35	0.31
	(0.0182)	(2.29)	(1.75)
	[-0.64]	[20.0]	[4.6]
Female	-0.0147	2.83	-1.41
	(0.0161)	(1.68)	(1.40)
	[-0.24]	[47.1]	[-23.5]
URM	-0.0965	4.32	-5.84
	(0.0322)	(3.03)	(2.68)
	[-0.95]	[42.5]	[-57.4]
High School Quartiles by SAT Score			
Bottom Quartile	-0.1147	1.22	-4.96
	(0.0380)	(2.78)	(2.27)
	[-0.69]	[7.4]	[-30.0]
Second Quartile	-0.0603	2.68	-1.42
	(0.0315)	(3.02)	(2.54)
	[-0.56]	[24.8]	[-13.1]

Note: Beta (treatment) coefficients from kernel-weighted fuzzy regression discontinuity estimation, with bias-corrected robust standard errors in parentheses (Calonico, Cattaneo, and Titiunik, 2014). Scaled estimates per new Absorbing UC student (conditional on enrollment or graduation, and by subgroup where appropriate) in brackets. Outcomes are conditional on earning a four-year degree within 6 (years to degree) or 5 (intended degree or STEM degree) years. Intended degree area is an indicator for earning a degree in the same area (like Humanities or Social Sciences; see Appendix Table A-5) as the intended major listed on the student's UC application. High school quartiles by SAT score of students within 0.3 GPA points of the ELC threshold. Applicants from high schools with approximated ELC thresholds between 3.96 and 4.00 are omitted.

Source: UC Corporate Student System and National Student Clearinghouse

Table A-1: Caetano (2015) Endogeneity Test Coefficients at 4.0 ELC GPA

	UC Campuses							
	Unimpacted	Absorbing	Dispersing	CSU	Comm. Coll.	CA Priv.	Non-CA Univ.	No Coll.
All	0.18	-0.06	-0.68	-0.23	0.07	0.68	-0.36	0.31
	(0.13)	(0.19)	(0.09)	(0.13)	(0.08)	(0.10)	(0.10)	(0.09)
Bottom	-2.94	1.44	-1.00	0.44	0.50	1.24	0.26	0.03
Quartile	(0.29)	(0.39)	(0.22)	(0.28)	(0.18)	(0.18)	(0.15)	(0.20)

Note: Endogeneity test coefficients estimated by two-step procedure described in Caetano (2015) around a 4.0 ELC GPA on likelihood of attending a university in each group (as in Table 5), with same controls as main specification (indicator for above ELC threshold, polynomial in distance from threshold, polynomial in SAT, gender/ethnicity indicators), for the full sample and for students from the bottom SAT quartile of high schools. Coefficients are normally distributed with standard errors in parentheses; statistical significance rejects the null hypothesis that the outcome is conditionally continuous at GPA 4.0. Coefficients can be interpreted as the bias induced by endogeneity in the running variable at 4.0. Bandwidths are optimally chosen following Calonico, Cattaneo, and Titiunik (2014), and range from 0.08 to 0.11 GPA points. Bottom HS Quartile refers to students from the bottom quartile of high schools by SAT score of students within 0.3 GPA points of the ELC threshold, weighted by number of such students.

Source: UC Corporate Student System and National Student Clearinghouse

Table A-2: Baseline Changes in Intended Major Selection

	Undec.	Art	Hum.	Soc. Sci.	Nat. Sci.	Engin.	Profess.	Bus.	STEM[1]
All	-1.3*	-0.8**	-0.4	1.3	-0.3	0.8	0.3	-1.3*	0.4
Bottom Q[2]	-0.8	-1.1	0.2	2.1	-1.5	-1.9	1.1	0.5	-2.4
Female	-0.4	-0.1	-0.1	1.7	0.4	-1.7**	1.0*	-1.6**	-1.1
URM	-0.4	-0.8	1	4.0*	-1.9	-1.1	0.6	-0.8	-3.8

