Pushing College Advising Forward: Experimental Evidence on Intensive Advising and College Success

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Abstract

While Hispanic students represent the fasting-growing segment of the American school-age population, substantial gaps exist in college enrollment and Bachelor's attainment between Hispanic and White and Asian students. Numerous factors contribute to these disparities and disproportionally affect Hispanic youth. In this paper, we contribute evidence on the impact of an intensive college advising program on Hispanic students' college participation and degree attainment. We report on a multi-cohort randomized controlled trial of College Forward, which provides individualized advising from junior year of high school through college for a majority Hispanic, lower-income student population in Texas. Students who receive College Forward advising are 6.5 percentage points more likely to earn a Bachelor's degree within 5 years of high school graduation; this effect appears largely driven by shifting high school graduates from the extensive margin of not going to college at all to instead enroll at four-year colleges and universities. Despite the costs associated with intensive advising programs like College Forward, back of the envelope calculations suggest that the benefit from increased college graduation induced by the program outweighs operating costs in less than three years following college completion.

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1 Introduction

Individuals of Hispanic origin are the fastest growing segment of the U.S. population, accounting for more than half of the population growth in the last decade (United States Census Bureau 2019; Schaeffer 2019). By 2050 Hispanic individuals will make up a quarter of all Americans, nearly a third of children aged 0-17, and will be the single largest demographic group represented in U.S. public schools (United States Census Bureau 2023; The Pew Charitable Trusts 2008). Corresponding to this growth in the general population, Hispanic students are also the largest growing segment of college enrollees, increasing by 148% from 2000 to 2018.

Despite this steady increase in college enrollment over the last two decades, Hispanic youth continue to lag considerably behind their peers in postsecondary education participation: 33% of Hispanic 18-to-24 year olds were enrolled in college in 2021 as compared to 60% of Asian and 38% of White students (National Center for Education Statistics 2023). These enrollment disparities contribute to lower rates of Bachelor's degree attainment: 25% of Hispanic youth earn a Bachelor's degree compared with 72% of Asian youth and 45% of White youth. Hispanic youth were particularly affected by the COVID-19 pandemic, with 50% of Hispanic students reporting it was difficult for them to remain enrolled in college – the highest share of any group (Ray 2023).

Numerous factors contribute to these enrollment and degree attainment disparities. At a structural level, Hispanic students are more likely to live in communities with higher poverty and lower educational attainment than their non-Hispanic White peers (Lichter and Johnson 2021). Hispanic students tend to have lower rates of college aspirations than other ethnic groups, which is driven in part by students' lack of information about college (Kao and Tienda 1998; Schneider and Saw 2016). Hispanic students, and specifically English language learners, disproportionately lack access to advanced placement courses, and as a result may not receive the same level of college preparation as non-Hispanic peers both in terms of academics and information provided by teachers (Solórzano and Ornelas 2004; Kanno and Kangas 2014). Hispanic students are more likely to report that attending college close to home is an important factor in their search process, which may contribute to decreased likelihood of applying to selective institutions and decreased enrollment in out-of-state institutions as compared to their non-Hispanic peers (Desmond and López Turley 2009; Smith et al. 2013; Niu 2014). Additionally, policies restricting financial aid for undocumented students create affordability barriers that largely impact Hispanic youth (Koohi 2017; Ngo and Hinojosa 2022).

Despite markedly lower college participation among Hispanic students and a unique set of

barriers that differentially affect this population, existing causal evidence on policies and strategies to improve postsecondary access, and particularly degree attainment, for Hispanic students is very limited. Several programs that provide comprehensive advising and financial support for *current* college students have generated sizeable improvements in college persistence and degree attainment, but these programs are limited to the intensive margin of current enrollees and do not address the extensive margin of participation (Hallberg et al. 2023; Dai et al. 2022). Bettinger and Evans (2019) demonstrate that school-wide college advising from the College Advising Corps in Texas increases Hispanic student enrollment at community colleges in the year after high school by approximately three percentage points, but these impacts quickly fade and there is no effect on persistence into the second year of college for this group. Phillips and Reber (2021) find suggestive but imprecisely estimated evidence that virtual peer mentoring may improve enrollment and persistence at University of California institutions among Hispanic youth in California. Cunha, Miller, and Weisburst (2018) show that college information centers in Texas, staffed by peer mentors, generated small effects on enrollment, but these impacts also faded and there was no effect on degree attainment. Gurantz et al. (2017) demonstrate that the College Board's National Hispanic Recognition Program led to slight increases (1.5 percentage points) in enrollment at four-year institutions but did not increase degree attainment. The study was moreover limited to the highest-achieving Hispanic students around the threshold of receiving this recognition, so has limited generalizability.

Several other studies demonstrate that more intensive college advising and mentoring programs can generate large improvements in college enrollment and success among historically-marginalized communities (Avery 2013; Barr and Castleman 2021; Carrell and Sacerdote 2017). These programs may be particularly well-suited to address information asymmetries and aspirational gaps that affect whether and where Hispanic students apply to college. Yet prior rigorous evaluations of intensive advising programs have focused on populations with substantially higher shares of white and Asian students (e.g. Avery 2013; Barr and Castleman 2021), as shown in Table 1.[1]

In this paper, we contribute evidence on the impact of intensive college advising on Hispanic students' enrollment in and graduation from college. We focus on the Texas-based College Forward model.[2] College Forward recruits lower-income students from Austin and Houston-area

[1]Note that Avery (2013) reports only the percentage of students from the Hmong ethnic group, which is included in the "Asian" row.

