Impact of Free Community College: Evidence from Chicago

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November 2025
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As the cost of college continues to rise, free community college has emerged as a strategic policy intervention aimed at improving access to higher education and alleviating the burden of student loans. While free community college offers a potentially lower-cost pathway through college, limiting financial aid exclusively to community colleges might have unintended consequences if it diverts students from attending better-resourced 4-year universities, which typically have higher completion rates. This study examines the impact of the Star Scholarship, a merit-based program in Chicago offering free community college tuition for high school graduates with at least a 3.0 GPA. Using a regression discontinuity design, we find that in the short run, free community college does not affect whether students enroll in college but does affect where they attend college, with a noticeable shift from students starting at 4-year universities after high school to beginning their higher education at community colleges. However, despite this initial diversion, in the long run, there is no evidence that becoming a Star Scholar reduces the probability that a student will eventually enroll in and complete a bachelor's degree at a 4-year university. In fact, we observe positive but imprecise effects on both overall degree completion and 4-year degree completion six years after high school. At the same time, we see a 1.7 percentage point increase in the probability that a student earns a degree from a 2-year institution. Taken together, these findings suggest that, in our context, free community college increases overall degree attainment, without leading students to substitute 2-year degrees for 4-year degrees. We also don't see a decrease in the average quality of the first 4-year university attended nor a decrease in the probability of earning a STEM degree. Students who are likely to be from immigrant families have the greatest probability of taking up the scholarship; this finding highlights a significant gap in support for immigrant students pursuing higher education. This study contributes to our broader understanding of how financial aid design affects economic opportunity for different groups of students, providing valuable insights for policymakers aiming to increase college access and success.

Introduction

Despite the well-documented monetary and non-monetary benefits of higher education (Card, 1999; Oreopoulos and Petronijevic, 2013; Heckman, Humphries and Veramendi, 2018), the rising demand for skilled labor continues to outpace growth in the supply of college-educated workers (Katz and Murphy, 1992; Acemoglu and Autor, 2011; Carnevale and Rose, 2013). Escalating college costs, which play a significant role in shaping students' decisions about whether and where to attend college, deter many students from pursuing higher education and burden others with significant debt, which is especially costly for those who do not complete a degree (Dynarski, 2016).

Recent policy initiatives have sought to address these challenges by expanding financial aid programs, which are critical in influencing both college attendance and completion. However, the design of these programs is crucial. Financial aid systems can be complex and confusing (Bettinger et al., 2012; Dynarski et al., 2021), and often fail to support middle-income and undocumented students who do not qualify for federal aid. College promise programs, which have proliferated in the last decade, aim to simplify financial aid by guaranteeing free college to all eligible students. In this study, we focus on one particular type of promise program that has been gaining traction in recent years: free community college.

There are currently over 30 publicly funded free community college promise programs in the U.S. implemented at the state and local level. (Miller-Adams et al., 2024). President Obama's America's College Promise proposal, which outlined a plan to offer free community college for high performing students across the country, propelled much of the momentum behind this expansion. The federal focus has continued under the Biden administration, which proposed $90 billion to further expand free community college access (U.S. Department of Education, 2024). While community college promise programs have the potential to be a cost-effective way to simplify the financial aid process for a large number of students, limiting promise aid exclusively to community colleges might have unintended consequences if they

divert students from attending higher quality institutions (Cohodes and Goodman, 2014; Goodman, Hurwitz and Smith, 2017; Mountjoy, 2019). However, despite the prevalence of free community college programs across the U.S., there is limited evidence of the causal impact of these programs on students' short- and long-term outcomes.

Prior research on free community college initiatives in Tennessee suggests that such promise programs boost college enrollment and reduce student loans (Carruthers and Fox, 2016; Nguyen, 2020; Gándara and Li, 2020; Odle, Lee and Gentile, 2021). However, the long-term effects on students remain unclear, particularly in terms of degree completion. Most studies have either looked at a degree completion at a subset of colleges or a subset of students. The most robust findings come from Carruthers, Fox and Jepsen (2023), which analyzed the impact of Knox Achieves—the county-level precursor to the Tennessee Promise by comparing students in other counties to students in Knox County before and after Knox Achieves was implemented. This study found a 0.8 percentage point increase in the likelihood of earning an associate degree from a public college in Tennessee, marking a 24% increase from the 3.3 percentage point control mean, and insignificant effects on earning a bachelor's degree attainment from a public 4-year university in Tennessee. However, this paper was unable to measure degree completion for private colleges or colleges outside Tennessee. Bell and Gándara (2021) and Bell (2021) evaluate a merit-based promise program in Tulsa, similar to the one being studied in this paper, which set a high school GPA cutoff of 2.0 for eligibility. Their findings indicate that students who exceeded this GPA threshold demonstrated higher rates of bachelor's degree attainment than community college students who were not eligible. However, these findings may partly reflect changes in the composition of students attending community college before and after the policy was introduced. Depending on the number of students who were diverted from attending a 4-year or induced to enroll in community college because of the free community college promise program, these estimates could be biased upwards or downwards.

Our study examines the Star Scholarship, a merit-based community college promise program launched in the fall of 2014, which enabled any Chicago Public Schools (CPS) graduate with a GPA of at least 3.0 to attend community college in Chicago tuition-free. This study is the first to comprehensively assess the long-term effects of free community college on degree completion across the United States. Furthermore, our focus on an urban setting provides insights into the policy's impact on a diverse population, including students likely to be from immigrant families, contrasting with the rural focus of prior studies. This analysis is enabled by our unique partnership with both the City Colleges of Chicago and Chicago Public Schools, allowing us to create a unique dataset combining detailed administrative data from both institutions for one of the largest school districts in the country. Previous research on the effects of free community college typically utilized difference-in-differences and propensity score matching, comparing similar groups of treated and control students across different geographic regions over time. Our study improves upon these methods by using a regression discontinuity design that offers a more robust identification strategy by comparing similar treated and control students within the same high school. Using this novel dataset and a more rigorous quasi-experimental design, we offer new insights into the impacts of free community college on both short- and long-term educational outcomes, including college enrollment choices, college quality, major selection, persistence, and degree completion.

We find that the Star Scholarship does not increase college enrollment for students near the eligibility cutoff. However, it does shift *where* students enroll. Students who are eligible for the Star Scholarship are 4 percentage points more likely to first enroll in one of Chicago's community colleges and 1.7 percentage points more likely to earn a 2-year degree (Table 4). Notably, these students are also 3 percentage points less likely to initially enroll in a 4-year university. Given the documented influence of college quality on bachelor's degree completion rates (Cohodes and Goodman, 2014; Goodman, Hurwitz and Smith, 2017) and the negative labor market outcomes for students diverted from 4-year colleges (Mountjoy,

2019), these findings raise concerns about the potential unintended consequences of diverting students from better-resourced 4-year universities to community colleges. While 81% of community college students begin with the intention to earn a bachelor's degree, only 33% percent actually transfer up to a 4-year institution within six years (Jenkins and Fink, 2016). Such figures fuel concern about the potential cost of substituting 2-year enrollment for 4-year enrollment. However, we find no evidence that eligibility for the Star Scholar decreases the probability that a student eventually enrolls in a 4-year university and completes their bachelor's degree. When we look 6 years post high school, we find that these students enroll in 4-year institutions at rates that are not significantly different from their comparison group peers. While eligibility for the Star Scholarship decreases the quality of the first college a student enrolls in, we see no significant changes in the quality of the first 4-year a student enrolls in.

We also find an insignificant but positive increase in both 4-year degree attainment and overall degree attainment for students near the eligibility cutoff (Table 4). By comparing high and low GPA high school graduates over time in a difference and differences framework, we find similar effects on degree attainment for students farther from the cutoff (Table 6), though we see some evidence of a changes in trends between high and low GPA students before the policy as well, which lead us to believe that our difference-in-differences results could be overestimated. When we examine degree attainment by degree field, we find that becoming a Star Scholar has the largest impact on whether students earn a health-related 4-year degree and smaller but insignificant changes in other degree fields. Importantly, access to free community college does not decrease the probably of earning a 4-year STEM degree. These findings provide evidence that community college promise programs can increase overall degree attainment without reducing 4-year degree attainment, decreasing the quality of a 4-year institution a student eventually enrolls in, or causing students to switch out of higher paying majors, while likely leaving students with less college debt.

We try to examine the differential effects of free community college for different groups of students, however our results are too noisy to precisely estimate differences. Our estimates suggest that students who persistently qualify for free/reduced priced lunch may have a larger propensity to be diverted from a 4-year institution despite the fact that they likely already qualify for enough federal aid to attend community college for free. This diversion, however, does not result in a decrease in 4-year degree attainment suggesting that diverted students ultimately transfer to a 4-year university or that low-income students who were diverted would not have completed a 4-year degree either way. Students who do not persistently qualify for free/reduced price lunch are less likely to be eligible for federal aid and thus are likely to have been awarded the largest financial aid from the Star scholarship, have potentially larger increases in degree attainment suggesting that there are some middle or higher income students who could benefit from additional financial aid. Finally, using home language as an imperfect proxy for students from immigrant families, we find that these students are twice as likely to take-up the Scholarship conditional on being eligible which highlights a potential gap in financial support for immigrant students pursuing higher education that can be mitigated by free community college policies.

The paper proceeds as follows: Section I describes our context and the Star Scholarship policy in greater detail, Section II describes our data and provides some sample descriptives, Section III outlines our empirical strategy, Section IV describes our findings, Section V discusses the external validity of our findings to students away from the eligibility cutoff, and Section VI concludes.

I Context

The Chicago Public School (CPS) system, one of the largest school districts in the United States, serves over 340,000 students in more than 600 schools. It encompasses a diverse array of educational institutions including neighborhood, magnet, and charter schools, providing a broad spectrum of educational opportunities. The demographic composition of

CPS is diverse. Approximately 47% of the students are Latinx, and about 39% are Black. White students constitute around 9% of the student body, while Asian and other racial groups make up the remaining percentage (Table 1). A significant portion of CPS students come from low-income families. Approximately 60% qualify for free or reduced-price lunch programs every year while in CPS, a key indicator of low socioeconomic status (Domina et al., 2018). To estimate household income, we use median household income from the 2015 American Community Survey 5-Year Estimates at the census block level based on students' home addresses and find that average household income is approximately $44,000 (Table 1). Graduation rates in CPS have historically been low but the district has made significant strides in academic performance in recent years, marked by improvements in both standardized test scores and graduation rates. Most recently, graduation rates were as high as 84%, up from 55.8% in 2010 (Chicago Public Schools, 2024, 2020). However, only about 27% of CPS high school students will earn a college degree within 10 years of their high school graduation (To&Through Project, 2021). These numbers trail national figures; as of 2022, 91% of the population age 25 and older had a high school degree and 47% had completed an associate degree or higher U.S. Census Bureau (2023). This contrast highlights the ongoing need for targeted educational policies and programs within CPS to address the specific needs of its student population and ensure that all students have support they need for their academic development.

City Colleges of Chicago (CCC) is the largest community college system in Illinois and the fourth largest in the nation. CCC has an open enrollment policy and serves over 80,000 students annually at seven colleges and five satellite sites across the city of Chicago.

In Fall of 2014, the city of Chicago launched a promise program called the Star Scholarship, which ensured free CCC tuition for all CPS students who graduate with a minimum GPA of 3.0. The first cohort of students who were eligible for the Star Scholarship were students who graduated in 2015. In addition to the GPA requirement, earlier cohorts of

Star scholars were required to be completion-ready, meaning they needed to place into CCC Math and English courses that are either college-level or developmental courses that are one level below college-level.[1] While the GPA requirement was strict, the completion-ready requirement was easier for students to address post-enrollment. For example, if students with a GPA above 3.0 did not have the test scores to be considered completion-ready, they could take developmental coursework at CCC until they are ready to take completion ready coursework. In April 2022, CCC removed the completion-ready requirement and now only use GPA to determine eligibility for the scholarship. Based on these requirements, an estimated 3,000 out of 20,000 CPS students qualify for the Star Scholarship each year.

A couple years following the introduction of the Star Scholarship, several 4-year institutions established additional scholarships and transfer agreements specifically targeting Star Scholars, with the goal of facilitating smoother transitions between CCC to a 4-year university for students pursuing bachelor's degrees.

Students apply for the Star Scholarship at the same time they apply to attend CCC. Because City Colleges of Chicago are open enrollment, any student who applies for enrollment is admitted. To apply for the Star Scholarships, student only need to check a box on their college application and agree to share their CPS transcripts with CCC. To continue receiving the Star Scholarship, students must maintain a cumulative college GPA of at least 2.0 and must complete the FAFSA or the Alternative Application for Illinois Financial Aid annually. Students are not required to enroll full-time, but they must be enrolled in a degree-seeking pathway to be eligible for the scholarship. The Star Scholarship is available for up to three years post-graduation from CPS. This allows students who delay their enrollment at CCC to still access the scholarship benefits. For example, if a student enrolls at CCC one year after graduating high school, they can still utilize the Star Scholarship for up to two years.

[1]Students can be considered completion ready by earning either (A) a score of 21 or higher on the English and math ACT, (B) a score of 540 or higher on the English SAT and 530 or higher on the math SAT, or (C) the designation of "Completion Ready" on the CCC placement exam. The best score from any of these components (ACT, SAT, or CCC placement exam) will be used to qualify the student.

The Star Scholarship is a last-dollar program designed to cover any remaining tuition costs after applying federal and state aid. Since in-district tuition at City Colleges of Chicago is well below the maximum federal Pell grant amount, most Pell-eligible students can already attend tuition-free. However, the Star Scholarship simplifies the financial aid process, which has been shown to independently increase college enrollment, even without extra financial support Dynarski et al. (2021). High- or middle-income students who do not qualify for federal financial aid would benefit from this policy both through the simplification of the aid process in addition to increased financial aid. Immigrant students, particularly those from families less familiar with the U.S. education system, may find the simplified aid process especially beneficial as it reduces administrative barriers often linked with need-based aid. Furthermore, undocumented immigrant students, who do not qualify for federal aid regardless of income, could see the most significant advantages from this scholarship. This study will specifically explore how the Star Scholarship impacts these distinct student groups, shedding light on its broader implications across different demographics.

II Data and Descriptive Statistics

We construct a novel dataset made possible through a unique partnership with both Chicago Public Schools and City Colleges of Chicago.

Data from Chicago Public Schools includes student demographics (including gender, race, languages spoken at home and student address), high school transcripts and course-taking history (including courses attempted, course grades, and weighted/unweighted GPA), as well as standardized test scores (including SAT and ACT). Data from City Colleges of Chicago includes a flag for whether a student was a Star Scholar in addition to information on degrees earned from CCC. College outcome variables come from CPS's merge of its data on students who graduated from CPS with the National Student Clearinghouse (NSC) database. Using this data, we can observe detailed information on college enrollment spells and degree completion for each student from 2009-2023. We supplement this data with information

on college quality from the Integrated Postsecondary Education Data System (IPEDS), the College Scorecard, and the US Department of Education's Office of Federal Student Aid. National Student Clearinghouse data uses student name and date of birth to match students to their enrollment records. This process involves some error, so we supplement the National Student Clearinghouse data with enrollment and degree records from City Colleges. This allows for a comprehensive analysis of community college attendance at City Colleges. One important limitation of National Student Clearinghouse Data is that it has less coverage of enrollment and degree completion at for-profit private institution than it does for all other colleges. Coverage was over 99 percent in 2011 among public 4-year institutions but only 48 percent at for-profit schools (Dynarski, Hemelt and Hyman, 2015). However, this coverage has been growing substantially over time (up from close to 0% in 1995) and the for-profit sector makes up a small proportion of all post-secondary enrollment. Nevertheless, this limitation could cause us to overestimate increases in enrollment from the Star Scholarship if it causes students to shift from for-profit colleges that don't report to the National Student Clearinghouse to public or non-profit college. If this is true, our results can still be interpreted as the change in enrollment in public and non-profit colleges, which is still of interest to policy-makers given the historically low average quality of for-profit colleges (Deming, Goldin and Katz, 2012; Cellini and Turner, 2019).

Our main sample – which we use for our regression discontinuity – includes all CPS students who graduated between 2015 (the first cohort who had access to the Star Scholarship) and 2020. We supplement this main sample with students who graduated from CPS between 2011-2014 to examine changes in outcomes before and after the policy. Table 1 shows a set of summary statistics. In our main sample, the largest racial group are Latinx students who make up 46.5% of all students at CPS, followed by Black students who make up 38.5%. These two groups make up the vast majority of students at CPS. White students comprise 9.2% and AAPI students make up 5%. The average estimated household income for students is around $44,500 and over 60% of students qualified for free/reduced price

lunch every year we observe them in CPS. Average weighted cumulative high school GPA is 3.2, which means that most students who graduate from CPS are eligible for the Star Scholarship.