Note: Beta coefficients from kernel-weighted fuzzy regression discontinuity estimation around the ELC threshold on the likelihood of an applicant's reporting a intended major in each category, with bias-corrected robust standard errors in parentheses (Calonico, Cattaneo, and Titiunik, 2014), overall and by demographic group. Thresholds are at the fourth percentile of specially-calculated ELC GPAs by high school and are approximated by a support vector machine algorithm described in the text. ELC eligibility compliance is imperfect, so estimation is fuzzy. Applicants from high schools with approximated ELC thresholds between 3.96 and 4.00 are omitted. [1]STEM includes all Natural Science and Engineering majors as well as some Professional majors (e.g. Agriculture and Architecture); see US Department of Homeland Security (2016). [2] Restricted to students from bottom-quartile high schools by the SAT scores of UC applicants within 0.3 GPA points of the ELC threshold, weighting schools by the number of such students.

Source: UC Corporate Student System

Table A-3: Change in Characteristics of ELC-Eligible Students' Degree-Providing Universities

		Admission Rate	Average SAT Score	Four-Year Grad. Rate	Six-Year Grad. Rate	% Male in STEM	% Female in STEM	Sticker Price	Net Price
Overall	α	42.5	1842.6	57.7	81.2	32.2	18.8	30,653	13,804
	β	-0.5	14.7	1.4	0.9	1	1.18	-55	124
		(0.41)	(4.04)	(0.46)	(0.27)	(0.36)	(0.27)	(337.34)	(57.99)
		[-7.7]	[208.1]	[19.4]	[13]	[14.2]	[16.8]	[-777.9]	[1,759.4]
Bottom HS	α	51.0	1721.6	48.5	75.1	31.2	17.6	25,465	13,396
Quartile	β	-3.1	42.7	5.2	3.0	3.07	2.55	640	521
		(1.41)	(11.38)	(1.22)	(0.87)	(0.69)	(0.53)	(407.87)	(161.76)
		[-19.2]	[265]	[31.9]	[18.8]	[19]	[15.8]	[3,967.1]	[3,229.2]

Note: Alpha (below-threshold constant intercept) and Beta (treatment) coefficients from kernel-weighted fuzzy regression discontinuity estimation, with bias-corrected robust standard errors for the beta coefficients in parentheses (Calonico, Cattaneo, and Titiunik, 2014). Scaled estimates per new Absorbing UC student (conditional on enrollment or graduation) in brackets. High school quartiles by SAT score of UC applicants within 0.3 GPA points of the ELC threshold. Outcome data from IPEDS and linked to NSC by college name (using a hand-coded crosswalk). The proportion of students who choose STEM fields of study was measured in 2008; all other outcomes are annual by year of initial enrollment (that is, the year following initial application to UC). Average SAT score 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. Average net price as reported for students awarded Title IV financial aid with income between $48,000 and $75,000. Applicants from high schools with approximated ELC thresholds between 3.96 and 4.00 are omitted.

Source: UC Corporate Student System, National Student Clearinghouse, and the Integrated Postsecondary Education Data System (IPEDS)

Table A-4: Age 40 Average Unemployment and Wages by College Attendance and Major Relative to No Higher Education