[2]Subsequent to our RCT College Forward joined the national college advising non-profit College Possible, and is

high schools and provides them with one-on-one advising starting at the beginning of their junior year of high school and continuing throughout college. College Forward primarily serves Hispanic, first generation, and lower-income students. The program serves more than twice the share of Hispanic students as any other rigorously-evaluated advising program, and aside from Bottom Line serves the largest share of lower-income students. We conducted a multi-cohort randomized controlled trial (RCT) with College Forward, randomizing at the student-level, within high school, among program applicants. There are 1,605 students in the experimental sample, 963 of whom were assigned to receive College Forward advising. To account for modest crossover between experimental groups, we report both Intent to Treat (ITT) results based on students initial group assignment and a crossover-adjusted ITT, in which we use experimental group random assignment as an instrument for receiving the offer of College Forward advising.[3] To date we have been able to follow the full experimental sample into their fourth year following high school and have been able to observe Bachelor's degree attainment rates five years after high school for the first two experimental cohorts.

Our analyses yield several primary results; we focus on here on our crossover-adjusted ITT estimates. First, College Forward advising has a substantial positive effect on Bachelor's degree attainment. Students randomly assigned to receive advising were 6.5 percentage points more likely to attain a Bachelor's degree within 5 years of graduating high school than students in the control group, a 32% relative increase. This follows from large effects on the extensive margin of college enrollment and on persistence throughout college. Students randomly assigned to College Forward were 7.3 percentage points more likely to initially enroll than students in the control group (a 12% relative increase), driven primarily by increasing the share of treated students enrolling at four-year institutions. Students were 4.8 percentage points more likely to be continuously enrolled in college through their fourth year (enrolled each fall and spring semester post high school graduation), a 16% relative increase.

Our paper makes multiple contributions to the existing literature. College Forward is the most comprehensive advising program of any that have been rigorously evaluated. Its advising starts a year earlier than other programs studied in the literature, and it provides advising throughout

now referred to as College Possible Texas.

[3]College Forward offered advising to 25 students who we assigned to the control group, and 25 students we assigned to the treatment group did not receive an offer of advising.

students' college careers, regardless of where they enroll.[4] By starting advising at the beginning of junior year in high school, College Forward may have a bigger effect on students' application choice set by influencing students' college entrance exam taking, college aspirations and expectations, and engagement in an earlier and more comprehensive college search. And by continuing to offer advising throughout college, College Forward may mitigate challenges students face in college that could lead to withdrawal (Bound et al. 2010; Kuh et al. 2008; Walton and Cohen 2011).

Importantly, our paper also presents the first rigorous causal evidence of a program that can lead to large improvements in both college access *and* completion among Hispanic youth. Given the rapid growth of the Hispanic youth population in the U.S. and the degree to which Hispanic youth currently lag other groups in college participation, our evaluation suggests intensive advising may be an effective strategy to promote greater educational equity. Despite the costs associated with intensive advising programs like College Forward, back of the envelope calculations suggest that the benefit from increased college graduation induced by the program outweighs operating costs in less than three years following college completion.

2 College Forward

College Forward, now College Possible Texas, was founded in 2003 with the mission of helping lower-income students in Texas enroll in and graduate from college. At the time of this evaluation, College Forward partnered with 16 high schools across Austin and Houston to provide advising to their students. Students are eligible to apply for College Forward if they are in the top 60% of their high school class and either a first-generation student or eligible for free and reduced-price lunch. Students are paired with a College Forward coach, a recent college graduate hired through AmeriCorps. College Forward advising starts as early as the beginning of students' junior year of high school and continues throughout college. College Forward's high school advising focuses on college entrance exam taking and re-taking; college exploration, selection and applications; financial aid applications and appeals; college choice; and the summer transition from high school to college. This advising is delivered through afterschool classes within the student's high school where they meet with their coach one-on-one. During a student's junior year, after school classes are offered

[4]Bottom Line provides advising to students in college if they enroll at one of Bottom Line's target institutions. See Barr and Castleman (2021) for additional detail.

twice per week from January to June; attendance at these classes is not required. During their senior year, classes are offered twice per week from September to December, and biweekly workshops are offered from January to June. Additionally, coaches meet 1-on-1 with students throughout the week as necessary.

College Forward also runs programming for parents, providing workshops in both English and Spanish to assist parents with understanding their children's college-going process. Once a student matriculates to college, they can continue to receive advising from their College Forward coach regardless of where they attend. This advising takes the form of contact via social media and phone calls and occasional visits to in-state schools.

While at the time of this evaluation College Forward did not collect data on student engagement, College Forward program leadership provided estimates of student time with advisors, highlighting the intensive nature of the program. Based on this internal analysis, during the study period students participated in an average of 10-15 after school classes with their advisors per year in high school. Students could also set up meetings with their advisors on top of these after school classes. Between the length of the program and the numerous opportunities for advisor-student interactions, College Forward provides some of the most intensive college advising studied in this line of literature thus far.