One critique of merit-based financial aid is that this type of aid often allocates resources to wealthier students. We explore this concern with the Star Scholarship by analyzing which student groups benefit most from the policy. Figure 2a shows that the proportion of low-income Star Scholars mirrors the proportion of low-income students across Chicago Public Schools (CPS).[2] When examining the proportion of Star Scholars by racial categories we see that Latinx students are over-represented among Star Scholars relative to the CPS population, whereas Black students are underrepresented. Only 19% of Star Scholars are Black (Figure 3a), despite the fact that Black students make up 38.5% percent of the student body in CPS within our sample (Table 1). This underrepresentation appears linked to eligibility and take-up differences. Figure 3a indicates that 70%-80% of White and AAPI students qualify for the Star Scholarship, in contrast to only 40%-50% of Black and Latinx students. Conditional on eligibility, approximately 10-11% of eligible White, AAPI, and Black students become Star Scholars. In contrast, eligible Latinx students more than twice as likely to take up the Star Scholarship, accounting for their over-representation among Star Scholars. There are two reasons why Latinx students are more likely to take up the Star Scholarship. First, they are the group most likely to be low income as measured by proportion of students who qualify for free/reduced price lunch every year (75% for Latinx students as opposed to only 24% for White students as shown in Appendix Table C.3). Second, a non-trivial number of Latinx students in the Chicago public school system who are from immigrant families and therefore face different barriers than other students. Immigrant students, particularly those from families less familiar with the U.S. education system, may find the simplified aid process especially beneficial as it reduces administrative barriers often linked with need-based

[2]We use persistent eligibility for free/reduced-price lunch as an indicator of income, which has been show to be a more reliable measure of low income than whether a student ever qualified for free/reduced price lunch (Domina et al., 2018).

aid. With over a half a million foreign-born residents from over 140 countries speaking over 100 languages, Chicago is a city of immigrants, highlighting the importance of understanding how the Star Scholarship affects immigrant students. Furthermore, in 2018, the City of Chicago estimated that over 19,000 students under age 18 were undocumented, and about 28,000 young adults ages 18-24 were undocumented (City of Chicago, Office of the Mayor, 2018). City Colleges of Chicago also estimated that between 5-15% of their students are undocumented. This is important to note because undocumented immigrant students cannot apply for federal aid such as Pell grants and subsidized loans, and therefore have the greatest potential to benefit from free community college.

We cannot observe which students are from immigrant families nor which students are undocumented, however we use language spoken at home as an imperfect proxy of immigrant status. The take-up rate for students whose home language is not English is twice as high as students whose home language is English (21% vs. 11%) highlighting a potential gap in financial support for this group of students. In Figure 3b, shows that while higher income students are more likely to be eligible for the Star Scholarship, lower income students are more likely to become Star Scholars, conditional on eligibility (19% vs. 13%). This is particularly interesting since low-income students are likely to already qualify for enough federal financial aid to cover the cost of community college. Given the differences in take-up rates, in our analysis we examine whether students in these groups are impacted differently by Star Scholarship eligibility.

Table 2 shows a more comprehensive picture of the average differences between eligible students who chose to become Star Scholars and eligible students who chose not become Star Scholars. Star Scholars have lower family income on average, they are less likely to be Black students but much more likely to be Latinx and more likely to speak Spanish at home. Lastly, eligible students who become Star Scholars have lower GPA and lower SAT scores than eligible students who are not Star Scholars. Taken together, these stylized facts

suggest that many high-income and/or high performing students are not taking up the Star Scholarship even though it is available to them.

III Empirical Strategy

In this section, we describe our empirical strategy for estimating the causal effect of the Star Scholarship on students' college outcomes. Directly comparing the outcomes of students who are eligible with those who are not eligible would confound the true impact of the scholarship, since students with high GPAs are likely to have different college outcomes than students with low GPAs for reasons other than just eligibility for the Star Scholarship. To address this potential bias, we employ a regression discontinuity design, comparing students who are just above and just below the scholarship's GPA eligibility threshold to ensure that the only significant difference between the comparison groups is whether or not they received the scholarship. This method relies on the assumption that students cannot precisely manipulate their GPAs to fall just above or just below the eligibility cutoff, thereby selecting into the treatment group. If students were able to precisely manipulate their GPAs to meet the threshold, the outcomes of those just above the cutoff might differ significantly from those just below who did not manipulate their GPAs to gain access to the scholarship.

One way to test for manipulation of the running variable near the cutoff is to examine whether there is a discontinuous jump in the density of the running variable just above the cutoff. However, because CPS only gives whole letter grades, we see a discontinuous jump in the density of students by construction at the 3.0 cutoff (as well as the 2.0 and 4.0 cutoffs). As shown in Figure 1(a), this heaping is present before and after the policy and thus is more likely a feature of this grading system, which makes whole number GPAs mechanically more common than it is to be a feature of manipulation.

To formally test whether the discontinuity in the density of the running variable is larger after the policy was implemented, we implement a variant of the McCrary density test (McCrary, 2008). To do this we estimates a local linear density estimator by binning the

running variable, counting the proportion of students in each GPA bin, and estimating the change in density at the cutoff by fitting a 4th order polynomial to both sides of the cutoff and estimating the size of the discontinuity at the cutoff. We do this for the distribution of GPAs both before and after the policy. In both cases, we see a significant change in the density at the cutoff, but the size of the discontinuities before and after the policy are not statistically different from each other (Figure 1b). This provides evidence that students are not precisely manipulating their GPA near the cutoff as a result of the policy. However, we do see an overall shift in the over distribution of the running variable consistent with grade inflation and/or an overall increase in effort after the policy was implemented. Appendix Figure B.1 shows average weighted high school GPAs for CPS graduates by graduation year; we see that grades have been increasing over time over the course of our study period.

In addition to the density tests we show in Figure 1, we provide further evidence that students cannot select into treatment by manipulating their running variable by testing for discontinuities in students' observed covariates at the eligibility threshold. To do this, we apply Equation 1 using a set of covariates as the outcome variables. The output of these regressions in shown in Table 3. Students just above the cutoff are equally likely to be Female, Latinx, or have taken an AP course. They also have similar estimated household income and were equally likely to be eligible for free/reduced price lunch every year they were in CPS. However, we do see an increase of 5 points in the average SAT score of students for students just above the cutoff as compared to students just below the cutoff. While this increase is statistically significant, it is small enough that we still believe students who are just above the cutoff are comparable to students who are just below.

This "heaping" of the running variable we see in our context is common in other contexts as well, including infant birth weight Almond et al. (2010) and home sizes (Li et al., 2020). Since heaping points both near and away from our cutoff can introduce bias into our results if students with "heaping" GPAs are systematically different than students with

“non-heaping" GPAs, following Barreca, Lindo and Waddell (2016) we provide an alternative specification in which we drop GPAs that are divisible by 0.25, which are much more common in our data. (For example, we drop students whose GPAs are exactly 3.5 but keep students whose GPAs are 3.51). When we drop “heaping" GPAs, we no longer see a discontinuity at the cutoff (Appendix Figure A.2). Results from this alternative specification can be found in Appendix A.B. However, we use the full sample for our main specification because we don't believe that students with more common GPAs have different outcomes than students with less common GPAs. For example, any students who gets an equal number of A's and C's and any number of B's will have exactly a 3.0 GPA. A student that gets an unequal number of A's and C's will have a less common GPA but is unlikely to systematically differ from a student with a more common GPA in a way that would be related to these students' potential outcomes. We also show estimates using a donut regression discontinuity design in which we drop students who are just above and just below the eligibility cutoff. In both of these alternative specifications, the estimates are similar to our main specification (Figure A.3).

Students can apply for the Star Scholarship at the same time that they apply to enroll at City Colleges of Chicago as part of the same application. Students can choose to apply using either their weighted or unweighted cumulative high school GPA. In most cases, weighted GPA is weakly greater than unweighted GPA, but at CPS there are a few instances of significantly modified courses graded on a 2.0 point scale; this means it is possible (though highly uncommon) for a student's weighted GPA to be lower than their unweighted GPA. We use the maximum of a student's unweighted and weighted cumulative high school GPA as our running variable to account for these cases, but we still refer to our running variable as weighted cumulative high school GPA for simplicity.

To estimate the causal effect of eligibility for the Star Scholarship on college outcomes, we implement a sharp RD specification using local linear regression to estimate linear prob-

ability models of the form:

$$Y_{ijt} = \beta_0 + \beta_1 Star_{ijt} + \beta_2 GPA_{ijt} + \beta_3 GPA_{ijt} \times Star_{ijt} + \delta_t + \gamma_j + \varepsilon_{ijt} \quad (1)$$

Where $Star_{ijt}$ is a binary variable indicating whether a student i who graduated from CPS school j in year t is eligible for the Star Scholarship (e.g. who has a cumulative weighted high school GPA greater than 3.0) and GPA_{ijt} is the running variable described above and centered around 0. γ_j represents high school fixed effects and δ_t represents graduation year fixed effects. In this specification, if all assumptions are met, β_1 identifies the causal effect of being eligible for the Star Scholarship on college outcome Y_{ijt} for students near the eligibility cutoff.

We estimate this local linear regression using a first order polynomial with a triangular kernel, which weights data points near the eligibility threshold more heavily than those far from the threshold. Bandwidths chosen using the MSE optimal bandwidth selection procedure for robust bias-corrected RD analysis described in Calonico, Cattaneo and Farrell (2020), which trades off precision for bias generated by deviations from linearity away from the threshold. Controls include CPS graduation year and high school fixed effects. Following Calonico, Cattaneo and Titiunik (2014a), we use robust bias-corrected standard errors clustered at the CPS high school level to account for within school correlations in the error term ε_{ijt}. Our results are robust to different specifications (In Appendix Section A we present results from alternative RD specifications which show similar findings to our main specification).

IV Results

IV.A Regression Discontinuity Results

In Figure 6 we visualize the effect of Star Scholarship eligibility on students' college enrollment decisions. We find that eligibility for the Star Scholarship did not increase overall college enrollment for students near the eligibility cutoff (Table 4). This result contrasts with

previous research, which finds that eligibility for free community college increases college enrollment (Carruthers and Fox, 2016; Nguyen, 2020). One reason why our finding may differ is due to the local nature of the RD estimate. Given the positive correlation between high school GPA and college enrollment, students with higher GPAs might be less likely to change their enrollment decisions in response to the Star Scholarship. It is possible that if students with lower GPAs were offered free community college, their college enrollment may increase.

However, while we do not see an impact on *whether* students enroll in college, the Star Scholarship does impact *where* students enroll. Specifically, eligibility for the Star Scholarship increases the probability that the first college that a student enrolls in is one of the City Colleges of Chicago by 4 percentage points and decreases the probability that the first college a student enrolls in will be a 4-year university by 3 percentage points (Table 4).

This shift in enrollment from 4-year universities to 2-year colleges could potentially be concerning if it is causing students to enroll in "lower-quality" institutions – where quality is measured by a variety of dimensions including instructional expenditures, median earnings of graduates, completion rates, and repayment rates of students who took out loans – since 2-year colleges generally score lower on these quality dimensions. To test whether eligibility for the Star Scholarship decreases the "quality" of the first college a student enrolls in, we estimate the difference in regression discontinuities before and after the policy for several measures of college quality at the Star Scholarship eligibility cutoff. We use a difference in regression discontinuity design instead of the traditional regression discontinuity design used in our main specification because we observed some small differences in quality of the first college students attended for students just above the cutoff versus just below the cutoff (Appendix Table C.4). This is likely because some colleges have GPA cutoffs for admission which will sort students just above the cutoff into slightly different types of colleges.

We find that eligibility for free community college causes a noisy but consistent de-

creases in the quality of the first college a student enrolls across all measures of college quality, suggesting that students first enroll in a college with fewer resources per student as a result of the Star Scholarship (Figure 7a).[3] This finding is consistent with Cohodes and Goodman (2014) who find that students are willing to forgo college quality for small increases in financial aid. However, even though we find a decrease in the quality of the first college a student enrolls in, this decrease in quality does not translate into lower degree completion rates. We see large increases in 2-year degree attainment as a result of the scholarship. In particular, we find that eligibility for the Star Scholarship increases a student's probability of earning a degree from a 2-year institution within three years of high school by 1.7 percentage points (Table 4). This represents a 33% increase from a 5 percent control mean. However, this increase in 2-year degree completion could be making students worse off if they are substituting 2-year degrees for 4-year degrees as a result of being diverted from first enrolling in a 4-year institution.

Despite students' initial diversion from enrolling in a 4-year institution, we find that eligibility for the Star Scholarship does not decrease the probability that students eventually enroll in a 4-year institution and complete a 4-year degree within 6 years of high school (Table 4). In fact, we see a non-significant but similarly sized increase in 4-year degree attainment than we do for 2-year degree attainment. We show similar patterns when we focus on the effect of earning specifically an associate degree or a bachelor's degree as well as the earning any degree (Table C.6).[4] We also estimate the change in the quality of the first 4-year college a student enrolls resulting from eligibility for the Star Scholarship and do not see the same consistent decrease in college quality measures that we see with the quality of the first college that students enroll in. This means that students who are diverted from

[3]It is important to note that many for-profit colleges, which are often low quality do not report to National Student Clearinghouse. If the policy induces students to switch from a low-quality for-profit to CCC after the policy, we will overestimate the decrease in college quality measures resulting from the Star Scholarship.

[4]Not all schools provide information on the type of degree earned so the impact on associate or bachelor's degree completion will be overestimated if the Star Scholarship changes the likelihood that a student enrolls in college that reports degree information.

a 4-year are not being diverted from high quality institutions and/or transferring to lower quality institutions after attending community college as a result of the policy (Figure 7a).

Taken together, these results suggest that eligibility for the Star Scholarship increases overall degree attainment, without leading students to substitute 2-year degrees for 4-year degrees or sacrificing on quality of 4-year universities. These findings are striking in the context of previous research, which finds that diverting marginal students from a 4-year to 2-year college has a negative impact on the probability of earning a 4-year degree (Goodman, Hurwitz and Smith, 2017; Mountjoy, 2019). It may be the case the attending a public community college for free in a state with transfer pathways between public community colleges and 4-year universities may not hurt student's chances of earning a bachelor's degree. Given our findings, it is possible that students who would have attended a 4-year college but not completed a bachelor's degree are better off on average by directly enrolling in community college and earning an associate degree. For example, students may graduate with less debt and students who are in danger of enrolling but not earning a degree may also get better support if they need to take remedial coursework or need more flexible course offerings (e.g. night classes).

To provide evidence that the effect of being just above the cutoff can be fully attributed to the change in eligibility for the Star Scholarship and not because there are other things changing for students at that cutoff, we estimate effect of being just above the 3.0 eligibility cutoff on students whose last year in CPS was between 2011-2014, which is before the Star Scholarship was implemented. We find no discontinuous changes in overall college enrollment, 4-year enrollment, and degree completion for students who were just above the cutoff in pre-policy years (Table 5). In Appendix Figure A.1, we also show that our results are robust to a range of alternative bandwidth specifications. In Appendix Figure A.3, we show that our findings are robust to different RD specifications including a donut regression discontinuity and dropping heaping values in the running variable.

IV.B Degree Completion by Field

Two prevailing theories explain why students who start at a 2-year institution with the intention of earning a bachelor's degree often do not transfer to complete their bachelor's degrees. The first is credit losses or other academic barriers and the second is that students who are diverted might end up getting a technical/professional degree such as cosmetology, welding, etc, instead of continuing down a bachelor's degree path (Monaghan and Attewell, 2015). This could either be due to the selection of the type of student who first enrolls in a 2-year college instead of a 4-year or this could be due to the availability of coursework or the focus on different majors by other students at faculty at a 2-year institution. In this analysis, we want to know whether becoming a Star Scholar has an effect on the type of degree you earn, either through a change in peers or through a change in courses and majors offered.

To answer this question, we look at the effect of becoming a Star Scholar on degree completion by field. Our analysis faces two limitations. First, we only observe a student's major if they complete their degree.[5] The second limitation is that we can only observe degree field for about 80% of degrees earned in our data. The types of schools that provide degree information are likely to be different than the types of schools that don't. CCC does provide degree titles to National Student Clearinghouse, so we could be overestimating the effect of a type of degree earned if the Star Scholarship induces students who would have otherwise enrolled in a college that did not report degrees. However, in this exercise, we are less interested in the absolute magnitude of the effects than we are the relative impacts across majors. All the same, these results should be viewed as exploratory in nature.

We show our results in Figure 7b; the increases in 2-year degree attainment as a result of eligibility for the Star Scholarship are not concentrated in any one field, but are spread out among Health, Human Services, Humanities/Social Science, and General Education, though

[5]Note that a student can earn more than one degree within our sample.

none of these increases are statistically significant.

We also show estimates for the effect of eligibility for the Star Scholarship on earning a 4-year degree in specific field. Our results indicate increases in Health and Human Services 4-year degrees, with minimal and statistically insignificant effects on other 4-year degree fields. This aligns with the fact that we found positive but noisy increases in Health, Human Services, and General Education 2-year degrees. Notably, eligibility for the Star Scholarship does not decrease the probability that students will earn a STEM 4-year degree. These findings suggest that the Star Scholarship does not significantly alter the types of bachelor's degrees students pursue, but it does seem to increase the number of students obtaining 4-year degrees in Health and Human Services (such as education related degrees).

IV.C Heterogeneity

Our results show that on average, students near the cutoff do not enroll in college more but are more likely to earn a 2-year degree and earn 4-year degrees at similar or slightly higher rates. However, different groups of students may be impacted differently by this policy. There are two dimensions on which we want to test for differences. The first is income. While low-income students might in theory be more sensitive to increases in financial aid, the Star Scholarship is last-dollar, which means that students federal grants are applied first. Given that the cost of tuition at City Colleges is lower than the average Pell grant awarded to students who attend, low-income students are likely to not receive any additional financial aid from the scholarship. However, research has shown that not all students are aware of the aid they would receive if they were to apply to college and policies that simplify the aid process can have large effects (Dynarski et al., 2021). By examining the impact of the policy on low and middle/high income students separately, we can disentangle the impact of simplifying aid to community college from the impact of both simplifying and proving financial assistance to cover the cost of tuition at community college. However, we find no significant differences on impact of eligibility for the Star Scholarship between low

or middle/high income students (Figure 9a) though we do see noisy but larger increases in college degree completion for middle/high-income students who become Star Scholars. This may be because they are eligible for less federal financial aid than low-income students and as a result, the Star Scholarship may provide a much larger financial benefit. Note that while we are calling students who did not receive free/reduced price lunch every year "middle/high" income because they likely have higher income relative to students who did qualify for free and reduced price lunch every year, but this does not mean they are high-income relative to the income distribution in the United States. They are more likely to be middle income students who none the less still qualify for less financial aid than low-income students.

