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Budget Model

Household Finances and Post-Secondary Enrollment

__Series on community colleges__: The Biden-Harris Administration has advocated for providing free community college. This series of briefs takes a deeper dive into the world of community colleges: who attends, who transfers, who graduates, who achieves high marks, and what factors seem to matter for each. In doing so, we hope to shed light on how some students may benefit from this policy, others may not, and what factors form this partition. More briefs can be found __here__.

Summary: Even after accounting for differences in observed student ability, students coming from lower-income households are less likely to attend college. If they attend college, lower-income students are also more likely to attend a two-year community college.

Key Points

- After accounting for differences in high school performance, students from households with a one-standard deviation lower family income are 8 percentage points more likely than the sample average of 20 percent to not enroll in college and 4 percentage points more likely than the 32 percent average to first enroll in community college.

- Conditional on taking the SAT that demonstrates an interest in four-year college, students from households with a one-standard deviation lower family income are 10 percentage points more likely than the 19 percent sample average to start at a community college, a relation that drops only slightly to 8 percentage points when accounting for performance on the SAT.

Introduction

Average annual tuition and fees in 2018--19 was 4.6 times greater for a four-year education than a community college; restricting attention to just public four-year colleges, the difference is 2.8 times.[1]

So, how important are financial constraints for college enrollment decisions? Is household income often a deciding factor in choosing between a community college or a four-year university? In this post, we investigate whether—after accounting for differences in student ability and interest in attending college—students of varying household income choose different post-secondary options.

The National Longitudinal Survey of Youth (NLSY97) tracks a representative cohort of high school students over time, allowing us to determine whether a high school graduate decides to enroll first in a four-year university, a community college, or neither. We observe the student's grade point average (GPA) in high school, allowing us to control for differences in student ability, as well as the student's household income. Additionally, we observe whether the student takes the SAT—which we interpret as a signal of student motivation to attend college. If the student does take the SAT, we then observe their scores on the math and verbal sections. We then examine the relation between household income and enrollment for high school graduates under three scenarios: i) overall, ii) those interested in pursuing college, and iii) those interested in pursuing college conditional on SAT performance. For ease of exposition, we convert each of our variable of interest to standardized z-scores (with a mean of zero and a standard deviation of one).

Overall Enrollment Among High School Graduates

First, we focus on how disparate enrollment patterns are broadly among high school graduates, accounting for students' marks in high school. Specifically, we estimate the relation between household income and the probability of enrollment, accounting for GPA. The first two columns of Table 1 reveal that students from low-income backgrounds are significantly more likely to not attend college or enroll first in a community college: A student with one-standard-deviation lower log family income---or 97 log points, equivalent to about 164% or $78,000---is 8.3 percentage points more likely than the 20 percent average not to go to college and 3.5 percentage points more like than the 32 percent average to first attend community college than the average-income student. In other words, students with one-standard-deviation greater log family income are 11.8 percentage points more likely than the 48 percent average to first enroll in a four-year university (Column 4). Such differences in enrollment persist into differences in degree attainment. Students from lower-income backgrounds are more likely to attain an associate degree (Column 3) and substantially less likely to earn a Bachelor's (Column 5). These estimates however are not causal, so factors that are correlated with both student enrollment decisions and family background could be driving these results. That said, since we account for student GPA, the disparities highlighted in Table 1 likely do not reflect differences in student ability.

Table 1: Correlation between Household Income and Post-Secondary Education

	No college	First enroll two-year institution	Earn Associates degree	First enroll four-year institution	Earn Bachelors degree
Z-score household income	-0.083***	-0.035***	-0.023***	0.118***	0.097***
	(0.009)	(0.010)	(0.008)	(0.010)	(0.010)
Sample mean	0.20	0.32	0.15	0.48	0.39
Respondents	3575	3575	3575	3575	3575
Sampling weight (millions)	9.89	9.89	9.89	9.89	9.89
Adjusted R-squared	0.16	0.07	0.01	0.28	0.23

Notes: Data are from the publicly available National Longitudinal Survey of Youth 1997. Sample is restricted to students with high school diplomas. Dependent variables reflect indicator variables. Each regression includes high school grade point average along with fixed effects for gender–ethnicity, gender–birthyear, ethnicity–birthyear, and census region interacted with relative location with a metropolitan statistical area. Regressions are weighted according to representative panel sampling weights. Coefficients are presented with robust Huber–White standard errors.

High School Graduates Interested in College

Analyzing enrollment patterns by income overall may conflate differences related to household finances with differences pertaining to other observable characteristics of the students, such as their motivations or intentions to attend college. Using whether a student has taken the SAT as a proxy for intention to attend college, we can again investigate the relation between income and enrollment patterns, but now among a sample of students all interested in a four-year education (community colleges do not require SAT scores) who differ in family income yet and for whom we can control for differences in high school performance. Again, these estimates should not be interpreted causally, as they likely understate the true effect of household income; students from lower-income households may opt out of taking the SAT altogether---and thus be excluded from this sample---because they might know they will not be able to afford a four-year education, even if they achieve scores sufficient for being accepted to a university.