3 Empirical Strategy

We worked with College Forward to modify their application process to implement an RCT for the high school classes of 2017 through 2020. The application pool contained students at 11 local high schools in Austin and Houston, Texas; we used high school as a randomization block. Each year, we assigned approximately 60% of the applicants from each high school who met the College Forward eligibility requirements to the offer of College Forward advising, an offer which virtually all students took up, or to a control group that received no advising services from College Forward. In Fall 2019, College Forward noticed the evaluation IDs previously assigned to the student-level files did not uniquely identify students in their database. College Forward used raw application data sent to the research team to match students back and assigned them a new evaluation ID, resulting in a 94% match rate. There are no compositional differences between the students who matched and those who did not. All results we report in this paper are based on analysis we

conducted with the matched sample. For further detail on this data matching issue, see Appendix A. In addition to this matching issue, College Forward also discovered that there were 50 crossover students whose participation group differed from their assignment group (25 students were assigned to the treatment group and ended up in the control group, and vice versa). Section 3.2 discusses how we handle this issue empirically.

Of the 1,605 students in the matched sample, 963 are in the treatment group and the remaining 642 are in the control group.[5] The first cohort, the graduating class of 2017, is the largest with 621 students in the experimental sample. The second, third and fourth cohorts have 388, 436 and 160 students, respectively.

3.1 Data

We combine two main data sources to conduct our analysis: student application data from College Forward and National Student Clearinghouse college enrollment data. Student applications provide baseline demographic and academic information such as gender, race/ethnicity, parental and sibling education levels, primary household language, and receipt of Free and Reduced Price Lunch.[6] In Table 2 we provide summary statistics of these student-level measures and provide the results of our tests for baseline equivalence across the treatment and control groups. Over 60% of students in our sample are Hispanic and another 13% are Black. Seventy-four percent of students are first generation, and 69% receive Free and Reduced Price Lunch. Additionally, 43% of the sample speaks a primary language other than English at home. As noted previously, when comparing the College Forward student population to that of similar advising programs (Table 1), College Forward serves over double the share of Hispanic students as other programs and one of the highest shares of low-income students. The sample is well-balanced except for a modest significant difference in the share of White students in the treatment group, which may arise probabilistically given the number of tests we conduct. Table B1 in Appendix B demonstrates that the treatment and control groups are also well-balanced within each of the four cohorts of students included in this analysis.

We match students to the National Student Clearinghouse (NSC), which contains detailed

[5]Differences in treatment/control ratios across cohorts are reflective of the minimum service numbers College Forward had to meet in each high school.

[6]Note that we cannot include measures of academic performance in this analysis, as students apply to the program prior to taking the ACT/SAT, and we do not have access to PSAT data. Additionally, we have a measure of GPA, but it is not standardized across high schools and can take on different ranges (i.e. out of 4.0, 5.0, etc).

term-level college enrollment data for the students in the sample. The NSC is a well-established data source for information on college enrollment and covers 97% of students enrolled in public and private institutions. Additionally, we match NSC enrollment records to the College Scorecard institution-level data from September 2022 to create indicators of college quality. The College Scorecard institution-level data is available for Title IV-participating, Integrated Postsecondary Education Data System (IPEDS) institutions. The data reported generally come from college's reports to IPEDS.[7] All but eight colleges observed in our NSC data successfully match to the College Scorecard.

3.2 Empirical Model

We estimate the impact of being offered College Forward advising on a variety of college enrollment, enrollment quality and persistence outcomes. We employ two different econometric models in our analysis. The first is an OLS model to estimate ITT impacts, with a treatment indicator based on a student's original experimental group assignment from our randomization process:

$$y_i = \beta_0 + \beta_1 Treatment\_Assignment_i + \beta_2 X_i + \beta_3 FE_{HS*COHORT} + \epsilon_i \tag{1}$$

where y_i is the college outcome of interest for student i, $Treatment\_Assignment$ is an indicator for whether student i was originally randomized into the group which received the offer of College Forward advising, and vector X_i contains student-level covariates as outlined in Table 2. We include a set of high-school by cohort fixed effects to account for the level at which we randomized students. The coefficient of interest is β_1, which provides ITT estimates of College Forward advising.

The second model we use is an instrumental variables (IV) model in which we use students' original experimental group assignment as an instrument for the offer of College Forward advising; this yields a crossover-adjusted ITT estimate. The IV model takes the following form:

$$Treatment\_Offer_i = \alpha_0 + \alpha_1 Treatment\_Assignment_i + \alpha_2 X_i + \alpha_3 FE_{HS*COHORT} + u_i \tag{2}$$

$$y_i = \gamma_0 + \gamma_1 \widehat{Treatment\_Offer}_i + \gamma_2 X_i + \gamma_3 FE_{HS*COHORT} + \epsilon_i \tag{3}$$

Where $Treatment\_Assignment_i$ is the student's original randomization group and $Treatment\_Offer_i$ corresponds to the student's ultimate treatment status. These variables only

[7] See https://collegescorecard.ed.gov/data/documentation for more detail.

differ for the 50 crossover students. All other variables in equations 2 and 3 correspond to the variables described in equation 1 above. This IV approach allows us to address the crossover issue by estimating the effect of the offer of College Forward on the compliers in the sample, i.e. those whose offer to participate in College Forward (or not) is in line with their original randomized assignment to the treatment or control group. While we do not have data on take-up of the advising offer, College Forward has shared with us that the vast majority of students who receive the offer join the program. This crossover-adjusted ITT is our preferred estimate and is the estimate referenced in the remainder of the paper, though in the regression tables we present both the ITT and crossover-adjusted ITT effects (OLS and IV models).