We also examine the differential impact of the Star Scholarship on student groups that are more likely to be from immigrant families than the general population of CPS students. Students from immigrant families might be more sensitive to policies which simplify financial aid since their families may be less familiar with the higher education system within the United States. Undocumented immigrant students are ineligible for federal student aid so may be more sensitive to increases in financial aid. In Figure 9b, we again do not see significant differences on the effect of the Star Scholarship between these two groups of students. This could be because our proxy for students from immigrant families is too noisy or because we are underpowered to detect differences given our sample of students. Though insignificant, we see a slightly larger probability of enrolling in any college and a smaller probably of being diverted from a 4-year institution as result of Star eligibility for students likely to be from immigrant families than we see for other students. This may be because immigrant students already had low 4-year enrollment rates and were were unlikely to have first attended a 4-year institution with or without access to the Star Scholarship. However, the Star Scholarship allows them to attend community college for free and presumably graduate with less debt.

V External Validity and Students Away from the Cutoff

While regression discontinuity designs provide strong evidence on the impact of the policy on student outcomes, note that the results presented above are only for students near the cutoff. Since students farther away from the cutoff might be impacted very differently that students near the cutoff, our regression discontinuity results might not reflect the true effect of the policy for all students. We address this in two ways. First, Figure 4 illustrates that the concentration of students near the eligibility cutoff is significantly higher than those farther from it, with students closer to the cutoff being more likely to participate in the policy. Consequently, this group forms the majority of the affected population, suggesting that our regression discontinuity (RD) estimates are representative of the effects experienced by most Star Scholars. Second, while the RD approach may accurately reflect the causal impact for the majority, we still want to know how the Star Scholarship affects all students, including those far from the cutoff. Since the RD design does not extend to students far from the cutoff, we will employ a difference-in-differences (DiD) strategy to estimate the scholarship's impact on college degree attainment for the broader CPS population.

In Figure 10, we plot the probability that a student enrolls in college, earns a 4-year degree, or 2-year degree over time by GPA groups. Most notably, after the Star Scholarship was implemented, we see a large jump in the probability that a student with a 3.0 GPA or higher earns a 2-year degree (Figure 10b). We don't see a similar increase for students who have a GPA less than 3.0. We see a similar, though smaller, divergence in these two groups for college enrollment and 4-year degree attainment (Figures 10c and 10a).

However, for all three outcomes, we start to see a small divergence in the year before the policy. This could imply that these two groups did not have similar trends in pre-policy enrollment leading to an overestimate of the effect of the policy on college enrollment when using a difference-in-differences strategy for this outcome. Or we could be picking up some spillover effects on the previous cohort who could not benefit from the Stat Scholarship but

might benefit from their higher-GPA peers attending community college at higher rates. If there are spillover effects, then we would underestimate the effect of the policy over time on higher-GPA students. Either way, the difference-in-differences estimates should be interpreted with these caveats in mind.

An additional threat to the parallel trends assumptions is that average GPA is increasing over time (Appendix Figure B.1), whether due to grade inflation, increased student effort, or both, this means that the population of students who have a GPA greater than 3.0 is changing over time. Also, if students who would benefit from the Star Scholarship are more likely to increase their effort in high school, then there could be greater selection into students who are eligible. This concern is greater for students who graduated in later years than it is for students who learned about the Star Scholarship while they were still in high school and had less time to affect their GPA. Both these concerns could potentially lead to overestimated effects of the Star Scholarship, necessitating careful consideration when interpreting results from the DiD analysis.

We formalize our difference-in-differences strategy using the following equation:

$$(2) \qquad Y_{ijt} = \tau \left(Post_t \times Eligible_i \right) + \beta_0 Eligible_i + \beta_1 GPA_i + \beta_2 GPA_i^2 + \delta_t + \gamma_j + \varepsilon_{ijt}$$

Where $Eligible_i$ is a binary variable indicating whether a student i has a GPA ≥ 3.0 and would therefore be eligible for the Star Scholarship were it to be available. $Post_t$ is a dummy variable indicating whether a student graduated after the policy was implemented. GPA_i represents a student's weighted cumulative high school GPA, which we control for. δ_t represents graduation year fixed effects and γ_j represents high school fixed effects. In this specification, τ identifies the causal effect of being eligible for the Star Scholarship on college outcomes Y_{ijt}.

Results from this specification can be found in the odd columns of Table 6. Using students with a GPA of at least 2.5 but less than 3.0 as a control group, we find that on

average, eligibility for the Star Scholarship increases the probability of earning a 2-year degree by 3.7 percentage points and has no effect on 4-year degree attainment. We also examine the differential impact of Star eligibility by GPA categories. We also see a 3.3 percentage point increase college enrollment, though we believe this is likely overestimated as discussed above.

We also want to estimate the effect of the policy separately for students in different eligible GPA groups. In particular, we want to look at students who are very close to the cutoff so we can compare out difference and differences estimates to our regression discontinuity estimates for students near the cutoff. We also want to examine students farther from the cutoff to see if they are affected differently. To do this, we split students into three eligible GPA groups $g \in G$ where $G = \{[3.0, 3.1),\ [3.1, 4.0),\ [4.0, 6.0]\}$. We then estimate the following equation:

$$(3)\ Y_{ijt} = \sum_{g \in G} \tau_g \left(Post_t \times Eligible_{ig}\right) + \sum_{g \in G} \left(\beta_g Eligible_{ig}\right) + \alpha_1 GPA_i + \alpha_2 GPA_i^2 + \delta_t + \gamma_j + \varepsilon_{ijt}$$

In this specification, τ identifies the causal effect of being eligible for the Star Scholarship on college outcomes Y_{ijt} for students with an eligible GPA that falls in g. Results from this specification can be found in the even columns of Table 6. Both our RD and DiD strategies find that Star eligibility increases the likelihood of earning a 2-year degree for students near the eligibility cutoff. Our RD estimates suggest a 1.7 percentage point change and our DiD estimate suggest a 1.8 percentage point change. Students farther away from the cutoff have a larger increase in the probability of earning a 2-year degree, but no significant effect on the probability of earning a 4-year degree. Overall, students near the cutoff seem to have a larger impact on enrollment. You can see the estimated difference in these groups over time in Appendix Figures B.3 and B.4. We use students with a GPA above 2.5 but below 3.0 as a control group because they have some more similar parallel trends to students above 3.0. We find similar estimates when including all students and not just students with a GPA

above 2.5 as shown in Appendix Table C.11.

VI Discussion

Existing research indicates that free community college programs tend to divert students from initially enrolling in 4-year universities, which could potentially decrease their overall degree completion. Our study, leveraging rich administrative data from City Colleges of Chicago and Chicago Public Schools and employing a more rigorous identification strategy, corroborates these findings within the Chicago context. We find that while free community college doesn't influence overall college enrollment, it does affect institutional choice, shifting students from 4-year universities to community colleges in the short-run. At first glance, these short-term effects might suggest that free community college is not an efficient or effective design for financial aid programs. However, examining longer-term outcomes provides a different perspective. Despite the initial diversion, we observe no reduction in 4-year degree completion in the long-run. On the contrary, we detect a positive but imprecise effect on both overall degree attainment and 4-year degree completion, along with significant increases in 2-year degree completion. These findings contradict previous work, which implies that students who are diverted from immediate enrollment in a 4-year university are usually worse off in terms of degree attainment.

There are several mechanisms through which the Star Scholarship can affect college enrollment and completion. First, it provides increased financial aid, directly reducing the cost barrier for college attendance. Second, by offering free college to all eligible students, the scholarship potentially shifts the college-going culture within schools. This cultural shift may stem from heightened aspirations among peers and reduced racial disparities in educational expectations set by teachers and counselors. Additionally, the implementation of the Star Scholarship has fostered enhanced cooperation between schools and higher education institutions. Following its introduction, many 4-year institutions established additional scholarships and transfer agreements specifically targeting Star Scholars from City Colleges

of Chicago (CCC), facilitating smoother transitions for students pursuing bachelor's degrees. This bolstered support likely contributes to the observed increase in bachelor's degree completion among certain student groups under the policy.

Given that most students who qualify for need-based federal aid can already attend community college for free, our findings suggest that offering a free community college broadly has additional advantages above only targeting aid to low-income students. This could be because the barriers to access targeted aid are too high for some students or because there are many students who are not eligible for need-based aid, but still struggle to afford college. These students are often hard to reach with traditional financial aid strategies, and offering a last-dollar free community college scholarship presents an effective, low-cost method to increase overall degree completion when offered in addition to need-based aid that can be used at any college.

While these findings are encouraging when it comes to free community college as a cost-effective tool to increase economic opportunity, it is important to highlight the limitations of this work both for internal and external validity. First, this analysis can only highlight the effect of free community college for students with above-average high school GPA. We don't know how students with low GPAs are affected, but it is likely that this group of students have larger increases in overall college enrollment and degree completion. Second, as discussed above, several 4-year universities created their own institutional scholarships and transfer pathways for Star Scholars in response to the Star Scholarship; we might not observe similar effects of bachelor's degree attainments in a different setting in the absence of this response. Third, we have fewer cohorts of students for whom we can observe 4-year degree attainment within 6 years of high school than students for whom we can observe 2-year degree attainment within 3 years of high school. For this reason, our estimates on the impact of free community college on associate degree attainment are more precise. While most of our estimates of the impact of bachelor's degree attainment are pos-

itive but insignificant, we cannot rule out either zero or small negative effects for bachelor's degree attainment. Finally, while we find positive impacts on college degree completion, we don't know how student loans and labor market outcomes are affected. This is an important avenue for future research.

This study adds to the ongoing debate about whether merit-based community college scholarships provide a cost-effective route through higher education or serve as a costly diversion that diminishes the likelihood of completing a 4-year degree. We find that, on average, students with high academic merit benefit from having the option to attend community college for free. Specifically, we find that the marginal student in our setting who has access to a 4-year university but chooses to enroll in community college instead is not worse off on average in terms of degree completion and likely leaves college with less debt.

VII Exhibits

VII.A Tables

TABLE 1
Summary Statistics

	All CPS Graduates		Post-Policy CPS Graduates	
	N	Mean	N	Mean
Female	226,045	0.53	138,197	0.53
Black	225,841	0.41	138,061	0.39
White	225,841	0.09	138,061	0.09
Latinx	225,841	0.44	138,061	0.46
AAPI	225,841	0.04	138,061	0.04
Spanish Spoken at Home	226,037	0.36	138,191	0.37
English Spoken at Home	226,037	0.56	138,191	0.55
Ever Failed a Course	186,478	0.49	110,605	0.44
Qualified for Free/Reduced Price Lunch Every Year	226,045	0.66	138,197	0.66
Household Income	222,722	$43,984	136,212	$44,353
Ever Homeless	226,045	0.13	138,197	0.15
Weighted Cumulative High School GPA	170,213	3.00	98,214	3.13
Took an AP Course	186,478	0.52	110,605	0.54
SAT Score	214,728	960.55	130,665	969.21
Completion Ready	198,657	0.56	114,509	0.69
Total Number	226,045	-	138,197	-

Note: Mean of student demographics for all CPS graduates includes students who graduated from CPS between 2011 and 2020. Post-policy CPS graduates includes all students who graduated between 2015-2020, after the Star Scholarship was implemented. Household income is estimated using median income of the census block where the student resides at time of graduation from the American Community Survey 2015 5-year estimates. Completion ready indicates whether a student had either a score of 21+ on the English and math ACT or a score of 540 or higher on the English SAT and 530 or higher on the math SAT.

TABLE 2
Demographics of Eligible, Star Eligible Students and Star Scholars

	N	Star Eligible	Star Scholar	Difference
Female	50,960	0.61	0.63	0.019**
Black	50,896	0.30	0.18	-0.125***
White	50,896	0.15	0.09	-0.066***
Latinx	50,896	0.44	0.67	0.228***
AAPI	50,896	0.08	0.05	-0.029***
Spanish Spoken at Home	50,959	0.35	0.56	0.211***
English Spoken at Home	50,959	0.51	0.33	-0.178***
Ever Failed a Course	50,938	0.16	0.21	0.048***
Free/Reduced Price Lunch Every Year	50,960	0.58	0.68	0.098***
Household Income	50,308	$48,633	$45,966	-$2,666**
Ever Homeless	50,960	0.08	0.06	-0.013**
Weighted Cumulative High School GPA	50,960	3.95	3.72	-0.235***
Took an AP Course	50,938	0.76	0.74	-0.021
SAT Score	49,176	1,063.52	1,003.81	-59.711***
Completion Ready	46,429	0.83	0.81	-0.021*

Note: The sample of star eligible consists of all students who graduated between 2015-2020 and had a high school transcript with a weighted cumulative high school GPA of at least 3.0. The sample of star scholar students includes all Star eligible students who became Star Scholars. Household income is estimated using median income of the census block where the student resides at time of graduation from the American Community Survey 2015 5-year estimates. Completion ready indicates whether a student had either a score of 21+ on the English and math ACT or a score of 540 or higher on the English SAT and 530 or higher on the math SAT. The estimated difference between the demographic means of these two groups and their standard error is calculated by regressing a dummy variable indicating whether a student is a Star Scholar on each demographic variable using the sample of all eligible students. *p<0.1; **p<0.05; ***p<0.01

TABLE 3
Estimated Discontinuities in Covariates at the Star Scholarship Eligibility Cutoff

	SAT Total	Female	Latinx	AP Course	FRPL Every Year	Household Income
	(1)	(2)	(3)	(4)	(5)	(6)
RD Estimate	5.545*	0.019	0.010	0.001	0.0129	96.584
P-value	0.053	0.124	0.184	0.881	0.197	0.832
MSE-Optimal Bandwidth	[2.56, 3.44]	[2.59, 3.6]	[2.53, 3.42]	[2.51, 3.53]	[2.49, 3.51]	[2.52, 3.53]
Sample Size	28,510	34,013	30,604	34,660	34,774	34,173
Controls						
CPS Grad Year	X	X	X	X	X	X
CPS High School	X	X	X	X	X	X

Note: This figure shows the estimated discontinuity in student demographics for students just above the 3.0 GPA Star Scholarship eligibility cutoff. This discontinuity is estimated using Equation 1. We use a first order polynomial with a triangular kernel. Bandwidths chosen using the MSE optimal bandwidth selection procedure for robust bias-corrected RD analysis described in Calonico, Cattaneo and Farrell (2020). Controls include CPS graduation year and high school fixed effects. Following Calonico, Cattaneo and Titiunik (2014a), we use robust bias-corrected standard errors clustered at the CPS high school level. Household income is estimated using median income of the census block where the student resides at time of graduation from the American Community Survey 2015 5-year estimates. *p<0.1; **p<0.05; ***p<0.01

TABLE 4
RD Estimates of the Effect of Star Eligibility on College Enrollment and Completion

(a) Immediate College Enrollment

	Enrolled Within 3 Years (1)	Enrolled First CCC (2)	Enrolled First 4-Year (3)
RD Estimate	-0.003	0.042***	-0.031**
P-value	0.587	0.003	0.033
MSE-Optimal Bandwidth	[2.57, 3.53]	[2.49, 3.54]	[2.6, 3.67]
Sample Size	32,307	26,101	26,750
Controls			
CPS Grad Year	X	X	X
CPS High School	X	X	X

(b) Long-term College Enrollment and College Completion

	Enrolled 4-Year Within 6 Years (1)	Earned 2-Year Degree Within 3 Years (2)	Earned 4-Year Degree Within 6 Years (3)
RD Estimate	-0.009	0.017***	0.015
P-value	0.390	0.006	0.146
MSE-Optimal Bandwidth	[2.5, 3.54]	[2.38, 3.37]	[2.46, 3.46]
Sample Size	18,445	34,556	17,875
Controls			
CPS Grad Year	X	X	X
CPS High School	X	X	X

Note: This figure shows the estimated discontinuity in college enrollment and college completion for students just above the 3.0 GPA Star Scholarship eligibility cutoff. This discontinuity is estimated using Equation 1. We use a first order polynomial with a triangular kernel. Bandwidths chosen using the MSE optimal bandwidth selection procedure for robust bias-corrected RD analysis described in Calonico, Cattaneo and Farrell (2020). Controls include CPS graduation year and high school fixed effects. Following Calonico, Cattaneo and Titiunik (2014a), we use robust bias-corrected standard errors clustered at the CPS high school level. *p<0.1; **p<0.05; ***p<0.01

TABLE 5
Pre-Policy RD Estimates on College Enrollment and Completion

	Enrolled Within 3 Years (1)	Enrolled 4-Year Within 6 Years (2)	Earned 2-Year Degree Within 3 Years (3)	Earned 4-Year Degree Within 6 Years (4)
RD Estimate	-0.001	0.015	0.004	-0.006
P-value	0.909	0.208	0.658	0.484
MSE-Optimal Bandwidth	[2.52, 3.55]	[2.62, 3.49]	[2.45, 3.45]	[2.53, 3.41]
Sample Size	24,436	20,372	24,394	21,472
Controls				
CPS Grad Year	X	X	X	X
CPS High School	X	X	X	X