	Male		Female			Male		Female	
	Unemp.	Income	Unemp.	Income		Unemp.	Income	Unemp.	Income
No College	0.0%	0%	0.0%	0%	Ethnic Studies	-6.1%	90%	-5.8%	78%
Some College	-2.6%	26%	-1.6%	20%	History	-6.5%	91%	-5.1%	74%
Religion	-7.8%	36%	-6.9%	26%	Business	-6.7%	91%	-5.6%	81%
A.A. Degree	-4.4%	41%	-3.8%	41%	Geology	-5.1%	91%	-5.5%	75%
Linguistics	-1.8%	46%	-2.6%	67%	Other Natural Sciences	-8.3%	92%	-5.9%	87%
Art	-4.6%	48%	-4.5%	46%	Marketing	-6.7%	96%	-5.1%	72%
Social Welfare	-6.1%	51%	-7.1%	65%	Public Health	-7.2%	96%	-6.9%	77%
Music	-5.6%	55%	-6.5%	39%	Nursing	-8.6%	97%	-8.7%	105%
Theater	-2.7%	55%	-5.4%	59%	Speech Pathology	-10.0%	99%	-7.7%	85%
Film	-4.7%	60%	-3.3%	62%	Bioengineering	-9.4%	99%	-5.8%	128%
Design	-5.5%	62%	-3.7%	48%	Other Engineering	-7.7%	102%	-7.0%	98%
Education	-8.2%	64%	-7.2%	62%	Computer Science	-6.3%	102%	-4.9%	96%
Creative Writing	-4.3%	66%	-6.1%	45%	Mathematics	-8.0%	104%	-6.7%	87%
Interdisciplinary	-3.3%	68%	-6.1%	73%	Public Policy	-6.6%	105%	-5.4%	90%
Anthropology	-4.5%	70%	-5.9%	62%	Information	-7.8%	105%	-8.2%	93%
Other Social Sciences	-6.7%	70%	-5.6%	55%	International Studies	-5.8%	105%	-6.2%	95%
Geography	-6.1%	71%	-6.7%	71%	Civil Engineering	-7.3%	107%	-5.5%	88%
Other Humanities	-6.4%	71%	-4.7%	61%	Industrial Engineering	-7.1%	107%	-4.2%	76%
Environmental Studies	-4.9%	71%	-5.6%	60%	Accounting	-7.4%	108%	-5.8%	92%
Other Languages	-7.1%	72%	-5.5%	53%	Political Science	-6.5%	108%	-5.1%	97%
Philosophy	-7.1%	73%	-6.5%	69%	Other Health Sciences	-8.8%	108%	-7.6%	93%
Agriculture	-8.2%	74%	-5.6%	65%	Physics	-8.4%	114%	-5.6%	94%
Art History	-6.3%	75%	-3.8%	65%	Electrical Engineering	-7.7%	114%	-5.9%	119%
Architecture	-4.7%	78%	-2.7%	81%	Finance	-6.3%	115%	-5.6%	97%
English	-5.8%	78%	-4.7%	70%	Mechanical Engineering	-7.9%	115%	-6.0%	113%
Journalism	-6.7%	78%	-5.2%	78%	Materials Science	-6.6%	115%	-2.7%	83%
Psychology	-6.3%	78%	-5.9%	69%	Chemistry	-7.5%	116%	-5.8%	108%
Sociology	-6.2%	80%	-5.3%	69%	Biology	-8.1%	119%	-7.1%	102%
Criminology	-7.8%	80%	-5.8%	77%	Chemical Engineering	-7.8%	120%	-8.1%	111%
European Langauges	-8.5%	81%	-5.8%	69%	Economics	-6.8%	121%	-5.3%	98%
Communications	-5.8%	82%	-4.8%	74%	Statistics	-9.2%	125%	-1.1%	77%
Law	-5.6%	85%	-4.9%	81%	Computer Engineering	-8.8%	127%	-6.4%	113%
Nutrition	-10.1%	85%	-6.3%	70%	Biochemistry	-8.6%	132%	-7.4%	135%
Other Professional	-5.6%	86%	-4.0%	68%					

Note: Coefficients from weighted least squares regression of unemployment (conditional on labor market participation) or log wages (conditional on employment) on gender interacted with university major or, if no Bachelor's degree, indicators for an Associate's Degree or any higher education enrollment. Sample of 2009-2013 American Community Survey respondents with high school degrees between ages 38 and 42, inclusive, with sample sizes of 773,376 and 721,523 and R^2 of 0.17 and 0.02 (Ruggles et al., 2018). Regressions control for race, age, and year indicators and are weighted using ACS person-level survey weights. Second majors are omitted. These statistics are used to construct the "Employment Coefficient" and "Income Coefficient" presented in Table 8.