4 Results

4.1 Impacts on Enrollment and Enrollment Quality

In Table 3 we present estimates of the impact of College Forward advising on enrollment in college during the fall semester immediately following high school. We also report impacts separately on enrollment at four-year and two-year institutions. Table 3 presents impact estimates pooled across all four experimental cohorts, using both OLS and IV models that include the full set of covariates described in Table 2. College Forward increases the share of students enrolling in college by 7.3 percentage points, a 12% increase relative to the control group (final column of Table 3, crossover-adjusted ITT). This effect is driven primarily by increasing the share of students attending a four-year college or university; the increase in four-year enrollment is 16% relative to the control group.

In Table 4 we present estimates of the impact of College Forward advising on several dimensions of institutional quality: the share of students attending an institution with average SAT scores above 1000, 1150, and 1300 and the share of students attending an institution with average annual earnings among graduates above $40,000, $50,000 and $60,000. For students not enrolled in college during the first fall semester, these indicators take value 0. These results highlight the increase in enrollment at moderately selective institutions as a result of receiving College Forward advising. For instance, students assigned to College Forward are 5.7 percentage points more likely to attend an institution with an average SAT score of over 1000, and 2.8 percentage points more

likely to attend an institution with average SAT scores of over 1300, a 30% increase relative to the control group. The average SAT score among all SAT test takers in 2019 was 1050, indicating that enrollment impacts are concentrated at institutions with higher-achieving students (College Board n.d.). Finally, College Forward students are more likely to enroll in institutions with higher average earnings of graduates. Students are 8.8 percentage points more likely to enroll in institutions with average graduate earnings of above $40,000 and 4.3 percentage points more likely to enroll in institutions whose graduates earn over $50,000 a year on average. These enrollment impacts indicate that students who receive College Forward advising are enrolling in four-year colleges with selective student bodies and positive post-graduation outcomes.

4.2 Impacts on College Persistence

In Table 5 we investigate the impact of College Forward advising on persistence into the fourth fall of college, which we can measure for the full experimental sample. For each year following high school, we measure three outcomes: (1) point-in-time enrollment in the fall semester each year following high school; (2) whether the student was enrolled in the fall semester at the same college as during their first fall semester; and (3) whether the student was continuously enrolled up until that fall semester, meaning they were enrolled every fall and spring semester up until that point. We see positive impacts of College Forward advising on all of these measures. The first row in each of the first two panels of Table 5 shows that College Forward has large impacts on fall enrollment in students' second and third years post-high school. Students who received College Forward advising were 5.5 percentage points (10%) more likely to be enrolled their second fall post-high school and 5.2 percentage points (11%) more likely to be enrolled their third fall post-high school. College Forward students were 2.6 percentage points more likely to be enrolled their fourth fall post high school, though this finding is not statistically significant.

The second row of the first panel shows that students who receive College Forward advising are 5.2 percentage points (12%) more likely to stay enrolled at the same college as their first year during their second year of college. This outcome is insignificant in years three and four of college. Finally, row three of Table 5 demonstrates that College Forward has a large impact on continuous enrollment in college: treated students were 6 percentage points (13%) more likely to remain continuously enrolled into the second year of college and 4.8 percentage points (16%) more likely to remain continuously enrolled into the fourth year of college. The results on continuous

enrollment in particular imply that students who receive College Forward advising pursued a well-matched institution with their initial enrollment, and are thus less likely to either transfer schools or drop out altogether.

4.3 Impacts on Degree Attainment

In Table 6 we present analyses on the impact of College Forward on Bachelor's degree attainment for the pooled sample. We can measure two- and three-year degree outcomes for the full experimental sample; four year outcomes include the first three cohorts, and so on. Table 6 present results for Bachelor's degree attainment within four, five and six years after high school graduation. While we do not see a significant increase in Bachelor's degree attainment within 4 years, students who received College Forward advising were 6.5 percentage points more likely to receive a Bachelor's degree within 5 years, a 32% increase relative to the control group. In Table B2 in Appendix B we present results on Associate's degree attainment and Bachelor's degree attainment by cohort. The outcomes we present are receiving an Associate's degree within 2, 3 or 4 years and Bachelor's degree attainment in 4 and 5 years broken out by cohort. Consistent with the initial enrollment impacts, we see no impact of College Forward advising on Associate's degree attainment. When we break Bachelor's degree impacts out by cohort, we find that Bachelor's degree attainment within 4 years is not statistically different from that of the control group for any of the first three cohorts, though the magnitudes of these estimates are much larger for cohorts 2 and 3 than for cohort 1. Impacts on Bachelor's degree attainment within 5 years are similar in magnitude for both cohorts 1 and 2.

4.4 Subgroup Impacts

We explored whether the impacts of College Forward on initial enrollment vary by the student-level characteristics described in Table 2. In Table B3 in Appendix B we present results on whether College Forward's impacts on initial enrollment varied across student subgroups. The only significant difference in treatment effects is between the male and female subgroups, and only within the crossover-adjusted ITT sample; given the small sample size of the male subgroup, we interpret this result with caution. We do not find significant between-group differences in enrollment in any other subgroups.