Note: This figure shows the estimated discontinuity in college enrollment and college completion for students just above the 3.0 GPA Star Scholarship eligibility cutoff who graduated between 2011 and 2014 before the policy was implemented. This difference is estimated using Equation 1. We use a first order polynomial with a triangular kernel. Bandwidths chosen using the MSE optimal bandwidth selection procedure for robust bias-corrected RD analysis described in Calonico, Cattaneo and Farrell (2020). Controls include CPS graduation year and high school fixed effects. Following Calonico, Cattaneo and Titiunik (2014a), we use robust bias-corrected standard errors clustered at the CPS high school level. *p<0.1; **p<0.05; ***p<0.01

TABLE 6
Difference and Difference Estimates of Star Eligibility on College Completion
Using All Students with GPA $\in [2.5, 3.0)$ as a Control Group

	Enrolled Within 3 Years		Earned 2-Year Degree Within 3 Years		Earned 4-Year Degree Within 6 Years	
	(1)	(2)	(3)	(4)	(5)	(6)
Post-Policy × GPA $\geq$ 3.0	0.033***		0.037***		0.0010	
	(0.009)		(0.005)		(0.009)	
Post-Policy × GPA $\in [3.0, 3.1)$		0.040***		0.018**		0.010
		(0.013)		(0.008)		(0.012)
Post-Policy × GPA $\in [3.1, 4.0)$		0.030***		0.040***		-0.007
		(0.008)		(0.005)		(0.010)
Post-Policy × GPA $\in [4.0, 6.0]$		0.035***		0.036***		0.011
		(0.011)		(0.008)		(0.011)
Weighted High School GPA	0.460***	0.460***	0.224***	0.202***	0.367***	0.360***
	(0.034)	(0.036)	(0.026)	(0.028)	(0.052)	(0.050)
Weighted High School GPA^2	-0.050***	-0.050***	-0.031***	-0.027***	-0.007	-0.011*
	(0.004)	(0.004)	(0.003)	(0.003)	(0.007)	(0.007)
Fixed Effects						
CPS Grad Year	Yes	Yes	Yes	Yes	Yes	Yes
CPS High School	Yes	Yes	Yes	Yes	Yes	Yes
GPA $\geq$ 3.0	Yes	No	Yes	No	Yes	Yes
GPA $\in [3.0, 3.1)$	No	Yes	No	Yes	No	Yes
GPA $\in [3.1, 4.0)$	No	Yes	No	Yes	No	Yes
GPA $\in [4.0, 6.0]$	No	Yes	No	Yes	No	Yes
Observations	78,419	78,419	78,419	78,419	78,402	78,402
R^2	0.14321	0.14323	0.02818	0.02848	0.34885	0.34951
Within R^2	0.00989	0.00436	0.00383	0.00250	0.11339	0.02799

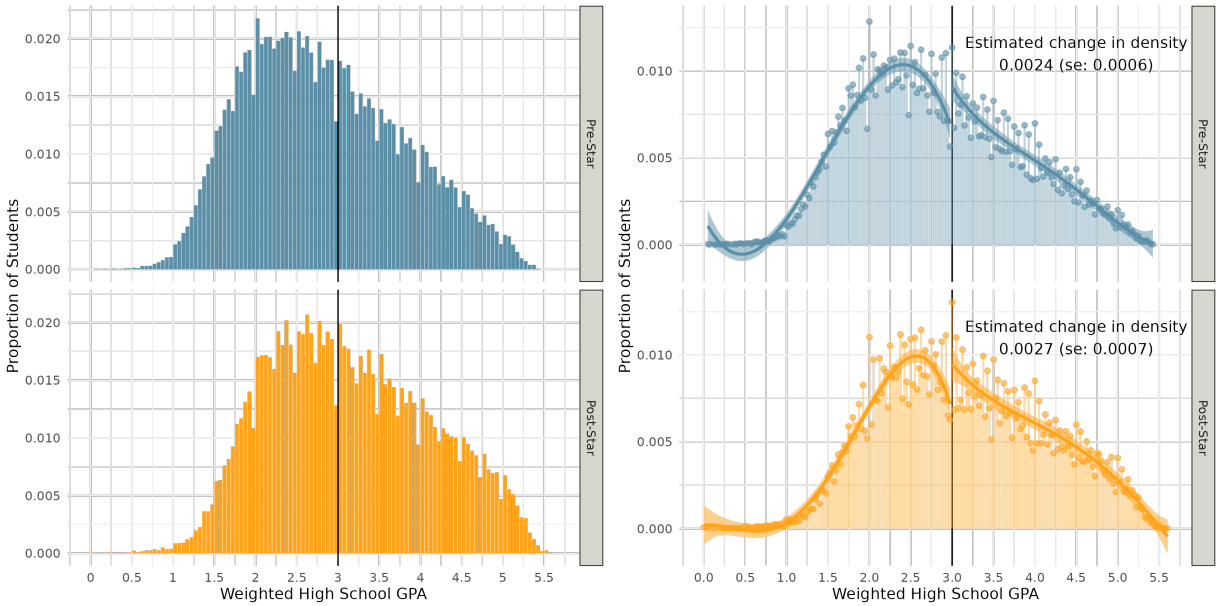
Note: This figure shows the difference in differences estimates of the effect of the Star Scholarship on college enrollment and completion estimated using Equations 2 and 3. The dependent variable in the first two columns is whether or not a student enrolled in college within 3-years of graduating high school. The dependent variable in columns (3)-(4) is whether or not a student earned a degree from a 2-year institution within 3 years of graduating high school. The dependent variable in columns (5)-(6) is whether or not a student earned a degree from a 4-year institution within 6 years of graduating high school. Students in the control group have a GPA $\in [2.5, 3.0)$. Standard-errors in parentheses clustered at the CPS high school level. *p<0.1; **p<0.05; ***p<0.01

VII.B Figures

FIGURE 1
Distribution of GPAs Around the Cutoff

(a) Histogram of Running Variable

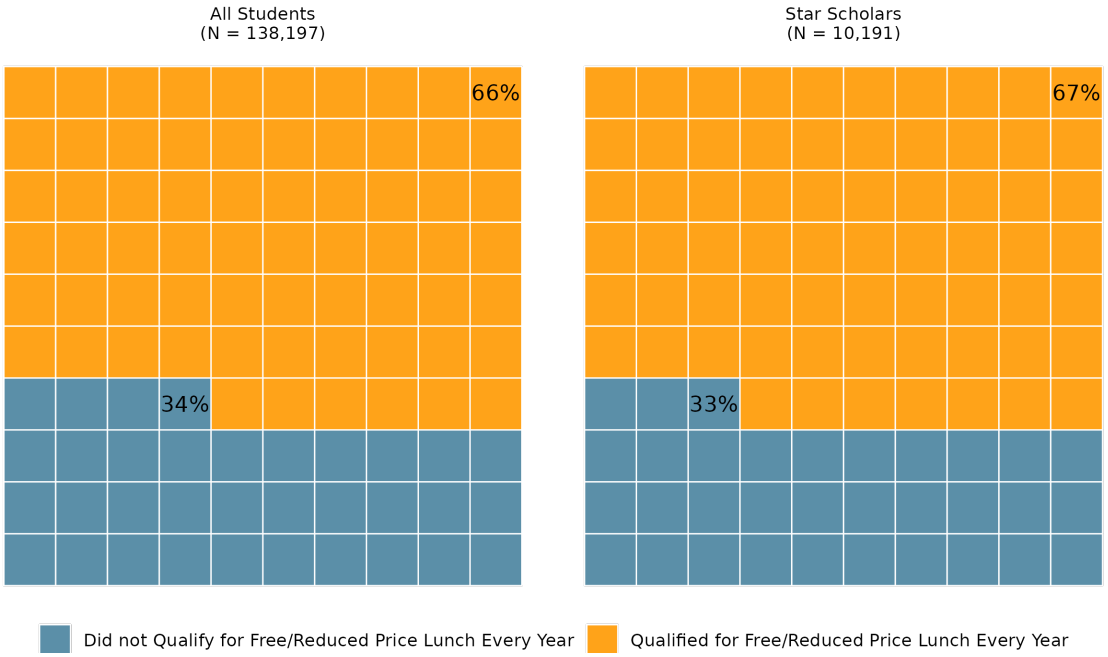
(b) McCrary Density Tests



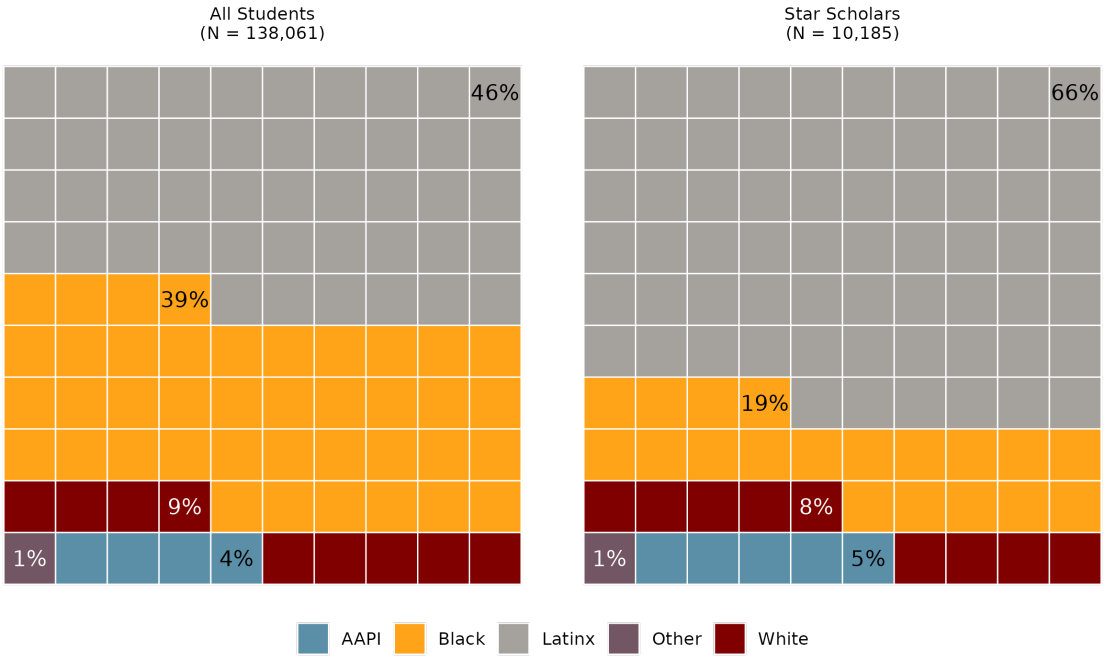
Note: This figure shows the distribution of our running variable around the cutoff for Star Scholarship eligibility. We extend the McCrary (2008) density test to a difference in RD framework to test for discontinuities in the running variable at the cutoff. Usually, if there is a statistically significant discontinuity, this is taken as evidence that individuals are sorting into treatment by manipulating their running variable to be just above or just below the cutoff. In our setting, there is a discontinuity at the cutoff before the policy due to the nature of the ways grades are assigned at CPS. So we test to see if the discontinuity at the cutoff is larger after the policy than before the policy. We find no significant differences in the density change at the cutoff before and after the Star Scholarship was implemented.

FIGURE 2
Proportion of Students in CPS and Proportion of Star Scholars

(a) By Free/Reduced Price Lunch



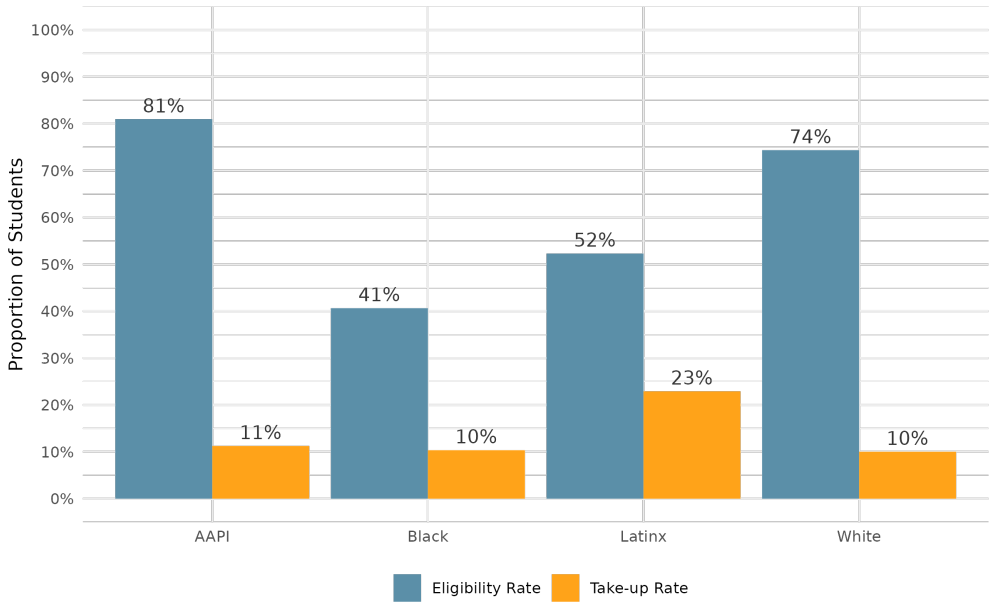
(b) By Race



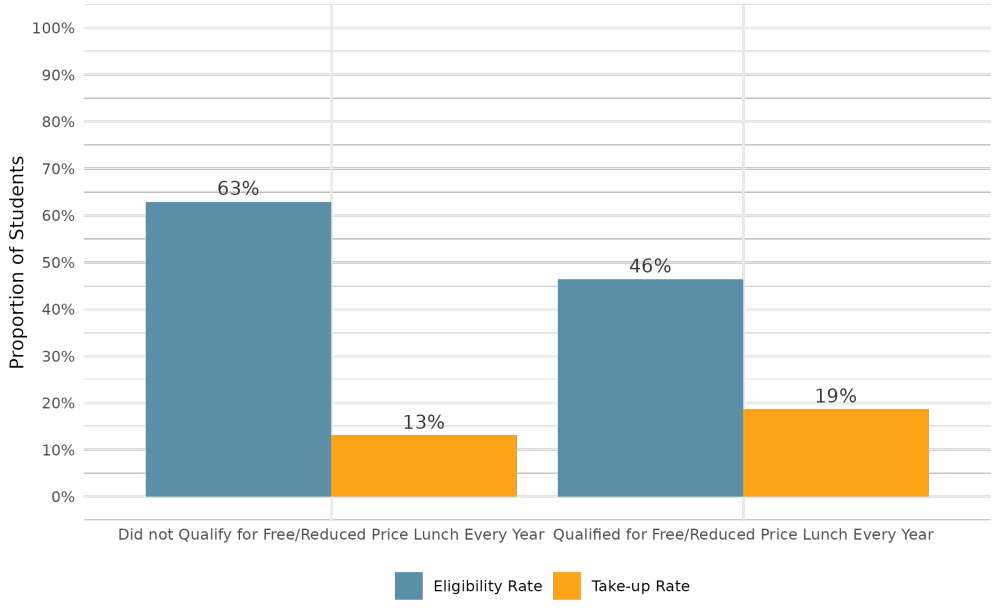
Note: This figure shows the proportion of students in CPS compared to proportion of Star Scholars by race and free/reduced price lunch status. Note that Latinx students are over represented in the population of students who become Star Scholars relative to their overall proportion of the total population of CPS students and Black students are under represented. A small number of students are missing a race category, which is why the sample sizes do not match across subfigures.

FIGURE 3
Star Scholarship Take-Up and Eligibility

(a) By Race

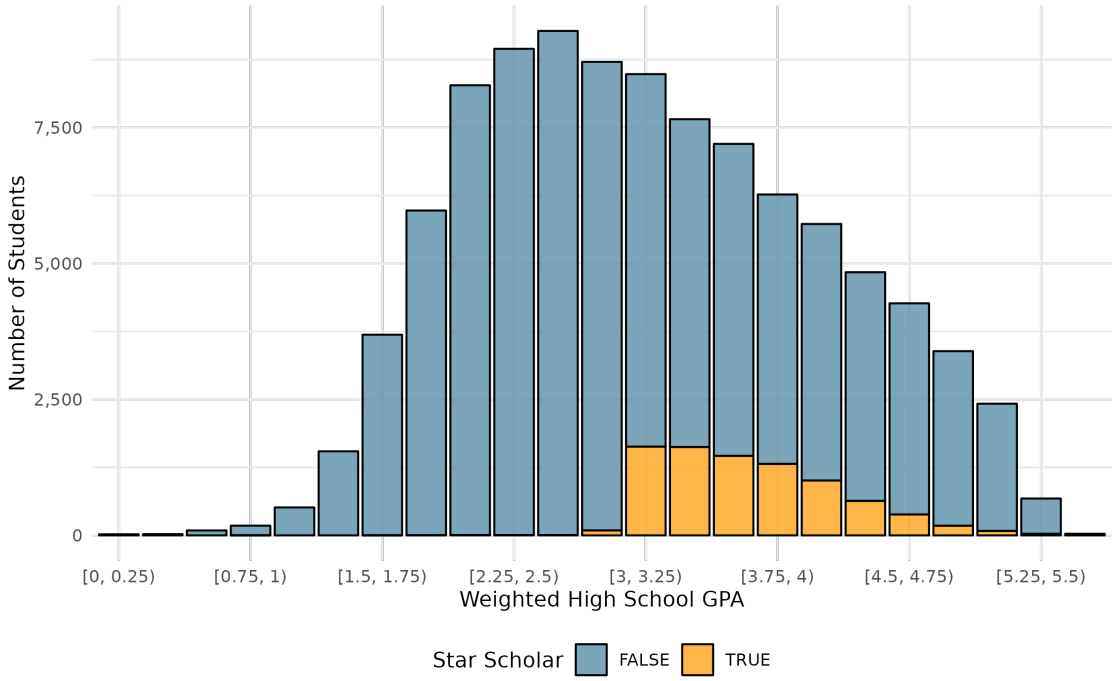


(b) By Free/Reduced Price Lunch Status



Note: The blue bar shows the percentage of all students in a given category who were eligible for the Star Scholarship. The orange bar shows the percentage of all eligible students in a given category who became Star Scholars (the take-up rate of the Star Scholarship).

