

Free for All? Investigating Who Would Get Free College

Technical Appendix

Kristin Blagg and Grace Luetmer

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We use data from the undergraduate 2015–16 National Postsecondary Student Aid Study (NPSAS) to create a representative sample of 100 students. NPSAS uses student-level financial aid records provided by the federal government and postsecondary institutions, in conjunction with demographic and enrollment data, to compile this comprehensive dataset. The 2015–16 NPSAS is the survey’s most recent iteration. We detail which students we include in the sample, what data we use to create the sample, and the “bootstrapping” procedure we use to select a representative sample.

International students and students registered in a nondegree program are not included in the sample, as these students are typically excluded from free college proposals. The net cost of education for students who attend more than one institution during the survey year is not available in NPSAS, so we do not include these students in the sample. All other undergraduate students included in NPSAS are represented in our dataset.

NPSAS Data We Use

Income Group

We use the CINCOME and DEPEND variables to create income groups for each respondent in NPSAS. CINCOME is a continuous measure of the student’s or the parent’s income, and DEPEND is an indicator of a student’s dependency status during the 2015–16 academic year. To be considered independent, undergraduates must meet at least one of the following criteria:

- be 24 or older on December 31, 2015
- be married
- have legal dependents other than a spouse
- be a veteran of the US Armed Forces
- be an active-duty member of the US Armed Forces
- be an orphan, a ward of the court, an emancipated minor, or in legal guardianship or foster care
- be homeless or at risk of homelessness

Any student who qualifies as an independent reports her own income. Dependent students report their parents' income. This income measure is reported either on the student's Free Application for Federal Student Aid, as an estimate based on a student interview, or through stochastic imputation.

Share of the Federal Poverty Level

We use CINCOME, in conjunction with the number of people in the household, to assess the student's income as a share of the federal poverty level. To determine how many students would be eligible for free college if the standard were 400 percent of the federal poverty level, we apply the poverty guidelines set by the US Department of Health and Human Services. We use the 2014 poverty guidelines, as the 2015–16 NPSAS asks respondents for information on family income in 2014.¹

Loan Status

We use the TOTLOAN variable to determine whether a student took out any academic loans in the survey year. The variable measures the total amount of student loans (federal, state, institutional, or private) taken out by a student at all institutions attended during the 2015–16 academic year. TOTLOAN does not include Parent PLUS Loans. The variable measures only the amount the student herself borrowed in the year of the survey.

Current Free College Recipient

To determine the number of students who currently receive free college, defined as paying no tuition or fees, we use NETCST9. This variable measures each student's tuition and fees minus total grants. We consider students with a NETCST9 value of zero to be free college recipients.

When we change the definition of free college to include an annual stipend of \$5,000, we use the TOTGRT and TUITION2 variables to determine who receives free college under this stricter definition.

TOTGRT is the total amount of all federal, state, institutional, and outside grants; employee tuition reimbursements; and grants from private sources received in 2015–16. TUITION2 measures the tuition and fees at sampled NPSAS institutions for students who attended only one institution in 2015–16. We subtract TOTGRT from TUITION2, and any student with grants that are at least \$5,000 greater than total tuition costs are defined as free college recipients.

Institution Type

In addition to family income, free college eligibility under these plans is determined by the type of institution the student attends. To determine whether a student attends a private or public university, we use the SECTOR4 variable. Students attending a private for-profit or private nonprofit institution are not eligible for the free college plans. Students enrolled in a public four-year or public two-year institution may be eligible, depending on family income.

Race or Ethnicity

NPSAS collects data on race and ethnicity from survey respondents and reports results in the RACE variable. The race categories include white, Black or African America, Hispanic or Latino, Asian, American Indian or Alaska Native, Native Hawaiian or other Pacific Islander, and more than one race. To create a sample of NPSAS data using only 100 personas, we combined students who identified as American Indian or Alaska Native, Native Hawaiian or other Pacific Islander, and more than one race into a single category. Although these are distinct groups, the number of respondents in each category was too low to accurately represent each group independently in the sample.

Generating 100 Personas

Using the NPSAS data described above, each student included in the survey was assigned a string of characteristics that included the following information in discrete categories:

Variable	Values
Income group	<ul style="list-style-type: none"> ■ Income ≤\$40,000 and dependent ■ Income from \$40,000 to \$80,000 and dependent ■ Income ≤\$40,000 and dependent ■ Income ≤\$15,000 and independent ■ Income from \$15,000 to \$30,000 and independent ■ Income ≤\$40,000 and independent
Share of the federal poverty level	<ul style="list-style-type: none"> ■ Less than 200% ■ 200% to 400% ■ Over 400%
Loan status	<ul style="list-style-type: none"> ■ Has loans ■ Does not have loans
Current free college recipient	<ul style="list-style-type: none"> ■ Does not have free college ■ Has free tuition and fees ■ Has free tuition and fees and at least \$5,000 in stipend
Institution type	<ul style="list-style-type: none"> ■ Public ■ Private
Race or ethnicity	<ul style="list-style-type: none"> ■ White ■ Black or African American ■ Hispanic or Latino ■ Asian ■ American Indian or Alaska Native, Native Hawaiian or other Pacific Islander, or more than one race

We tabulate these data with weights, creating a large table that showed the estimated frequency of each distinct profile in the 2015–16 population. A single combination of characteristics might be

“Income from \$40,000 to \$80,000 and dependent”—“200% to 400%”—“Has loans”—
“Does not have free college”—“Public”—“Hispanic or Latino”

To maintain the National Center for Education Statistics (NCES) confidentiality standard for small samples, we round all frequencies to the nearest 10. This NCES-approved table has 712 combinations of characteristics and their corresponding frequencies. From this table, we “bootstrap” a representative sample by picking 100 profiles randomly (with high-frequency profiles having a higher chance of being selected). This sample is assessed for its representativeness by building cross-tabulations of frequencies (e.g., free college receipt by race or ethnicity) and testing against the real cross-tabulations from the NPSAS 2015–16 data.

After several thousand random pulls of 100 profiles, we keep the dataset that is the “least distant” from the true cross-tabulations—that is, where these tabulations look most like what we see in the real data. This technique is not perfect, but it maintains many of the relationships we see in the real data. To ensure the dataset is as close as possible to what we present in the final data visualization, we also

implement a few manual changes to the base dataset (we make 22 data-point-level changes out of the 600 data points). Further information on our technique and the manual changes we made are available upon request.

Note

¹ Annual Update of the HHS Poverty Guidelines, 79 Fed. Reg. 3593 (January 22, 2014).

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500 L'Enfant Plaza SW
Washington, DC 20024

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