5 Discussion

Our results demonstrate large impacts on college enrollment and Bachelor's degree attainment as a result of College Forward advising, the most comprehensive college advising model that has been rigorously evaluated to date. College Forward's impacts operate at the extensive margin of college enrollment, supporting students who would otherwise not enroll in college to not only pursue post-secondary education but to do so at four-year colleges and universities.

Over sixty percent of students served by College Forward are Hispanic; this is more than double the share of Hispanic students served by any other rigorously-evaluated college advising program. These results are both important and policy-relevant given that Hispanic students are the most rapidly growing share of the college-going population in the U.S. and face a unique set of barriers to postsecondary participation that intensive advising is well suited to assist with. College Forward's impact may operate on multiple margins. Given Hispanic students' decreased access to advanced placement courses and information about college, College Forward may aid in filling in these information gaps about college attendance and financial aid options. Additionally, College Forward advisors may help Hispanic students balance preferences to stay close to home after high school with finding schools that fit students' academic potential. This focus on supporting students to "move up the selectivity ladder" through geographically-proximate institutions may have important implications for broader efforts to increase socioeconomic representation at selective colleges and universities in the U.S., especially given small or null impacts of national-level initiatives to improve college enrollment quality among higher-achieving, lower-income students (Gurantz et al. 2019; Sullivan et al. 2021).

College Forward's impacts are particularly noteworthy given the financial returns to a college degree. Median earnings of individuals with a college degree were $29,000 higher than those with a high school degree but no college degree in 2021 (Ma and Pender 2023). This premium is $21,200 compared to individuals with Associates degrees and $22,400 compared to individuals with some college but no degree (Ma and Pender 2023). Increasing Bachelor's degree attainment among this population of students could help in closing inequities in longer-term labor market outcomes; the median household income for Hispanic households in 2022 was $56,230, compared to an overall median of $64,240 (Guzman and Kollar 2023). While intensive advising programs like College Forward are resource-intensive, our back-of-the-envelope calculations, shown in Table 7,

suggest the earnings benefits of programs like College Forward likely exceed costs. We estimate the return to College Forward based on the observed 6.5 percentage point increase in 5-year Bachelor's attainment for the first two cohorts of students (1009 students, 620 of whom are treated). College Forward estimates the cost per student over the life cycle of the program to be around $4,400 for a student enrolled in college for five years ($1,200 for each year in high school and $400 for each year in college). For the 620 treated students in the first two cohorts, this brings total cost to $2.73 million dollars. A 6.5 percentage point increase in Bachelor's attainment induced by treatment means an extra 40 students graduating with a bachelor's degree, so the cost per student induced to earn a Bachelor's degree comes to $68,250. Given the median earnings for students with Bachelor's degrees is $29,000 higher than students with high school diplomas and no college experience, College Forward likely has a positive rate of return in just over two years after students graduate college. Similarly, we estimate this return based on the earnings premium for students who earn Bachelor's degrees as compared to students with some college but no degree, which is $22,400 (panel 2 of Table 7). Given this more conservative earnings premium, benefits of the program exceed costs in just over three years after college graduation. These calculations show that while intensive advising programs are more cost intensive than other methods tested in the literature, they result in large and fast returns on investment.

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Tables

Table 1: Background Characteristics, College Forward and Similar Programs

	College Forward	Bottom Line	CollegePoint	College Possible	NH Peer Mentor
Female	0.700	0.701	0.549	0.59	0.425
First Gen	0.750	0.811	0.525		
Low Income Proxy	0.714	1.00	0.403		0.286
White	0.075	0.027	0.428		0.799
Black	0.128	0.324	0.069		
Hispanic	0.656	0.317	0.192		
Asian	0.040	0.237	0.254	0.691	
Race - Other	0.081	0.056	0.06		
Observations	963	2422	21073	134	871

Notes: College Forward sample presented is treated students from all four cohorts included in this analysis (based on original treatment assignment group). Demographics for each organization, starting in column 2, are from: Table 1 of Barr and Castleman (2021); Table 3 of Sullivan et al. (2021); Table 2 from Avery (2013); and Table 1 from Carrell and Sacerdote (2017). Note that Table 2 from Avery (2013) presents statistics for only students from the Hmong ethnic group, which is recorded under the "Asian" column.

Table 2: Demographic Characteristics and Balance

	OLS		**IV**	
	Control Mean	Treatment	Control Mean	Treatment
Female	0.681	0.004	0.679	0.004
		(0.024)		(0.026)
First Gen	0.743	0.008	0.743	0.008
		(0.022)		(0.024)
Receive FRPL	0.690	0.001	0.687	0.002
		(0.023)		(0.025)
White	0.112	-0.028*	0.112	-0.029*
		(0.015)		(0.016)
Black	0.129	-0.006	0.129	-0.006
		(0.017)		(0.018)
Hispanic	0.640	0.008	0.637	0.009
		(0.024)		(0.026)
Asian	0.030	0.011	0.030	0.011
		(0.009)		(0.010)
Race - Other	0.076	0.015	0.079	0.016
		(0.014)		(0.015)
Non-English at Home	0.433	-0.004	0.428	-0.004
		(0.025)		(0.027)
Observations	642	963	642	963