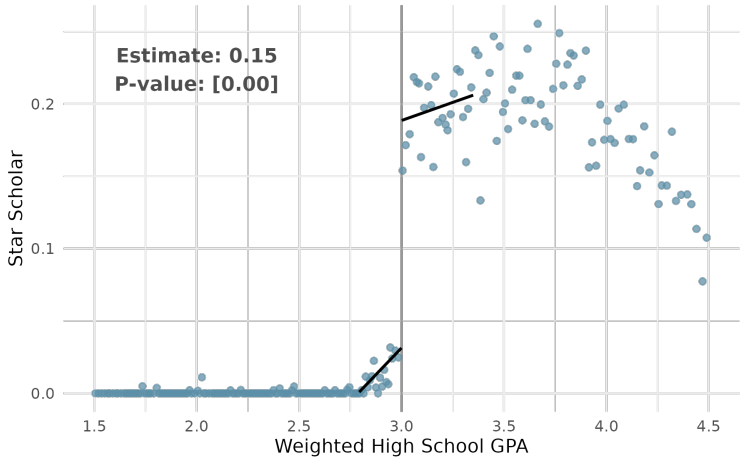
FIGURE 4
Distribution of Weighted Cumulative High School GPA by Star Scholarship Take-Up



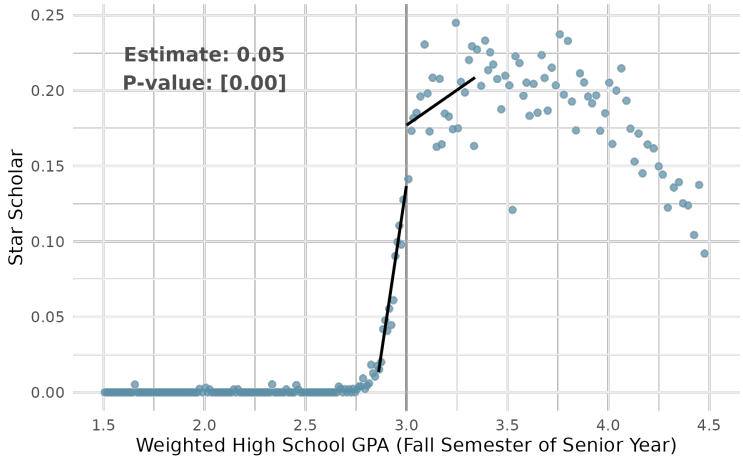
Note: This figure shows the number of students in each GPA bin for Star Scholars and non-Star Scholars. Just below the cutoff we see a very small number of students who become Star Scholars. Most of the Star Scholars have GPAs near the cutoff. The higher your GPA, the less likely you are to become a Star Scholar.

FIGURE 5
First Stage RD Plots

(a) Main Specification



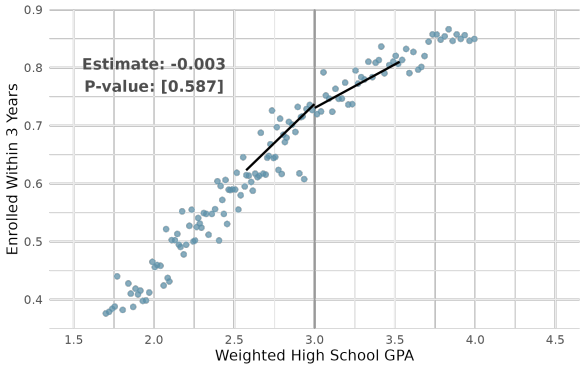
(b) Fall Semester GPA



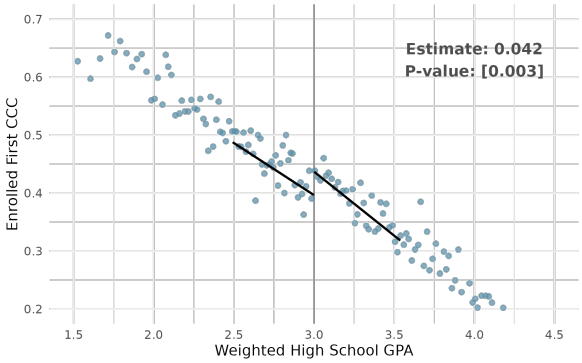
Note: Panel (a) shows the discontinuity of the probability of being a Star Scholar at the policy eligibility threshold of a 3.0 GPA using a student's final GPA. Note that there are some students just below the cutoff that still get access to the scholarship, these students likely applied to the policy before they graduated using their GPA from the fall semester of their senior year. While this is theoretically possible, it is likely uncommon for students to apply to the Star Scholarship using their fall semester GPA since the first stage using this GPA measure is much weaker as shown in Panel (b).

FIGURE 6
Sharp RD Plots

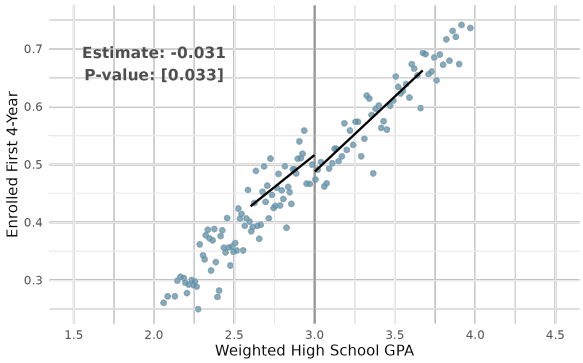
(a) Enrolled within 3-Years



(b) Enrolled First in CCC



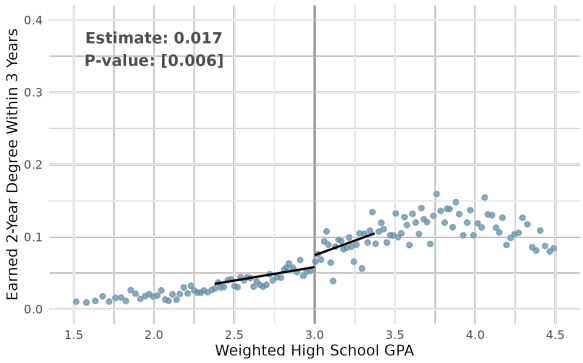
(c) Enrolled First in 4-Year



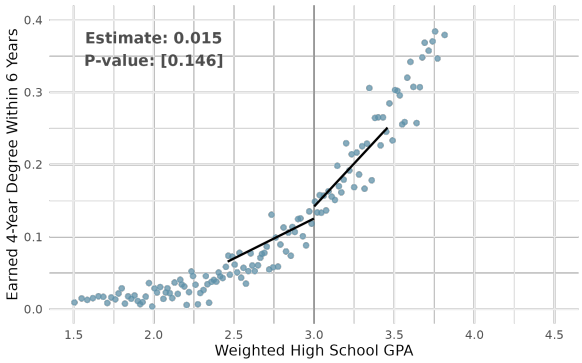
(d) Enrolled 4-Year Within 6 Years



(e) Earned 2-Year Degree Within 3 Years



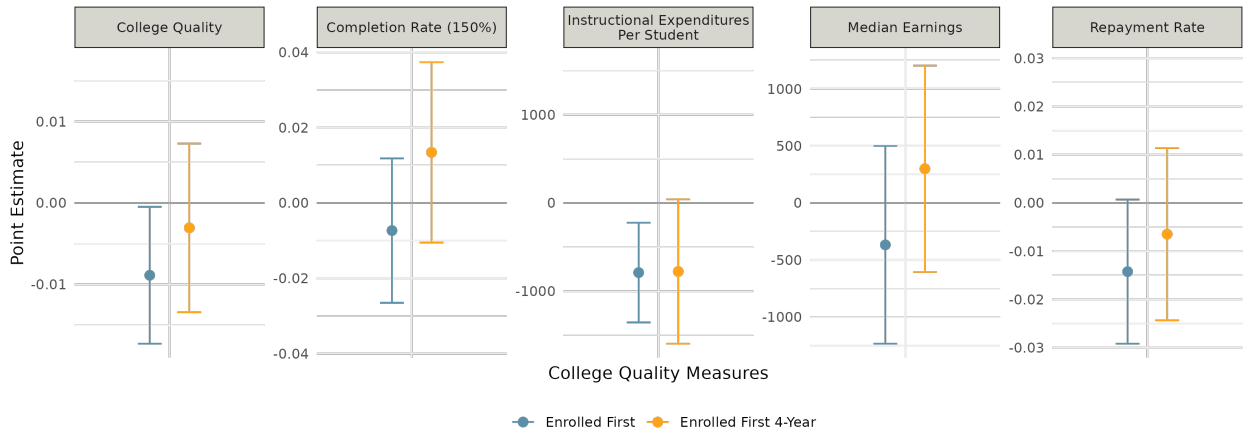
(f) Earned 4-Year Degree Within 6 Years



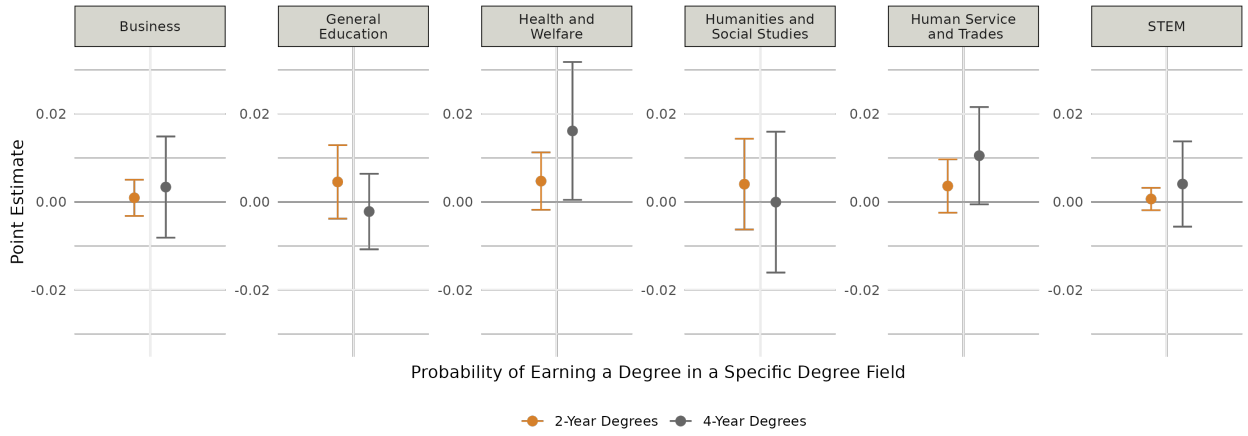
Note: This figure shows the discontinuity in college enrollment and completion outcomes at the 3.0 GPA Star Scholarship eligibility cutoff. All specifications use a first-order polynomial, a triangular kernel, and include CPS graduation year and high school fixed effects. P-values are calculated from robust bias-corrected standard errors clustered at the CPS high school level (Calonico, Cattaneo and Titiunik, 2014a). Bandwidths chosen using the MSE optimal bandwidth selection procedure for robust bias-corrected RD analysis described in Calonico, Cattaneo and Farrell (2020). Bin sizes are chosen using the Integrated-MSE optimal quantile-spaced method described in Calonico, Cattaneo and Titiunik (2015b).

FIGURE 7
Difference-In-RD Estimates for the Impact of the Star Scholarship on College Quality and Degree Field

(a) College Quality

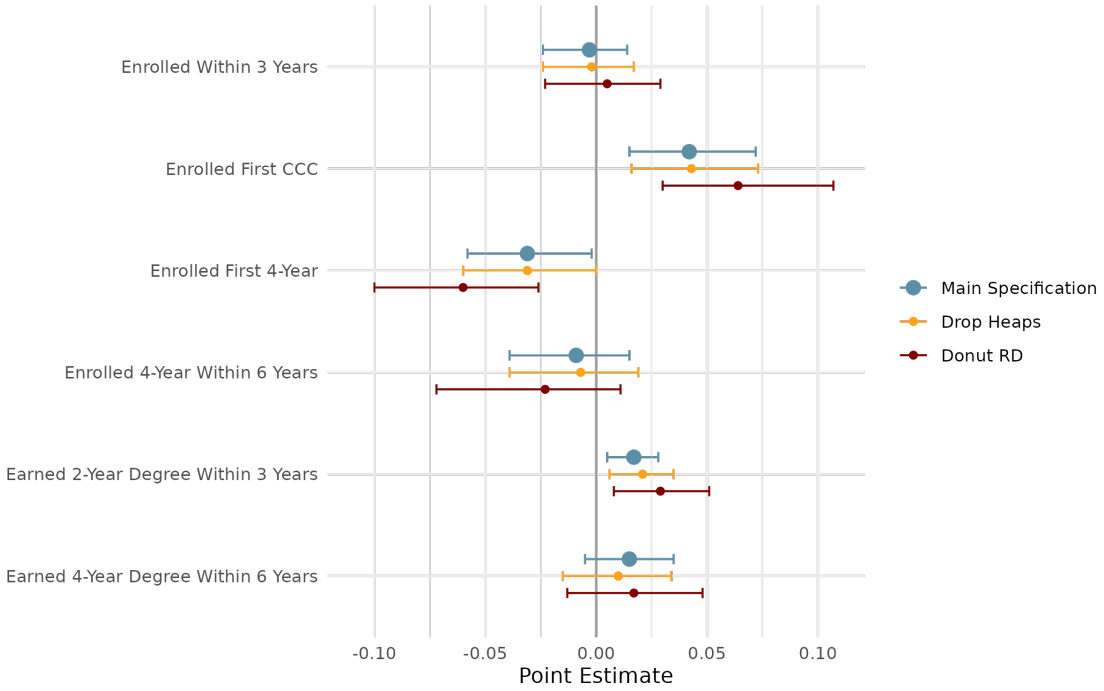


(b) Degree Field



Note: This figure shows the estimated difference in discontinuity for college quality and college degree field choices for students who were just above the Star Scholarship eligibility cutoff compared to students who were just below the cutoff before and after the scholarship program was implemented. All specifications use a first-order polynomial, a triangular kernel, and include CPS graduation year and high school fixed effects. Standard errors clustered at the CPS high school level. We use the same MSE optimal bandwidths chosen for each outcome in our regression discontinuity specification estimated in the post-policy period as shown in Appendix Tables C.4, C.5, C.7, and C.8.