We repeat the exercise above, estimating the relation between household income and the probability of enrollment after accounting for GPA, but now limiting our attention to high school graduates who report SAT scores. The results, displayed in Table 2, are highly like those observed among high school graduates overall except for one key difference. Among students interested in a four-year education, students from households with one standard deviation lower family income are still more than 11 percentage points less likely than the 76 percent average to first enroll in a four-year program (Column 4); but rather than not attending college at all, these lower-income students interested in a four-year education choose a community college (Columns 1 and 2). Moreover, this divide between two-year and four-year enrollment persists through to differences in degree attainment, as students (interested in a four-year education) from households with one standard deviation lower

incomes are nearly 5 percentage points more likely than the 11 percent average to earn an Associate's degree (Column 3).

Table 2: Correlation between Income and Post-Secondary Education: Students took SAT

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	No college	First enroll two-year institution	Earn Associates degree	First enroll four-year institution	Earn Bachelors degree
Z-score household income	-0.014	-0.097***	-0.049***	0.112***	0.059**
	(0.009)	(0.021)	(0.017)	(0.022)	(0.025)
Sample mean	0.04	0.19	0.11	0.76	0.61
Respondents	875	875	875	875	875
Sampling weight (millions)	2.67	2.67	2.67	2.67	2.67
Adjusted R-squared	0.02	0.13	0.08	0.16	0.13

Notes: Data are from the publicly available National Longitudinal Survey of Youth 1997. Sample is restricted to students with high school diplomas. Dependent variables reflect indicator variables. Each regression includes high school grade point average along with fixed effects for gender–ethnicity, gender–birthyear, ethnicity–birthyear, and census region interacted with relative location with a metropolitan statistical area. Regressions are weighted according to representative panel sampling weights. Coefficients are presented with robust Huber–White standard errors.

We observe these enrollment patterns among students who take the SATs. Importantly though, we have yet to take into consideration the scores these students actually receive on the SATs. A student's (math and verbal) SAT scores certainly affect where the student decides to apply. And, if higher-income students tend to perform better on the SATs---increasing their prospects for acceptance into four-year universities---then the relations we've documented so far between income and enrollment will reflect this. For our last analysis, we include each student's performance on the math and verbal sections of the SAT when predicting post-secondary enrollment. The results, displayed in Table 3, are like those from Table 2, meaning that the differences we observe by household income are not driven by differences in SAT performance. While higher SAT scores do translate into increased enrollment in a four-year university (Column 4), for both the math and verbal sections, students from households with one standard deviation lower incomes are 8 percentage points more likely than the average of 19 percent to enroll in community college even after accounting differences in GPAs and SATs. Thus, among students who are interested in attending a four-year college, we see sharp differences by household income in the decision to first to enroll in community college, differences that cannot be explained by students' abilities or test scores.

Table 3: Correlation between Income and Post-Secondary Education with SAT Scores

	No college	First enroll two-year institution	Earn Associates degree	First enroll four-year institution	Earn Bachelors degree
Z-score household income	-0.012	-0.080***	-0.039**	0.092***	0.050**
	(0.009)	(0.019)	(0.016)	(0.020)	(0.025)
Z-score SAT math score	-0.017	-0.066***	-0.055**	0.083***	0.054
	(0.012)	(0.025)	(0.025)	(0.026)	(0.033)
Z-score SAT verbal score	-0.005	-0.108***	-0.033**	0.113***	0.024
	(0.015)	(0.021)	(0.016)	(0.023)	(0.029)
Sample mean	0.04	0.19	0.11	0.76	0.61
Respondents	874	874	874	874	874
Sampling weight (millions)	2.66	2.66	2.66	2.66	2.66
Adjusted R-squared	0.03	0.17	0.09	0.21	0.14

Notes: Data are from the publicly available National Longitudinal Survey of Youth 1997. Sample is restricted to students with high school diplomas. Dependent variables reflect indicator variables. Each regression includes SAT math and verbal scores and high school grade point average, along with fixed effects for gender–ethnicity, gender–birthyear, ethnicity–birthyear, and census region interacted with relative location with a metropolitan statistical area. Regressions are weighted according to representative panel sampling weights. Coefficients are presented with robust Huber–White standard errors.

This analysis was produced by Jason Sockin.

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1. See Table 330.10 available at https://nces.ed.gov/programs/digest/d19/tables/dt19_330.10.asp from the Digest of Education Statistics, produced by the National Center for Education Statistics. ↩