Notes: The first two columns present results from an OLS regression of the demographic characteristic (row title) on a treatment indicator based on original treatment assignment. Column 1 presents the control mean for each demographic characteristic and column 2 presents the point estimate from a regression of the characteristic on treatment assignment, controlling for high school by cohort. The final two columns present the control mean and point estimate from an IV model where the treatment offer is instrumented with the original treatment assignment group. Balance across missing indicators for all variables not shown, but is met. Standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 3: Effects on College Enrollment, First Fall after High School Graduation

	ITT		**IV**	
	Control Mean	Treatment	Control Mean	Treatment
Enrolled, Anywhere	0.601	0.068***	0.595	0.073***
		(0.025)		(0.026)
Enrolled, 4 Year	0.372	0.056**	0.361	0.060**
		(0.025)		(0.027)
Enrolled, 2 Year	0.229	0.013	0.234	0.013
		(0.022)		(0.023)
Observations		1605		1605

Notes: The first two columns present results from an OLS regression of the enrollment outcome (row title) on a treatment indicator based on original treatment assignment. Column 1 presents the control mean for each demographic characteristic and column 2 presents the point estimate from a regression of the outcome on treatment assignment, controlling for the covariates shown in Table 2 and including high school by cohort fixed effects. The final two columns present the control mean and point estimate from an IV model where the treatment offer is instrumented with the original treatment assignment group. All outcomes are measured the student's first fall after graduating high school. Standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 4: Effects on College Quality, First Fall after High School Graduation

	ITT		IV	
	Control Mean	Treatment	Control Mean	Treatment
Average SAT Score Above...				
1000	0.321	0.053**	0.315	0.057**
		(0.025)		(0.026)
1150	0.146	0.006	0.139	0.006
		(0.018)		(0.019)
1300	0.097	0.026*	0.092	0.028*
		(0.016)		(0.017)
Average Earnings Above...				
40K	0.525	0.083***	0.519	0.088***
		(0.025)		(0.026)
50K	0.293	0.040*	0.285	0.043*
		(0.024)		(0.025)
60K	0.106	0.016	0.100	0.017
		(0.016)		(0.017)
Observations		1605		1605

Notes: The first two columns present results from an OLS regression of the enrollment outcome (row title) on a treatment indicator based on original treatment assignment. Column 1 presents the control mean for each demographic characteristic and column 2 presents the point estimate from a regression of the outcome on treatment assignment, controlling for the covariates shown in Table 2 and including high school by cohort fixed effects. The final two columns present the control mean and point estimate from an IV model where the treatment offer is instrumented with the original treatment assignment group. All outcome measures constructed from College Scorecard data. Students who were not enrolled are coded as 0s for quality outcome measures. Standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 5: Effects on College Persistence

	ITT		IV	
	Control Mean	Treatment	Control Mean	Treatment
Second Year Enrollment				
Enrolled, Second Fall	0.556	0.051**	0.550	0.055**
		(0.025)		(0.027)
Enrolled, Same College	0.447	0.049*	0.439	0.052*
		(0.026)		(0.027)
Continuously Enrolled	0.483	0.056**	0.478	0.060**
		(0.026)		(0.027)
Observations		1605		1605
Third Year Enrollment				
Enrolled, Third Fall	0.483	0.048*	0.477	0.052*
		(0.026)		(0.027)
Enrolled, Same College	0.329	0.022	0.319	0.024
		(0.025)		(0.026)
Continuously Enrolled	0.386	0.053**	0.382	0.056**
		(0.025)		(0.027)
Observations		1605		1605
Fourth Year Enrollment				
Enrolled, Fourth Fall	0.435	0.025	0.428	0.026
		(0.026)		(0.027)
Enrolled, Same College	0.266	0.007	0.254	0.007
		(0.023)		(0.024)
Continuously Enrolled	0.312	0.044*	0.308	0.048*
		(0.024)		(0.026)
Observations		1605		1605

Notes: The first two columns present results from an OLS regression of the enrollment outcome (row title) on a treatment indicator based on original treatment assignment. Column 1 presents the control mean for each demographic characteristic and column 2 presents the point estimate from a regression of the outcome on treatment assignment, controlling for the covariates shown in Table 2 and including high school by cohort fixed effects. The final two columns present the control mean and point estimate from an IV model where the treatment offer is instrumented with the original treatment assignment group. Standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 6: Effects on College Graduation

	ITT		IV	
	Control Mean	Treatment	Control Mean	Treatment
Bachelors within 4 Years	0.134	0.021	0.128	0.023
		(0.019)		(0.021)
Observations		1445		1445
Bachelors within 5 Years	0.210	0.058**	0.201	0.065**
		(0.028)		(0.030)
Observations		1009		1009
Bachelors within 6 Years	0.251	0.043	0.239	0.045
		(0.037)		(0.037)
Observations		621		621

Notes: The first two columns present results from an OLS regression of the graduation outcome (row title) on a treatment indicator based on original treatment assignment. Column 1 presents the control mean for each demographic characteristic and column 2 presents the point estimate from a regression of the outcome on treatment assignment, controlling for the covariates shown in Table 2 and including high school by cohort fixed effects. The final two columns present the control mean and point estimate from an IV model where the treatment offer is instrumented with the original treatment assignment group. Standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 7: Benefit-Cost Analysis, First Two Cohorts