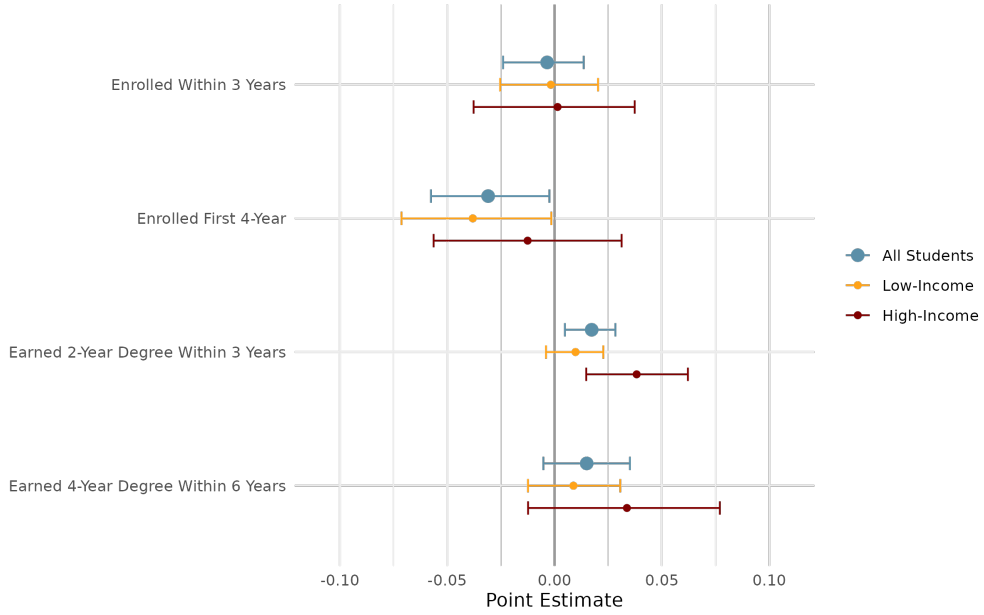
FIGURE 8
Summary of RD Estimates using Alternative Specifications



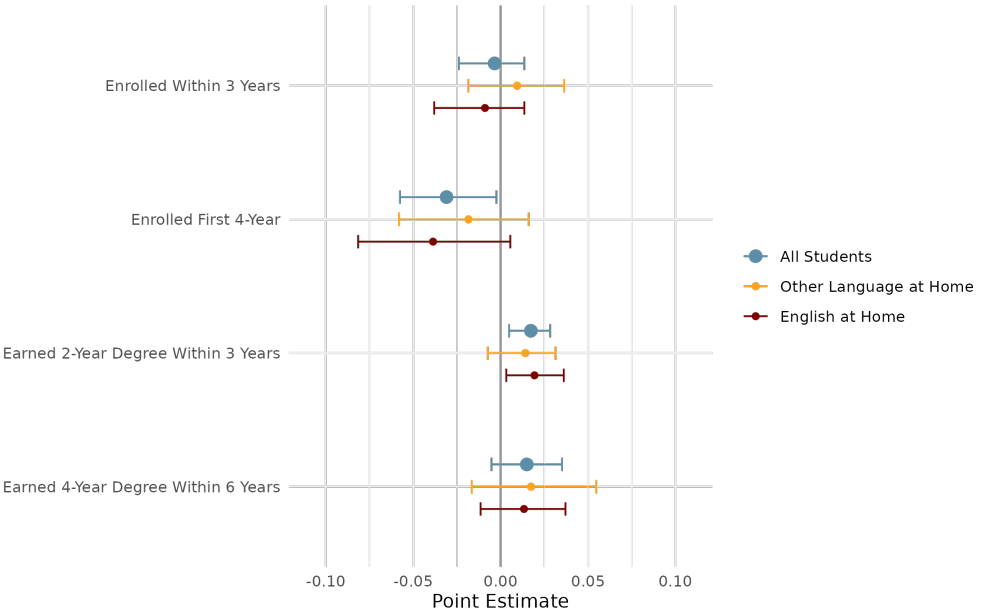
Note: This figure shows the estimated discontinuity in college enrollment and completion outcomes at the 3.0 GPA Star Scholarship eligibility cutoff using different regression discontinuity specifications. All specifications use a first-order polynomial, a triangular kernel, and include CPS graduation year and high school fixed effects. Robust bias-corrected standard errors clustered at the CPS high school level (Calonico, Cattaneo and Titiunik, 2014a). Bandwidths chosen using the MSE optimal bandwidth selection procedure for robust bias-corrected RD analysis described in Calonico, Cattaneo and Farrell (2020). For the main specification, we estimate Equation 1 described in Section III. For the specification where we drop heaps in the running variable, we drop all weighted cumulative high school GPA values that are multiples of 0.25. For the Donut RD, we drop observations that are near the cutoff. Specifically, we drop students whose GPA falls between 2.95 and 3.05.

FIGURE 9
RD Estimates of the Effect of Star Eligibility on College Enrollment and Completion by Student Subgroup

(a) By Free/Reduced Price Lunch Eligibility



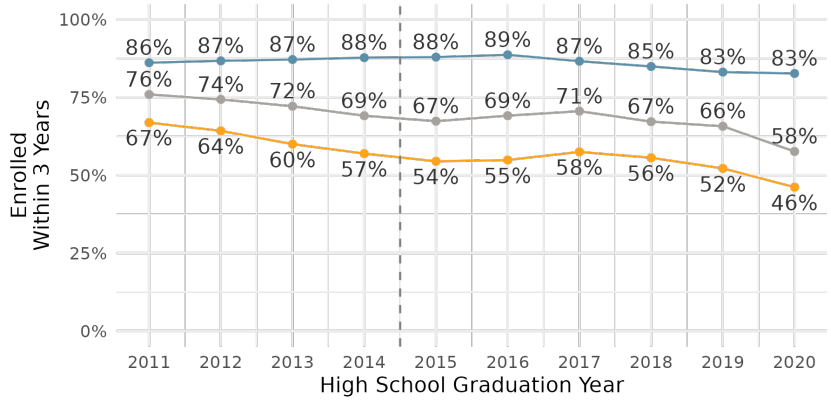
(b) By Home Language



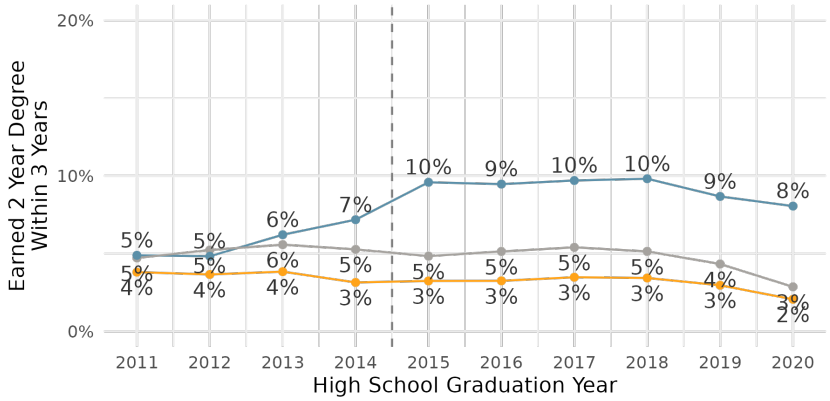
Note: This figure shows how different student subgroups were effected differently by eligibility for the Star Scholarship. Panel (a) shows the estimated discontinuity in college enrollment and college completion for students just above the 3.0 GPA Star Scholarship eligibility cutoff separately for students who qualified for free/reduced price lunch every year in CPS and students who did not. Panel (b) shows the same thing as Panel (a) but separately for students whose home language is English and students for whom it is not. Appendix Table C.9 and Appendix Table C.10 show the regression estimates and outputs for this figure.

FIGURE 10
College Enrollment and Degree Completion Trends Over Time by GPA

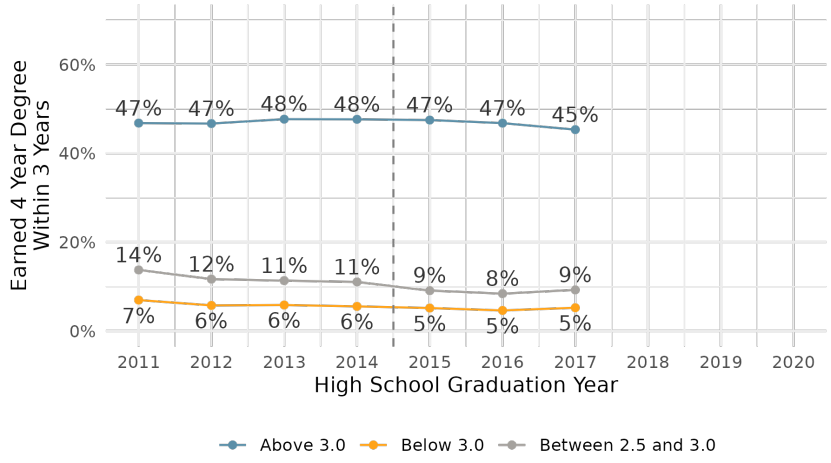
(a) Enrolled Within 3 Years



(b) Earned 2-Year Degree Within 3 Years



(c) Earned 4-Year Degree Within 6 Years



Note: This figure shows college enrollment and completion rates for each cohort of students who graduated between 2011-2020 in different GPA bins. Note that degree completion is not conditional on enrollment.

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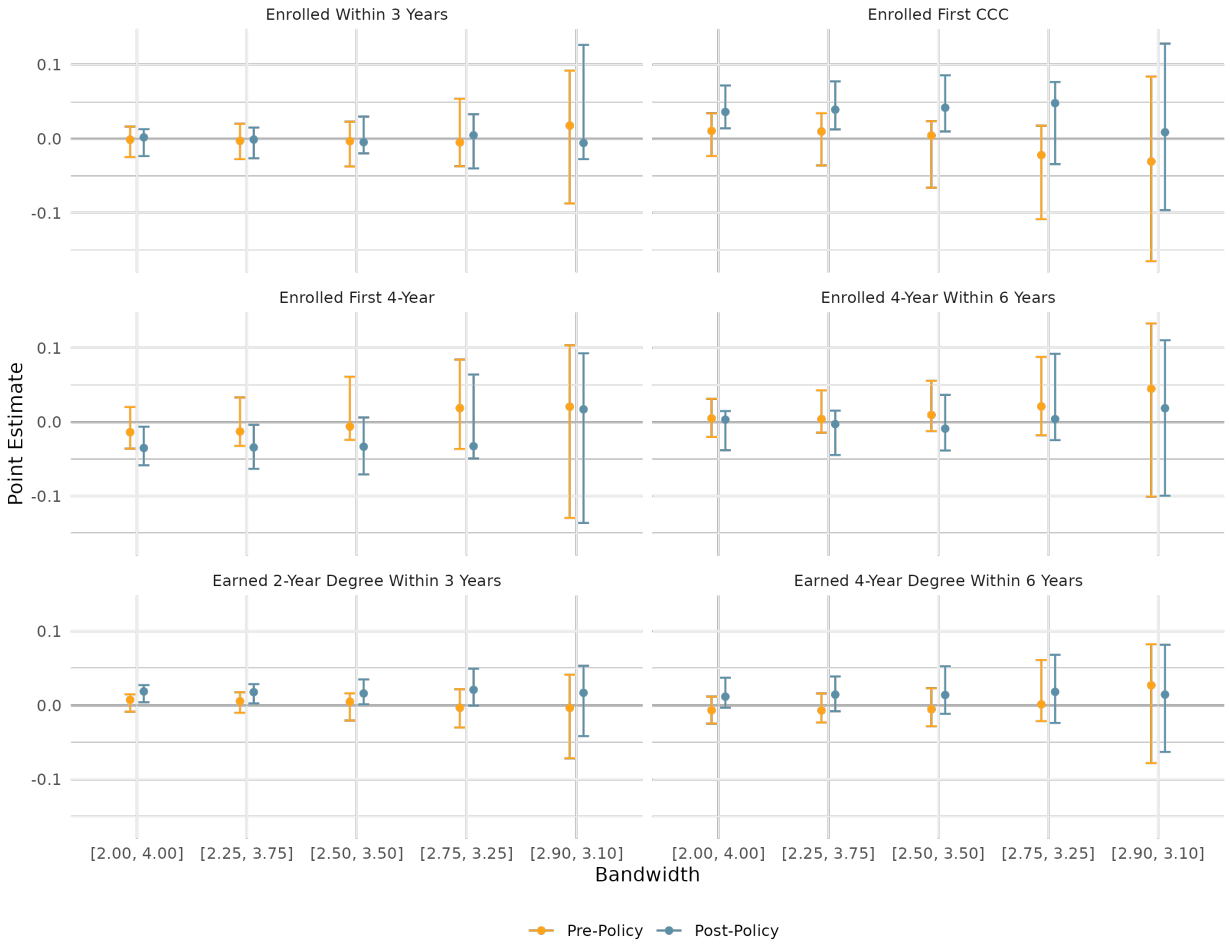
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Appendix

A Alternative RD Specifications

A.A Robustness to Different Bandwidth Specifications

FIGURE A.1
RD Estimates by Bandwidth



Note: This figure shows RD estimates for our main outcomes and their corresponding confidence intervals for a range of bandwidths. We show these estimates both for the pre-policy period and the post-policy period. We see from this figure that being above the eligibility cutoff increased the probability of earning a 2-year degree, and this is robust to a range of bandwidth choices. We also see that the probability of earning a 4-year degree or any degree is consistently positive but insignificant from zero for a range of bandwidth choices. We see no effect on college enrollment. We also don't see an effect on any of our main outcomes before the policy was implemented.

TABLE A.1
RD Estimates of the Effect of Star Eligibility Using Constant Bandwidths

(a) Immediate College Enrollment

	Enrolled Within 3 Years (1)	Enrolled First CCC (2)	Enrolled First 4-Year (3)
RD Estimate	-0.005	0.042**	-0.033
P-value	0.682	0.014	0.100
Bandwidth	[2.5, 3.5]	[2.5, 3.5]	[2.5, 3.5]
Sample Size	33,656	24,582	24,582
Controls			
CPS Grad Year	X	X	X
CPS High School	X	X	X

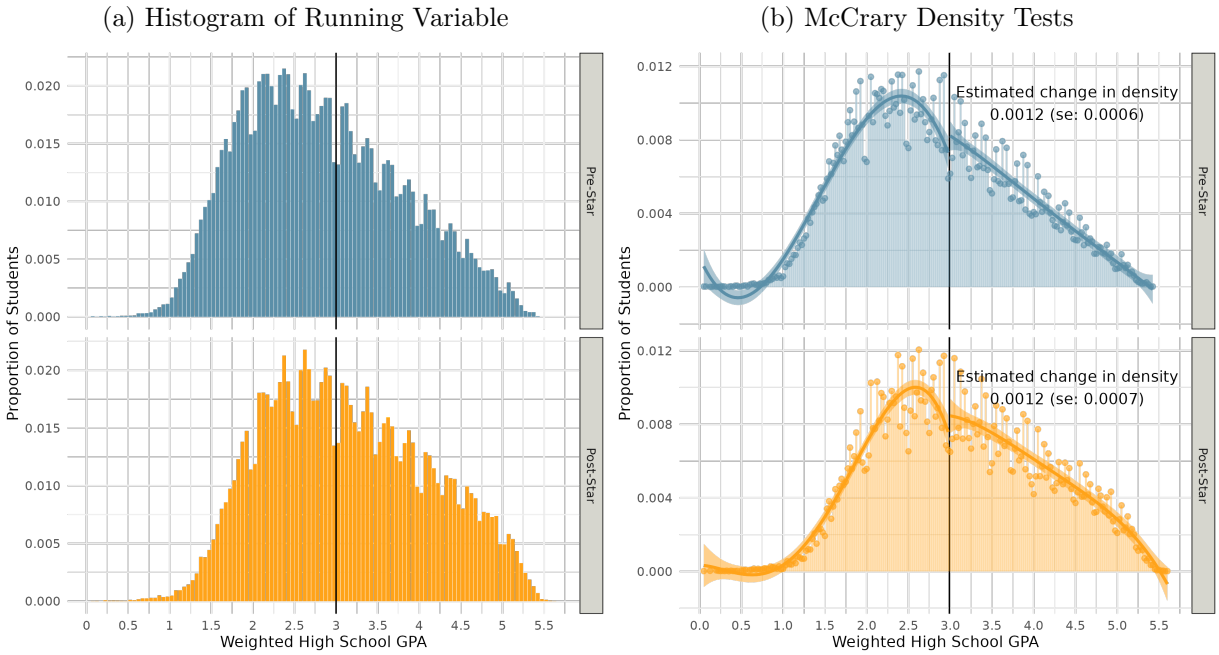
(b) Long-term College Enrollment and College Completion

	Enrolled 4-Year Within 6 Years (1)	Earned 2-Year Degree Within 3 Years (2)	Earned 4-Year Degree Within 6 Years (3)
RD Estimate	-0.009	0.016**	0.014
P-value	0.962	0.034	0.211
MSE-Optimal Bandwidth	[2.5, 3.5]	[2.5, 3.5]	[2.5, 3.5]
Sample Size	17,435	33,656	17,435
Controls			
CPS Grad Year	X	X	X
CPS High School	X	X	X

Note: This table is analogous to Table 4 in the main text. However, in this RD specification we use a constant bandwidth of 0.5 GPA points on either side of the eligibility cutoff.

A.B Drop Heaps in Running Variable

FIGURE A.2
Distribution of GPAs Around the Cutoff with Heaps Dropped



Note: This figure shows the distribution of our running variable around the cutoff for Star Scholarship eligibility. We extend the McCrary (2008) density test to a difference in RD framework to test for discontinuities in the running variable at the cutoff. Usually, if there is a statistically significant discontinuity, this is taken as evidence that individuals are sorting into treatment by manipulating their running variable to be just above or just below the cutoff. In our setting, there is a discontinuity at the cutoff before the policy due to the nature of the ways grades are assigned at CPS. So we dropped the heaping GPAs following Barreca, Lindo and Waddell (2016) and test to see if there is still a discontinuity at the cutoff both before or after the policy. We find no significant differences in the density change at the cutoff before and after the Star Scholarship was implemented.