Source: American Community Survey

Table A-5: ELC Impact on Intended Major to Earned Major Transitions

	No Degree	Art	Human.	Soc. Sci.	Nat. Sci.	Engin.	Profess.	Bus.	STEM
Baseline Transition Likelihoods									
Undeclared	16.5	2.8	13.9	25.1	17.1	2.6	9.2	15.8	23.6
Art	19.8	41.7	18.1	13.1	6.1	2.1	5.2	4.5	9.7
Hum.	17.5	3.8	43.3	22.2	4.8	0.6	8.3	4.8	6.7
Soc. Sci.	17.2	1.3	15.7	47.4	8.7	0.8	12.0	6.7	12.2
Nat. Sci.	18.6	0.8	4.6	14.5	42.6	5.8	10.7	6.4	53.4
Engin.	21.9	0.7	2.4	5.1	15.6	47.4	3.5	7.8	63.9
Profess.	16.9	3.0	7.1	19.8	11.0	1.8	32.9	9.8	24.6
Bus.	14.0	0.3	4.3	16.1	9.9	4.4	6.6	49.9	18.0
STEM	20.2	0.7	4.0	11.5	31.3	20.2	8.7	7.0	55.8
ELC Impact on Transitions									
Undeclared	-2.2	0.4	1.4	0.9	-0.4	-0.4	-3.1**	2.0	-0.2
Art	2.9	10.2	5.4	0.2	-3.8	-1.5	-2.4	1.0	-6.1
Hum.	-2.0	-3.4*	11.5***	0.8	-0.7	-0.9	-1.9	-1.0	-1.5
Soc. Sci.	-4.5***	0.0	4.0*	10.7***	-0.2	-0.6	1.6	-4.4**	-0.8
Nat. Sci.	-2.0	-0.1	0.5	1.8*	0.0	-0.8	-0.2	-0.1	-0.7
Engin.	-2.6	0.0	-0.3	0.1	3.2*	-2.0	-0.4	0.3	-0.2
Profess.	-3.6	0.4	-4.3**	-1.3	-1.6	-1.3	5.4*	-0.1	-1.9
Bus.	-0.5	-0.8	-2.3	1.8	-1.5	2.5**	0.9	-1.6	1.3
STEM	-1.9*	0.0	0.1	1.0	-0.1	-0.5	-0.5	0.2	-1.0
ELC Impact on Transitions, Bottom Q.									
Undeclared	-2.1	1.9	4.7	2.8	-3.5	0.8	-3.6	2.6	-0.2
Art	-	-	-	-	-	-	-	-	-
Hum.	1.0	-4.5*	-10.1	1.1	-1.5	-1.0	-3.6	5.6*	-3.0
Soc. Sci.	-8.1	-	-	-	-	-	-	-	-
Nat. Sci.	-4.3	-0.7	1.2	5.2	-0.2	-2.5*	-1.6	-0.6	-4.2
Engin.	-2.6	1.1	-1.5	3.4	0.4	-7.2	0.4	1.1	-6.4
Profess.	-5.1	-3.9	-0.4	5.0	-5.9	-1.3	13.4*	-0.2	-7.5
Bus.	-16.6**	-2.0	-6.1	14.4*	2.5	-2.9	12.4**	-0.8	-2.2
STEM	-4.8	0.0	-0.3	3.9*	-0.1	-4.2**	-1.5	0.8	-6.3**

Note: Alpha (below-threshold baseline intercept) and Beta (treatment) coefficients from kernel-weighted fuzzy regression discontinuity estimation of the likelihood of earning a major in each category (or earning no degree), conditional on reporting a intended major in each category (or reporting an ‘undeclared’ intended major), with bias-corrected robust standard errors for the beta coefficients in parentheses (Calonico, Cattaneo, and Titiunik, 2014). Estimates are not scaled per new Absorbing UC student. Degree attainment measured five years after initial enrollment. Bottom panel shows effects for students from bottom-quartile high schools by the SAT scores of UC applicants within 0.3 GPA points of the ELC threshold, weighting schools by the number of such students. Coefficients omitted if conditional sample too small to estimate robust standard errors. Applicants from high schools with approximated ELC thresholds between 3.96 and 4.00 are omitted.