Based on a 6.5pp increase in Bachelor's degree attainment...	
Comparison Group: HS Degree	
Number of Students Induced to Graduate	40
Cost per Student Induced to Graduate	$68,250
Earnings Premium per Student Induced to Graduate	$29,000
Number of Years for Benefit to Exceed Cost	2.35
Comparison Group: Some College, No Degree	
Number of Students Induced to Graduate	40
Cost per Student Induced to Graduate	$68,250
Earnings Premium per Student Induced to Graduate	$22,400
Number of Years for Benefit to Exceed Cost	3.05

Notes: This table presents a back-of-the-envelope benefit-cost analysis for the first two cohorts of College Forward students. Earnings premium estimates are from Ma and Pender (2023). Panel 1 uses the earnings premium for bachelor's degree recipients as compared to high school graduates with no college experience. Panel 2 uses the earnings premium for bachelor's degree recipients as compared to students with some college experience but no degree.

Appendix A: Data Matching Issue

As noted in section 3, prior to requesting NSC data in Fall 2019 for the first three cohorts of students, a member of the College Forward team noticed that the evaluation IDs previously assigned to the student-level files did not uniquely identify students in College Forward's identifiable student database. College Forward used the student-level data (e.g. demographic characteristics, responses to open-ended questions) contained in the original raw application data sent to the research teams for randomization to manually match student records back to the College Forward identifiable student database. This resulted in nearly a 94% match rate. In addition to the 6% of students in the original sample who were not in the matched sample, i.e. College Forward did not have a record of these student application records in their database, there were 25 students assigned to the control group who received treatment, and 25 students assigned to treatment who were in the control group (less than 4% of the matched sample in total).

In order to confirm the validity of the RCT with the matched sample, we conducted additional balance tests to ensure that the updated matched sample is balanced across the treatment and control groups and that it is similar on observable characteristics to the original sample. Table 2 shows that the matched sample is balanced across observable characteristics, so our estimate of College Forward's impact still has internal validity. We also compare the matched sample with the original applicant sample College Forward sent to our research team to ensure that there are not compositional differences between the original and matched sample. As we show in Table B4 in Appendix B, the two samples are very similar on student demographics.[8] After analyzing the results from these two tests, we are confident that the integrity of the randomized controlled trial holds up despite the data discrepancy and that we can continue to estimate the causal effect of College Forward on students' college outcomes.

[8]Note that in returning the matched sample, College Forward was able to fill in some previously missing baseline data points for students who matched their records, contributing to the decrease in missingness in the matched sample.

Appendix B: Supplemental Tables

Table B1: Demographic Characteristics and Balance by Cohort

	ITT		IV	
	Control Mean	Treatment	Control Mean	Treatment
Cohort 1				
Female	0.706	-0.032	0.699	-0.034
		(0.040)		(0.041)
First Gen	0.701	0.021	0.695	0.022
		(0.039)		(0.040)
Receive FRPL	0.636	0.040	0.628	0.041
		(0.037)		(0.038)
White	0.087	-0.017	0.088	-0.018
		(0.022)		(0.022)
Black	0.203	0.002	0.212	0.002
		(0.033)		(0.034)
Hispanic	0.602	-0.011	0.588	-0.012
		(0.040)		(0.042)
Asian	0.035	0.017	0.035	0.017
		(0.017)		(0.017)
Race - Other	0.048	0.014	0.049	0.015
		(0.019)		(0.020)
Non-English at Home	0.433	-0.004	0.425	-0.004
		(0.042)		(0.043)
Observations	231	390	226	395
Cohort 2				
Female	0.639	0.067	0.650	0.082
		(0.049)		(0.059)
First Gen	0.787	-0.006	0.798	-0.008
		(0.042)		(0.051)
Receive FRPL	0.619	0.056	0.626	0.069
		(0.050)		(0.060)
White	0.142	-0.048	0.135	-0.059
		(0.033)		(0.040)
Black	0.084	0.005	0.074	0.006
		(0.031)		(0.037)
Hispanic	0.671	0.021	0.675	0.025
		(0.049)		(0.059)
Asian	0.045	0.001	0.049	0.001
		(0.021)		(0.026)
Race - Other	0.058	0.013	0.067	0.016
		(0.026)		(0.031)
Non-English at Home	0.432	-0.018	0.436	-0.022
		(0.052)		(0.063)
Observations	155	233	163	225