TABLE A.2
RD Estimates of the Effect of Star Eligibility
Dropping Heaping Points in Running Variable

(a) Immediate College Enrollment

	Enrolled Within 3 Years (1)	Enrolled First CCC (2)	Enrolled First 4-Year (3)
RD Estimate	-0.002	0.043***	-0.031*
P-value	0.747	0.002	0.051
MSE-Optimal Bandwidth	[2.58, 3.49]	[2.49, 3.65]	[2.57, 3.57]
Sample Size	27,165	23,793	17,556
Controls			
CPS Grad Year	X	X	X
CPS High School	X	X	X

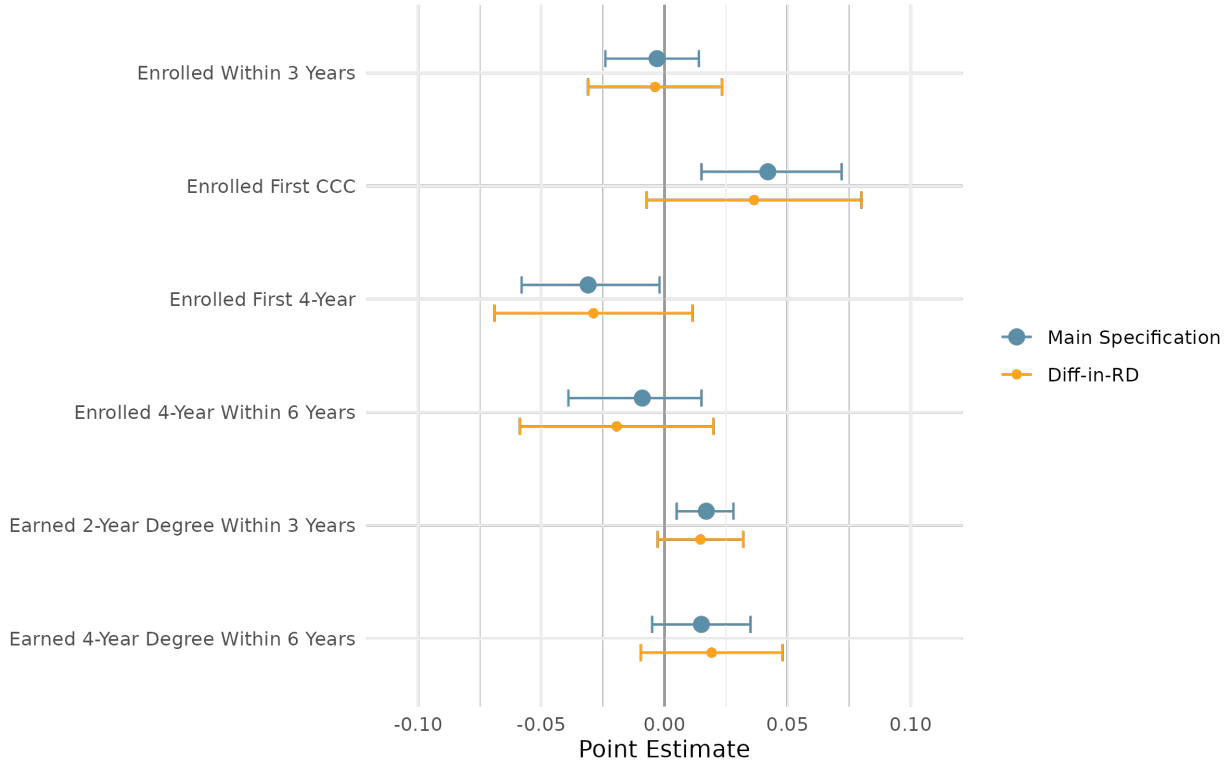
(b) Long-term College Enrollment and College Completion

	Enrolled 4-Year Within 6 Years (1)	Earned 2-Year Degree Within 3 Years (2)	Earned 4-Year Degree Within 6 Years (3)
RD Estimate	-0.007	0.022***	0.010
P-value	0.504	0.006	0.439
MSE-Optimal Bandwidth	[2.45, 3.5]	[2.32, 3.32]	[2.46, 3.46]
Sample Size	17,515	33,667	16,912
Controls			
CPS Grad Year	X	X	X
CPS High School	X	X	X

Note: This table is analogous to Table 4 in the main text. However, in this RD specification, we dropped heaping points in the running variable following Barreca, Lindo and Waddell (2016). This includes all weighted cumulative high school GPA values that are multiples of 0.25.

A.C Difference-in-Discontinuity Estimates

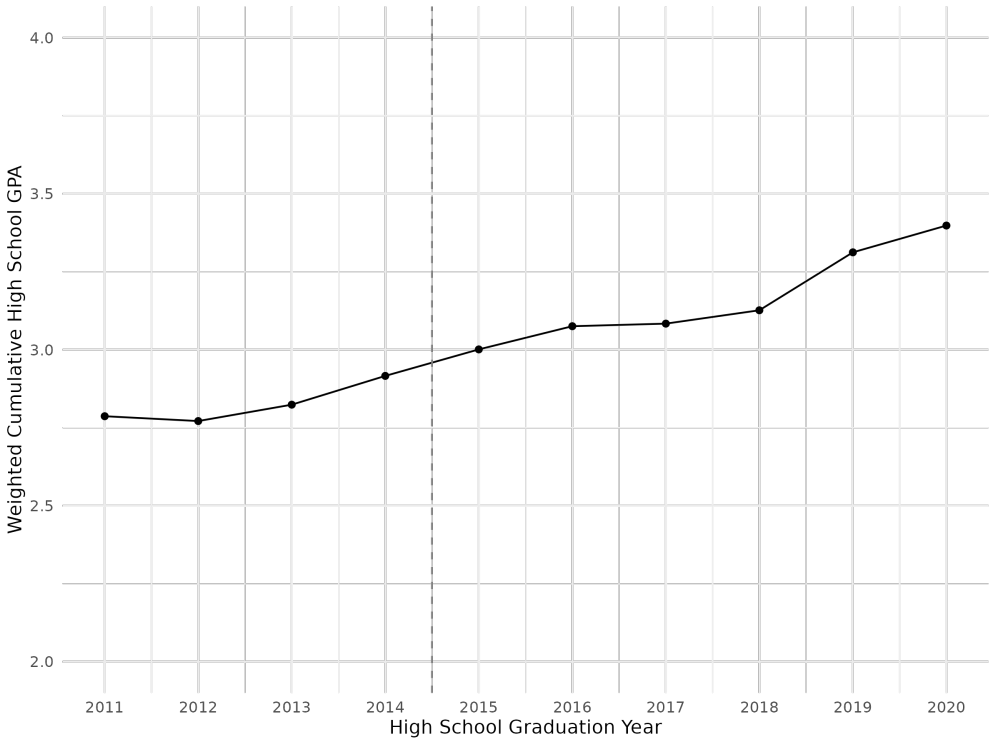
FIGURE A.3
Difference-in-Discontinuity Estimates



Note: This figure compares the estimated difference in discontinuity estimates at the 3.0 GPA Star Scholarship eligibility cutoff to our main regression discontinuity estimates. All specifications use a first-order polynomial, a triangular kernel, and include CPS graduation year and high school fixed effects. Standard errors clustered at the CPS high school level. For the difference in discontinuity specification (Diff-in-RD), we use use the same optimal bandwidths chosen for each outcome variable in our main specification for each main outcome for ease of comparison.

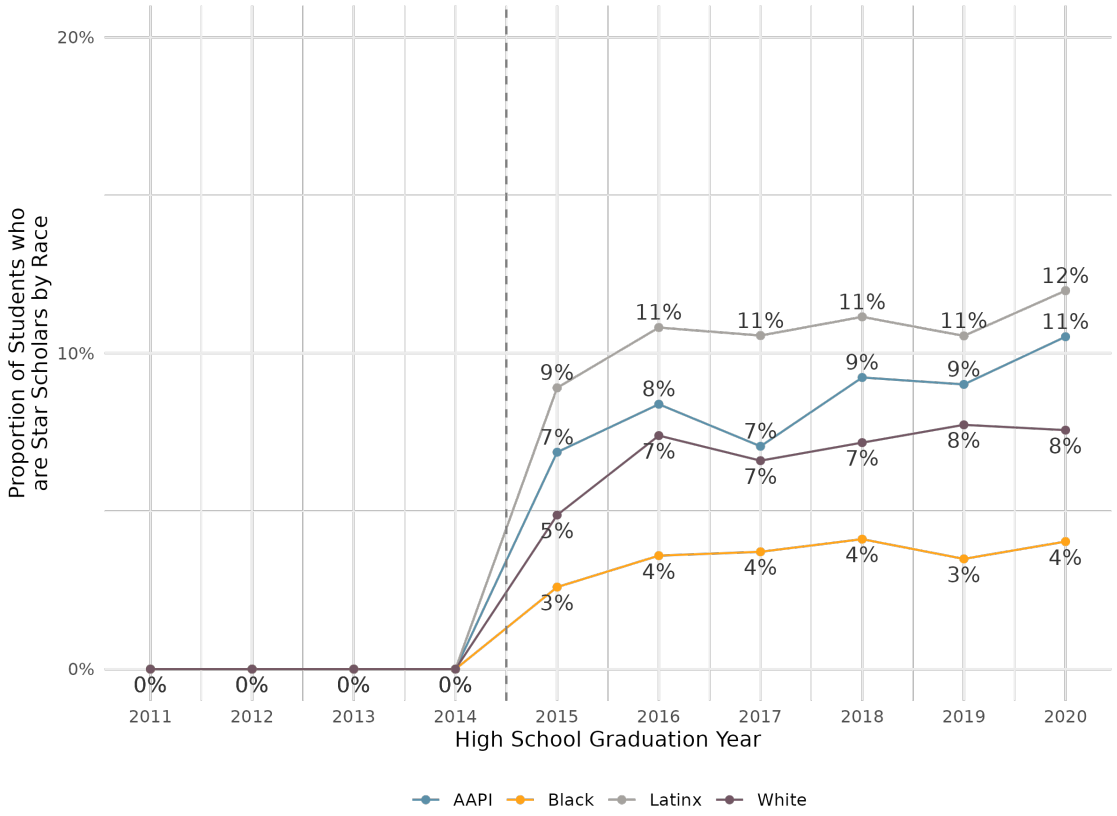
B Appendix Figures

FIGURE B.1
Average Weighted Cumulative High School GPA Over Time



Note: This figure shows the average weighted cumulative GPA over time for CPS high school graduates by high school graduation year. We see an upward trends in grades during the years in our sample.

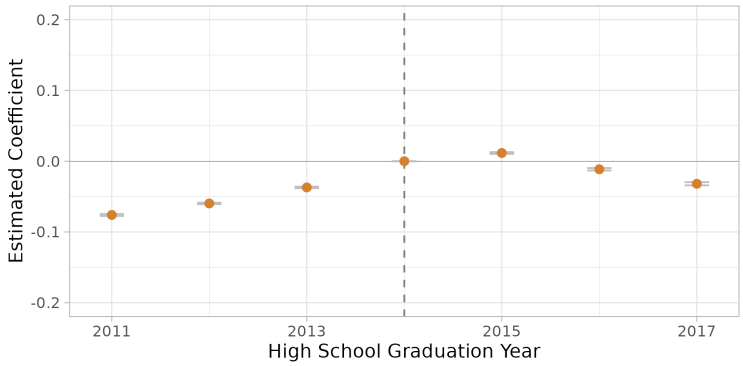
FIGURE B.2
Proportion of Students Who Become Star Scholars by Race Over Time



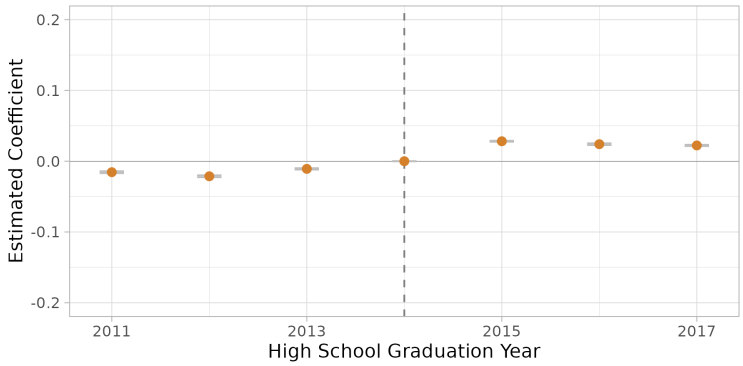
Note: This figure shows the proportion of students in CPS within a given racial category who become Star Scholars over time. Note that no students were retroactively eligible before the policy was implemented.

FIGURE B.3
Event Study Plots

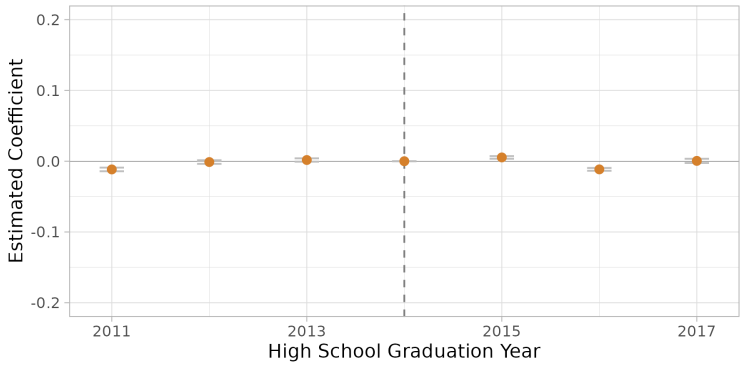
(a) Enrolled Within 3 Years



(b) Earned 2-Year Degree Within 3 Years



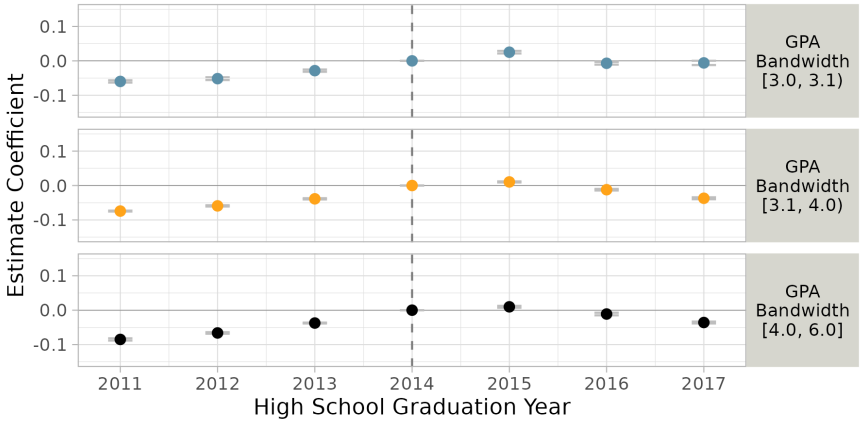
(c) Earned 4-Year Degree Within 6 Years



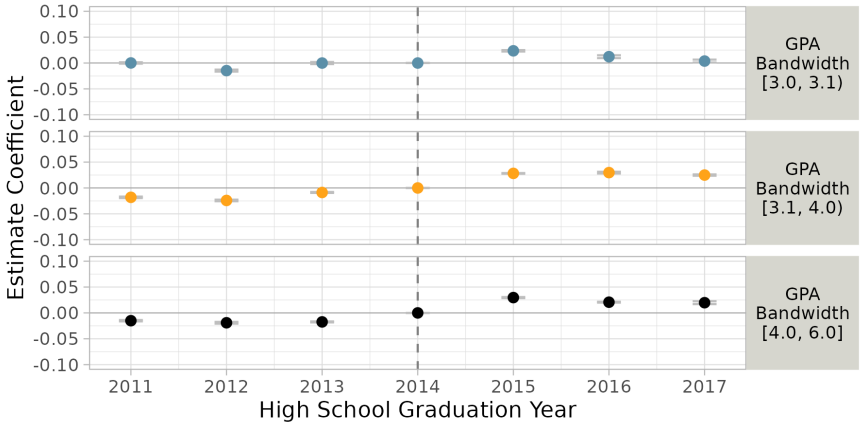
Note: This figure plots the coefficients on the year fixed effects from a two way fixed effects regression. The dashed line separates treated and control years. Students in the control group are CPS graduates with a weighted cumulative high school GPA $\in [2.5, 3.0)$. Students in the treated group are CPS graduates with a weighted cumulative high school GPA $\in [3.0, 6.0]$. Coefficients are estimated using Equation 2.

FIGURE B.4
Event Study Plots by GPA

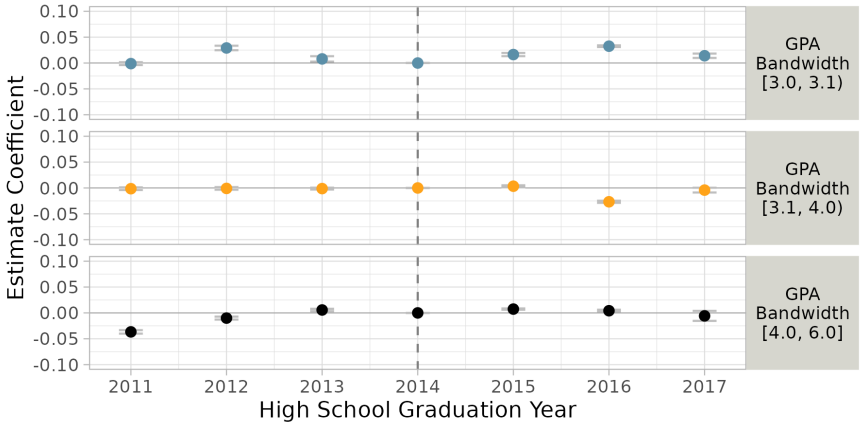
(a) Enrolled in College Within 3 Years of Graduating High School



(b) Earned 2-Year Degree Within 3 Years of Graduating High School



(c) Earned 4-Year Degree Within 6 Years of Graduating High School



Note: This figure plots the coefficients on the year fixed effects from a two way fixed effects regression. The dashed line separates treated and control years. Students in the control group are CPS graduates with a high school GPA $\in [2.5, 3.0)$. Students in the treated group are CPS graduates within the GPA bandwidths indicated in the panels on the right side. We use a small GPA bandwidth near the cutoff for ease of comparison to the RD estimates. Coefficients are estimated using Equation 3.

C Appendix Tables

TABLE C.3
Student Demographics by Race

Race	Home Language is not English	Free/Reduced Price Lunch Every Year	SAT Score	Weighted High School GPA
AAPI	84%	55%	1116	3.91
Black	3%	68%	907	2.86
Latinx	81%	75%	967	3.12
Other	27%	41%	1092	3.50
White	33%	24%	1147	3.75

Note: This table shows average student demographics by student race/ethnicity.