Source: UC Corporate Student System and National Student Clearinghouse

Table A-6: Impact of ELC Eligibility on Expected Labor Market Outcomes

	Age 30 Averages			Age 40 Averages			Age 50 Averages		
	Unemp.	Income	Fam. Inc.	Unemp.	Income	Fam. Inc.	Unemp.	Income	Fam. Inc.
All	-0.18	1.30	0.74	-0.14	1.41	1.01	-0.08	1.66	0.92
	(-0.06)	(0.58)	(0.41)	(-0.04)	(0.66)	(0.53)	(-0.03)	(0.67)	(0.5)
	[-2.3]	[16.6]	[9.5]	[-1.8]	[18]	[12.9]	[-1]	[21.2]	[11.7]
Male	-0.19	2.47	1.19	-0.17	1.99	1.08	-0.07	2.08	1.41
	(-0.08)	(0.97)	(0.48)	(-0.07)	(1.1)	(0.72)	(-0.06)	(1.12)	(0.79)
	[-2.9]	[37.1]	[17.9]	[-2.6]	[29.9]	[16.2]	[-1.1]	[31.3]	[21.2]
Female	-0.12	0.52	0.36	-0.09	0.41	0.63	-0.07	0.63	0.32
	(-0.07)	(0.77)	(0.57)	(-0.05)	(0.76)	(0.73)	(-0.04)	(0.7)	(0.66)
	[-1.7]	[7.4]	[5.1]	[-1.3]	[5.8]	[8.9]	[-1]	[8.9]	[4.5]
URM	-0.21	2.12	1.13	-0.18	2.29	1.78	-0.17	2.01	1.65
	(-0.13)	(1.3)	(1.12)	(-0.09)	(1.42)	(1.23)	(-0.08)	(1.42)	(1.12)
	[-1.6]	[15.9]	[8.5]	[-1.4]	[17.2]	[13.4]	[-1.3]	[15.1]	[12.4]
High School Quartiles by SAT Score									
First Quartile	-0.38	4.89	2.88	-0.26	4.10	3.73	-0.18	4.05	3.30
	(-0.16)	(1.86)	(1.2)	(-0.11)	(1.89)	(1.65)	(-0.08)	(1.91)	(1.55)
	[-2]	[26.1]	[15.4]	[-1.4]	[21.9]	[19.9]	[-1]	[21.6]	[17.6]
Second Quartile	-0.16	1.30	0.38	-0.15	1.54	1.00	-0.06	1.91	1.13
	(-0.12)	(1.26)	(0.74)	(-0.1)	(1.34)	(1.14)	(-0.08)	(1.24)	(1.08)
	[-1.6]	[12.8]	[3.8]	[-1.5]	[15.2]	[9.9]	[-0.6]	[18.9]	[11.2]

Note: Beta (treatment) coefficients from kernel-weighted fuzzy regression discontinuity estimation, with bias-corrected robust standard errors in parentheses (Calonico, Cattaneo, and Titiunik, 2014). Scaled estimates per new Absorbing UC student (conditional on enrollment or graduation, and by subgroup where appropriate) in brackets. Enrollment measured in fall semester following application. High school quartiles by SAT score of students within 0.3 GPA points of the ELC threshold. Expected unemployment and income levels estimated from respondents of 2009-2013 American Community Survey, matched by gender and college major, Associate's Degree, some college, or no college (omitting respondents without high school degrees; see Appendix Table A-4). ACS respondents within 2 years of the stated age are included in the estimation sample. Applicants from high schools with approximated ELC thresholds between 3.96 and 4.00 are omitted.