Table B1: Demographic Characteristics and Balance by Cohort, Continued

	ITT		IV	
	Control Mean	Treatment	Control Mean	Treatment
Cohort 3				
Female	0.714	-0.032	0.711	-0.032
		(0.045)		(0.044)
First Gen	0.783	-0.033	0.781	-0.034
		(0.041)		(0.041)
Receive FRPL	0.794	-0.071*	0.791	-0.072*
		(0.042)		(0.041)
White	0.101	-0.035	0.102	-0.036
		(0.027)		(0.027)
Black	0.095	-0.012	0.096	-0.012
		(0.028)		(0.028)
Hispanic	0.651	0.035	0.647	0.036
		(0.047)		(0.046)
Asian	0.011	0.011	0.011	0.011
		(0.012)		(0.012)
Race - Other	0.132	0.004	0.134	0.004
		(0.032)		(0.032)
Non-English at Home	0.450	0.002	0.444	0.002
		(0.048)		(0.048)
Observations	189	247	187	249
Cohort 4				
Female	0.597	0.084	0.591	0.085
		(0.079)		(0.079)
First Gen	0.672	0.104	0.667	0.106
		(0.070)		(0.070)
Receive FRPL	0.746	-0.080	0.742	-0.082
		(0.072)		(0.072)
White	0.164	0.003	0.167	0.003
		(0.062)		(0.062)
Black	0.075	-0.047	0.076	-0.048
		(0.035)		(0.035)
Hispanic	0.672	-0.023	0.682	-0.023
		(0.077)		(0.077)
Asian	0.030	0.011	0.015	0.012
		(0.029)		(0.029)
Race - Other	0.060	0.051	0.061	0.052
		(0.044)		(0.044)
Non-English at Home	0.388	0.011	0.379	0.011
		(0.073)		(0.073)
Observations	67	93	66	94

Notes: Each panel represents a different cohort. Within a panel, the first two columns present results from an OLS regression of the demographic characteristic (row title) on a treatment indicator based on original treatment assignment. Column 1 presents the control mean for each demographic characteristic and column 2 presents the point estimate from a regression of the characteristic on treatment assignment, controlling for high school by cohort. The final two columns present the control mean and point estimate from an IV model where the treatment offer is instrumented with the original treatment assignment group. Balance across missing indicators for all variables not shown, but is met. Standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 8: Effects on College Graduation

	ITT		IV	
	Control Mean	Treatment	Control Mean	Treatment
Panel A: Associates Outcomes				
Associates within 2 Years	0.033	0.001	0.031	0.001
		(0.009)		(0.009)
Observations		1605		1605
Associates within 3 Years	0.062	0.011	0.064	0.012
		(0.013)		(0.014)
Observations		1605		1605
Associates within 4 Years	0.106	-0.020	0.106	-0.021
		(0.016)		(0.017)
Observations		1445		1445
Panel B: Effects by Cohort				
Cohort 1: Bachelors within 4	0.134	-0.002	0.124	-0.002
		(0.029)		(0.030)
Observations		621		621
Cohort 1: Bachelors within 5	0.195	0.049	0.181	0.051
		(0.034)		(0.035)
Observations		621		621
Cohort 2: Bachelors within 4	0.142	0.034	0.135	0.041
		(0.039)		(0.046)
Observations		388		388
Cohort 2: Bachelors within 5	0.232	0.064	0.227	0.079
		(0.047)		(0.055)
Observations		388		388
Cohort 3: Bachelors within 4	0.127	0.035	0.128	0.036
		(0.039)		(0.038)
Observations		436		436

Notes: The first two columns present results from an OLS regression of the graduation outcome (row title) on a treatment indicator based on original treatment assignment. Column 1 presents the control mean for each demographic characteristic and column 2 presents the point estimate from a regression of the outcome on treatment assignment, controlling for the covariates shown in Table 2 and including high school by cohort fixed effects. The final two columns present the control mean and point estimate from an IV model where the treatment offer is instrumented with the original treatment assignment group. All outcomes are measured the student's first fall after graduating high school. Standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table B3: Effect on Initial Enrollment by Subgroup, First Fall after High School Graduation

	ITT			IV		
	Control Mean	Treatment	P-Value	Control Mean	Treatment	P-Val
Female	0.595	0.090***	.263	0.592	0.098***	.092
		(0.030)		(0.032)		
Male	0.615	0.010		0.602	0.011	
		(0.047)		(0.047)		
First Generation	0.606	0.047	.481	0.600	0.051	.622
		(0.029)		(0.031)		
Non-First Generation	0.627	0.071		0.619	0.073	
		(0.058)		(0.055)		
FRPL	0.587	0.072**	.909	0.580	0.078**	.833
		(0.030)		(0.032)		
Non-FRPL	0.648	0.067		0.639	0.070	
		(0.054)		(0.054)		
White	0.625	0.040		0.611	0.043	
		(0.100)		(0.090)		
Black	0.663	-0.050	.432	0.651	-0.054	.514
		(0.071)		(0.068)		
Hispanic	0.562	0.089***	.639	0.557	0.095***	.453
		(0.032)		(0.033)		
Non-English at Home	0.601	0.084**		0.596	0.090**	
		(0.038)		(0.040)		
English at Home	0.608	0.047		0.602	0.050	
		(0.034)		(0.035)		

Notes: Results from a regression of an indicator for enrollment in college the first fall following high school on a treatment indicator for the subgroup listed in the row title, controlling for the covariates shown in Table 2 and including high school by cohort fixed effects. Control Mean refers to the mean for the students in the given subgroup in the control group. P-Value represents the p-value from the test of equality of regression coefficients within the fully interacted regression models. The coefficients from the Black and Hispanic race categories are tested against the White coefficient. FRPL stands for Free and Reduced Priced Lunch. Standard errors in parentheses. Standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table B4: Demographics of Original and Matched Samples

	Original Sample	Matched Sample
Female	0.687	0.692
First Gen	0.749	0.747
Receive FRPL	0.704	0.705
White	0.087	0.090
Black	0.126	0.128
Hispanic	0.649	0.650
Asian	0.034	0.036
Race - Other	0.079	0.079
Non-English at Home	0.447	0.440
Observations	1702	1605