TABLE C.4
RD Estimates of the Effect of Star Eligibility on Quality Measures of First College

(a) Post-Policy

	College Quality (1)	Instructional Expenditures Per Student (2)	Median Earnings (3)	Completion Rate 150% (4)	Repayment Rate (5)
RD Estimate	-0.003	-336.002***	-116.467	0.001	-0.005
P-value	0.235	0.006	0.858	0.705	0.287
MSE-Optimal Bandwidth	[2.59, 3.43]	[2.53, 3.27]	[2.68, 3.53]	[2.61, 3.5]	[2.55, 3.48]
Sample Size	21,080	18,463	21,310	22,113	23,312
Controls					
CPS Grad Year	X	X	X	X	X
CPS High School	X	X	X	X	X

(b) Pre-Policy

	College Quality (1)	Instructional Expenditures Per Student (2)	Median Earnings (3)	Completion Rate 150% (4)	Repayment Rate (5)
RD Estimate	0.0069**	462.8482**	312.9401	0.0086	0.0131**
P-value	0.026	0.035	0.257	0.122	0.011
MSE-Optimal Bandwidth	[2.61, 3.31]	[2.59, 3.27]	[2.59, 3.31]	[2.61, 3.39]	[2.67, 3.38]
Sample Size	13,378	13,292	14,213	15,020	13,687
Controls					
CPS Grad Year	X	X	X	X	X
CPS High School	X	X	X	X	X

Note: This figure shows the estimated discontinuity in measures of the quality of the first college a student enrolls in for students just above the 3.0 GPA Star Scholarship eligibility cutoff. In Panel (a) we show the estimated discontinuity in college quality at the cutoff after the policy and in Panel (b) we show the same estimate before the policy was implemented. This discontinuity is estimated using Equation 1. We use a first order polynomial with a triangular kernel. Bandwidths chosen using the MSE optimal bandwidth selection procedure for robust bias-corrected RD analysis described in Calonico, Cattaneo and Farrell (2020). Controls include CPS graduation year and high school fixed effects. Following Calonico, Cattaneo and Titiunik (2014a), we use robust bias-corrected standard errors clustered at the CPS high school level. Following Cohodes and Goodman (2014), we construct a single measure of college quality using the first principal component of all the other college quality variables in columns (2)-(5). 58% of the variance is explained by this first principal component. *p<0.1; **p<0.05; ***p<0.01

TABLE C.5
RD Estimates of the Effect of Star Eligibility on Quality Measures of First 4-Year College

(a) Post-Policy

	College Quality (1)	Instructional Expenditures Per Student (2)	Median Earnings (3)	Completion Rate 150% (4)	Repayment Rate (5)
RD Estimate	0.0061	-41.3166	873.3404**	0.0228***	0.0096
P-value	0.104	0.660	0.013	0.009	0.140
MSE-Optimal Bandwidth	[2.68, 3.4]	[2.59, 3.32]	[2.7, 3.42]	[2.7, 3.56]	[2.67, 3.8]
Sample Size	10,452	10,455	10,708	12,844	17,513
Controls					
CPS Grad Year	X	X	X	X	X
CPS High School	X	X	X	X	X

(b) Pre-Policy

	College Quality (1)	Instructional Expenditures Per Student (2)	Median Earnings (3)	Completion Rate 150% (4)	Repayment Rate (5)
RD Estimate	0.0089***	690.8977***	513.3927*	0.0099	0.0147**
P-value	0.005	0.005	0.060	0.109	0.011
MSE-Optimal Bandwidth	[2.62, 3.32]	[2.53, 3.33]	[2.59, 3.36]	[2.46, 3.41]	[2.71, 3.54]
Sample Size	8,814	10,002	9,869	11,745	10,862
Controls					
CPS Grad Year	X	X	X	X	X
CPS High School	X	X	X	X	X

Note: This figure shows the estimated discontinuity in measures of the quality of the first 4-year college a student enrolls in for students just above the 3.0 GPA Star Scholarship eligibility cutoff. In Panel (a) we show the estimated discontinuity in college quality at the cutoff after the policy and in Panel (b) we show the same estimate before the policy was implemented. This discontinuity is estimated using Equation 1. We use a first order polynomial with a triangular kernel. Bandwidths chosen using the MSE optimal bandwidth selection procedure for robust bias-corrected RD analysis described in Calonico, Cattaneo and Farrell (2020). Controls include CPS graduation year and high school fixed effects. Following Calonico, Cattaneo and Titiunik (2014a), we use robust bias-corrected standard errors clustered at the CPS high school level. Following Cohodes and Goodman (2014), we construct a single measure of college quality using the first principal component of all the other college quality variables in columns (2)-(5). 58% of the variance is explained by this first principal component. $^{*}p<0.1$; $^{**}p<0.05$; $^{***}p<0.01$

TABLE C.6
RD Estimates of Star Scholarship Eligibility on College Degree Completion

	Earned Associate Degree Within 3 Years (1)	Earned Bachelor's Degree Within 6 Years (2)	Earned Any Degree Within 6 Years (3)
RD Estimate	0.0193***	0.0167*	0.0157
P-value	0.000	0.075	0.230
MSE-Optimal Bandwidth	[2.39, 3.33]	[2.43, 3.47]	[2.47, 3.59]
Sample Size	32,608	18,526	19,583
Controls			
CPS Grad Year	X	X	X
CPS High School	X	X	X

Note: This figure shows the estimated discontinuity in college degree completion for students just above the 3.0 GPA Star Scholarship eligibility cutoff. This discontinuity is estimated using Equation 1. We use a first order polynomial with a triangular kernel. Bandwidths chosen using the MSE optimal bandwidth selection procedure for robust bias-corrected RD analysis described in Calonico, Cattaneo and Farrell (2020). Controls include CPS graduation year and high school fixed effects. Following Calonico, Cattaneo and Titiunik (2014a), we use robust bias-corrected standard errors clustered at the CPS high school level. *p<0.1; **p<0.05; ***p<0.01

TABLE C.7
RD Estimates of the Effect of Star Scholarship Eligibility on 2-Year Degree Completion Within 3 Years of High School by Degree Field

(a) Post-Policy

	General Education (1)	STEM (2)	Human Services & Trades (3)	Humanities & Social Science (4)	Business (5)	Health & Welfare (6)
RD Estimate	0.0118***	0.0013	0.0010	0.0046	0.0016	0.0026
P-value	0.003	0.387	0.538	0.213	0.336	0.439
MSE-Optimal Bandwidth	[2.29, 3.33]	[2.32, 3.57]	[2.47, 3.52]	[2.6, 3.39]	[2.4, 3.36]	[2.46, 3.68]
Sample Size	36,512	42,743	35,902	27,585	33,514	40,978
Controls						
CPS Grad Year	X	X	X	X	X	X
CPS High School	X	X	X	X	X	X

(a) Pre-Policy

	General Education (1)	STEM (2)	Human Services & Trades (3)	Humanities & Social Science (4)	Business (5)	Health & Welfare (6)
RD Estimate	0.0073**	0.0006	-0.0026	0.0015	0.0008	-0.0047***
P-value	0.027	0.403	0.313	0.605	0.398	0.002
MSE-Optimal Bandwidth	[2.57, 3.41]	[2.55, 3.37]	[2.48, 3.55]	[2.36, 3.47]	[2.43, 3.54]	[2.29, 3.27]
Sample Size	20,254	19,923	25,465	27,361	26,632	25,361
Controls						
CPS Grad Year	X	X	X	X	X	X
CPS High School	X	X	X	X	X	X

Note: This figure shows the estimated discontinuity in the probability of earning a 2-year degree in a specific degree field within 3 years of graduating high school for students just above the 3.0 GPA Star Scholarship eligibility cutoff as compared to students just below. In Panel (a) we show the estimated discontinuity at the cutoff after the policy and in Panel (b) we show the same estimate before the policy was implemented. This discontinuity is estimated using Equation 1. We use a first order polynomial with a triangular kernel. Bandwidths chosen using the MSE optimal bandwidth selection procedure for robust bias-corrected RD analysis described in Calonico, Cattaneo and Farrell (2020). Controls include CPS graduation year and high school fixed effects. Following Calonico, Cattaneo and Titiunik (2014a), we use robust bias-corrected standard errors clustered at the CPS high school level. Following Cohodes and Goodman (2014), we construct a single measure of college quality using the first principal component of all the other college quality variables in columns (2)-(5). 58% of the variance is explained by this first principal component. *p<0.1; **p<0.05; ***p<0.01

TABLE C.8
RD Estimates of the Effect of Star Scholarship Eligibility on 4-Year Degree Completion Within 6 Years of High School by Degree Field

(a) Post-Policy

	General Education (1)	STEM (2)	Human Services & Trades (3)	Humanities & Social Science (4)	Business (5)	Health & Welfare (6)
RD Estimate	-0.0029	0.0031	0.0080**	0.0014	0.0015	0.0142**
P-value	0.312	0.262	0.046	0.931	0.937	0.011
MSE-Optimal Bandwidth	[2.53, 3.6]	[2.41, 3.39]	[2.4, 3.47]	[2.4, 3.61]	[2.36, 3.55]	[2.33, 3.39]
Sample Size	18,662	17,752	19,150	21,249	21,115	19,307
Controls						
CPS Grad Year	X	X	X	X	X	X
CPS High School	X	X	X	X	X	X

(a) Pre-Policy

	General Education (1)	STEM (2)	Human Services & Trades (3)	Humanities & Social Science (4)	Business (5)	Health & Welfare (6)
RD Estimate	-0.0018	-0.0009	-0.0023	0.0004	-0.0025	-0.0011
P-value	0.443	0.628	0.427	0.955	0.427	0.732
MSE-Optimal Bandwidth	[2.48, 3.39]	[2.25, 3.35]	[2.47, 3.5]	[2.43, 3.39]	[2.36, 3.32]	[2.48, 3.36]
Sample Size	22,415	28,103	24,670	23,560	24,465	21,822
Controls						
CPS Grad Year	X	X	X	X	X	X
CPS High School	X	X	X	X	X	X

Note: This figure shows the estimated discontinuity in the probability of earning a 4-year degree in a specific degree field within 6 years of graduating high school for students just above the 3.0 GPA Star Scholarship eligibility cutoff as compared to students just below. In Panel (a) we show the estimated discontinuity at the cutoff after the policy and in Panel (b) we show the same estimate before the policy was implemented. This discontinuity is estimated using Equation 1. We use a first order polynomial with a triangular kernel. Bandwidths chosen using the MSE optimal bandwidth selection procedure for robust bias-corrected RD analysis described in Calonico, Cattaneo and Farrell (2020). Controls include CPS graduation year and high school fixed effects. Following Calonico, Cattaneo and Titiunik (2014a), we use robust bias-corrected standard errors clustered at the CPS high school level. Following Cohodes and Goodman (2014), we construct a single measure of college quality using the first principal component of all the other college quality variables in columns (2)-(5). 58% of the variance is explained by this first principal component. *p<0.1; **p<0.05; ***p<0.01

TABLE C.9
RD Estimates of the Effect of Star Eligibility on College Enrollment and Completion by Free/Reduced Price Lunch Status

(a) Qualified for Free/Reduced Price Lunch Every Year in CPS

	Enrolled Within 3 Years (1)	Enrolled First 4-Year (2)	Earned 2-Year Degree Within 3 Years (3)	Earned 4-Year Degree Within 6 Years (4)
RD Estimate	-0.0017	-0.0381**	0.0098	0.0088
P-value	0.828	0.041	0.169	0.405
MSE-Optimal Bandwidth	[2.58, 3.62]	[2.62, 3.61]	[2.43, 3.35]	[2.42, 3.4]
Sample Size	24,303	17,183	22,789	13,013
Controls				
CPS Grad Year	X	X	X	X
CPS High School	X	X	X	X

(b) Did Not Qualify for Free/Reduced Price Lunch Every Year in CPS

	Enrolled Within 3 Years (1)	Enrolled First 4-Year (2)	Earned 2-Year Degree Within 3 Years (3)	Earned 4-Year Degree Within 6 Years (4)
RD Estimate	0.0014	-0.0125	0.0383***	0.0337
P-value	0.992	0.575	0.001	0.156
MSE-Optimal Bandwidth	[2.73, 3.64]	[2.52, 3.66]	[2.58, 3.62]	[2.45, 3.57]
Sample Size	9,122	8,790	10,367	5,320
Controls				
CPS Grad Year	X	X	X	X
CPS High School	X	X	X	X

Note: This figure shows the estimated discontinuity in college enrollment and college completion for students just above the 3.0 GPA Star Scholarship eligibility cutoff separately for students who qualified for free/reduced price lunch every year in CPS and students who did not. This difference is estimated using Equation 1. We use a first order polynomial with a triangular kernel. Bandwidths chosen using the MSE optimal bandwidth selection procedure for robust bias-corrected RD analysis described in Calonico, Cattaneo and Farrell (2020). Controls include CPS graduation year and high school fixed effects. Following Calonico, Cattaneo and Titiunik (2014a), we use robust bias-corrected standard errors clustered at the CPS high school level. *p<0.1; **p<0.05; ***p<0.01

TABLE C.10
RD Estimates of the Effect of Star Eligibility on College Enrollment and Completion By Home Language

(a) Students Whose Home Language is Not English

	Enrolled Within 3 Years (1)	Enrolled First 4-Year (2)	Earned 2-Year Degree Within 3 Years (3)	Earned 4-Year Degree Within 6 Years (4)
RD Estimate	0.0094	-0.0184	0.0142	0.0174
P-value	0.523	0.266	0.223	0.292
MSE-Optimal Bandwidth	[2.62, 3.56]	[2.54, 3.5]	[2.41, 3.4]	[2.48, 3.45]
Sample Size	15,211	11,549	16,047	7,952
Controls				
CPS Grad Year	X	X	X	X
CPS High School	X	X	X	X

(b) Students Whose Home Language is English

	Enrolled Within 3 Years (1)	Enrolled First 4-Year (2)	Earned 2-Year Degree Within 3 Years (3)	Earned 4-Year Degree Within 6 Years (4)
RD Estimate	-0.0089	-0.0387*	0.0194**	0.0134
P-value	0.353	0.087	0.019	0.301
MSE-Optimal Bandwidth	[2.58, 3.64]	[2.43, 3.34]	[2.54, 3.35]	[2.54, 3.5]
Sample Size	18,371	9,703	17,102	9,077
Controls				
CPS Grad Year	X	X	X	X
CPS High School	X	X	X	X

Note: This figure shows the estimated discontinuity in college enrollment and college completion for students just above the 3.0 GPA Star Scholarship eligibility cutoff separately for students whose home language is English and students whose home language is not English. This difference is estimated using Equation 1. We use a first order polynomial with a triangular kernel. Bandwidths chosen using the MSE optimal bandwidth selection procedure for robust bias-corrected RD analysis described in Calonico, Cattaneo and Farrell (2020). Controls include CPS graduation year and high school fixed effects. Following Calonico, Cattaneo and Titiunik (2014a), we use robust bias-corrected standard errors clustered at the CPS high school level. *p<0.1; **p<0.05; ***p<0.01

TABLE C.11
Difference and Difference Estimates of Star Eligibility on College Completion
Using All Students with GPA < 3.0 as a Control Group

	Enrolled Within 3 Years		Earned 2-Year Degree Within 3 Years		Earned 4-Year Degree Within 6 Years	
	(1)	(2)	(3)	(4)	(5)	(6)
Post-Policy × GPA ≥ 3.0	0.062***		0.038***		0.013	
	(0.009)		(0.004)		(0.011)	
Post-Policy × GPA $\in [3.0, 3.1)$		0.077***		0.027***		0.001
		(0.013)		(0.007)		(0.012)
Post-Policy × GPA $\in [3.1, 4.0)$		0.067***		0.046***		-0.009
		(0.008)		(0.004)		(0.012)
Post-Policy × GPA $\in [4.0, 6.0]$		0.069***		0.033***		0.007
		(0.012)		(0.006)		(0.010)
Weighted High School GPA	0.127***	0.165***	0.004**	0.013***	0.197***	0.109***
	(0.005)	(0.005)	(0.002)	(0.001)	(0.004)	(0.004)
Fixed Effects						
CPS Grad Year	Yes	Yes	Yes	Yes	Yes	Yes
CPS High School	Yes	Yes	Yes	Yes	Yes	Yes
GPA ≥ 3.0	Yes	No	Yes	No	Yes	Yes
GPA $\in [3.0, 3.1)$	No	Yes	No	Yes	No	Yes
GPA $\in [3.1, 4.0)$	No	Yes	No	Yes	No	Yes
GPA $\in [4.0, 6.0]$	No	Yes	No	Yes	No	Yes
Observations	125,596	125,596	125,596	125,596	125,579	125,579
R^2	0.19317	0.19603	0.03160	0.03309	0.38880	0.40570
Within R^2	0.02343	0.02457	0.00257	0.00341	0.07743	0.01652

Note: This figure shows the difference in differences estimates of the effect of the Star Scholarship on college enrollment and completion estimated using Equations 2 and 3. The dependent variable in the first two columns is whether or not a student enrolled in college within 3-years of graduating high school. The dependent variable in columns (3)-(4) is whether or not a student earned a degree from a 2-year institution within 3 years of graduating high school. The dependent variable in columns (5)-(6) is whether or not a student earned a degree from a 4-year institution within 6 years of graduating high school. Students in the control group have a GPA $\in [0, 3.0)$. Standard-errors in parentheses clustered at the school level. *p<0.1; **p<0.05; ***p<0.01