Source: UC Corporate Student System, National Student Clearinghouse, and the American Community Survey

Table A-7: Impact of ELC Eligibility on Observed Early-Career Earnings

	Presence in EDD Data (%)				Observed EDD Earnings (100s log pts.)			
Years after HS Grad:	6 Years	7 Years	8 Years	9 Years	6 Years	7 Years	8 Years	9 Years
All	0.22	0.11	-0.4	0.68	1.06	3.85	4.49	-2.37
	(1.04)	(0.84)	(0.88)	(0.88)	(2.66)	(2.76)	(3.06)	(2.7)
	[2.4]	[1.5]	[-5.3]	[9.4]	[11.4]	[54.2]	[59.8]	[-32.6]
Male	0.78	0.26	-0.53	1.62	0.44	0.64	1.03	-12.1
	(1.53)	(1.37)	(1.29)	(1.18)	(4.69)	(5.64)	(5.56)	(6.05)
	[8.6]	[4.8]	[-10.2]	[22.8]	[4.9]	[11.7]	[19.9]	[-170.7]
Female	-0.15	-0.36	-0.16	0.48	0.98	2.95	4.01	-0.02
	(1.31)	(1.19)	(1.09)	(0.98)	(3.33)	(3.23)	(3.32)	(3.37)
	[-1.8]	[-4.6]	[-1.8]	[5.5]	[11.7]	[37.5]	[44.7]	[-0.2]
URM	2.67	-0.81	-2.66	1.55	8.73	6.61	10.59	2.93
	(2.16)	(1.96)	(2.01)	(1.69)	(5.93)	(5.47)	(4.83)	(5.73)
	[19.4]	[-5.5]	[-20.2]	[14.6]	[63.4]	[45.2]	[80.6]	[27.5]
High School Quartiles by SAT Score								
First Quartile	4.11	3.25	2.01	3.65	7.63	3.03	8.66	-4.05
	(1.94)	(1.8)	(2.17)	(1.9)	(5.59)	(4.41)	(6.36)	(5.6)
	[20.3]	[16]	[9.8]	[22.9]	[37.8]	[15]	[42.1]	[-25.4]
Second Quartile	-1.25	0.39	0.21	-0.03	-4.02	11.38	8.35	-1.35
	(2.25)	(2.03)	(1.63)	(1.89)	(5.69)	(4.36)	(6.13)	(6.75)
	[-9.1]	[3.3]	[1.9]	[-0.2]	[-29.2]	[96.4]	[77.1]	[-10.8]
Latest Cohort Included	2011	2010	2009	2008	2011	2010	2009	2008
Sample Size, All	171,558	148,827	127,436	106,044	96,011	82,190	70,613	59,389
Percent Coverage	100%	87%	74%	62%	56%	48%	41%	35%
Percent Coverage, Compliers[1]	100%	85%	74%	58%	56%	47%	41%	32%

Note: Beta (treatment) coefficients from kernel-weighted fuzzy regression discontinuity estimation, with bias-corrected robust standard errors in parentheses (Calonico, Cattaneo, and Titiunik, 2014). Scaled estimates per new Absorbing UC student (conditional on enrollment or graduation, and by subgroup where appropriate) in brackets. EDD Earnings matched by Social Security Number to quarterly earnings covered by California unemployment insurance, which are summed annually. Quarterly wages lower than half-time minimum wage are omitted. Number of years measured relative to high school graduation; more than 6 years out requires dropping recent cohorts (who have not yet earned those earnings). High school quartiles by SAT score of students within 0.3 GPA points of the ELC threshold. Applicants from high schools with approximated ELC thresholds between 3.96 and 4.00 are omitted. [1] Estimated using Equation (3) on annual fixed effects.

Source: UC Corporate Student System and the California Employment Development Department. Reduced-form estimates reproduced from Bleemer (2018b).