The state of financial knowledge in college: New evidence from a national survey

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Abstract

Financial literacy has been evaluated in many different surveys of American adults and children. College students are a dynamic population who face unique financial challenges, yet they have not been broadly sampled as part of existing work measuring financial literacy. This is a notable void in the literature given the rapid increase in college prices and the number of students who finance their college investment using loans. The 2015–16 National Postsecondary Student Aid Study (NPSAS:16) included, for the first time, a standard set of financial literacy questions as well as a new set of questions measuring awareness of student loan repayment terms. Students demonstrated objectively low levels of financial literacy, but levels were higher among groups with social, demographic, economic, and institutional characteristics that are predictive of success in college. Student borrowers tended to have higher student loan literacy, even if they were part of groups with lower financial literacy. We conclude from this that financial literacy is distinctive from student loan literacy and that student loan literacy appears to be learned through experience.

1. Introduction

Today's college students face difficult financial decisions as they balance enrollment, employment, and everyday life expenses. As the price of college continues to rise, students increasingly use multiple sources to pay for their enrollment, including grants, scholarships, personal earnings, and loans (College Board 2017). Furthermore, the fastest growing segment of college students are those coming from low-income families who have less experience with things like financial aid and its award processes (Cataldi et al. 2018; Snyder et al. 2018). This underscores a need for educators, policymakers, and taxpayers to understand whether today's students are equipped with the financial knowledge needed to succeed in this environment.

One area in which poor financial knowledge may manifest itself in the college student population is through student loan default. Even as the availability of federal income-driven repayment plans has increased, the percentage of dollars in default in the federal student loan portfolio rose steadily from 5.4% in 2013 to 8.3% in early 2018 (Federal Student Aid 2018). In the first quarter of 2018, a total of $7 billion owed by 312,000 borrowers entered default, even though most defaulters would be eligible to lower or eliminate their payments by enrolling in income-driven repayment plans. Also in the first quarter of 2018, a total of $21 billion owed by 240,000 borrowers entered income-driven plans. But many students apparently are still unaware that these options can be used to avoid default or improve their credit and financial stability, as shown by Herbst (2018).

This suggests there are informational barriers in the college financing system that lead to adverse outcomes. Less is known about the location of these barriers. One possibility is that students are generally financially capable, but the repayment system is opaque even for knowledgeable students. Another possibility is that gaps in financial knowledge exist and are associated with the student populations most likely to default. If so, then targeted financial knowledge-building interventions might help students avoid default. Gaps in financial knowledge could also be related to the colleges students attend, suggesting institutional barriers to information flows.

In this paper we explore these issues and the overall state of financial literacy of college students. We use the most comprehensive source of information about college financial aid,

the National Postsecondary Student Aid Study or NPSAS. The NPSAS is traditionally conducted every four years and compiles student interviews and administrative records to measure how students and families in the U.S. pay for college. The most recent release (NPSAS:16) contained an undergraduate sample of over 89,200 individuals, representative of all students who attended college during the 2015–16 academic year. For the first time, the NPSAS:16 student interview included a set of questions designed to measure financial literacy and student loan literacy. This study describes and synthesizes these new data, and draws new conclusions about how well today's students are prepared to meet financial challenges in college and beyond.

Our first finding is that many college students are not familiar with basic economic concepts like inflation, interest, risk diversification, and loan repayment. Only 28% of students correctly answered all three financial literacy items. This is comparable to the performance of young adults who answered the same questions in other surveys, but it is lower than that of adults with college degrees. Specific to student loans, just 15% of college students were aware of the ramifications of default and the existence of income-driven repayment plans.

Our second finding is that financial literacy varies significantly within the college student population and tends to align with other socioeconomic, demographic, academic, and institutional characteristics that are predictive of college success. One of the largest and most concerning disparities was across students with different levels of financial security, as measured by confidence in obtaining emergency funds. The students who indicated they certainly could not come up with $2,000 in the the next month were also least equipped with financial knowledge.

Our third finding is that regardless of *financial* literacy, students who borrowed to pay for college had better *student loan* literacy than those who did not. This led to some interesting juxtapositions. Poorer students, black students, and students attending for-profit colleges had lower financial literacy. But these are also the populations who borrow at the highest rates (Looney and Yannelis 2015; Cellini and Darolia 2016; Scott-Clayton and Li 2016). Students from these groups who borrowed knew more about the consequences of not repaying loans and were more aware of repayment plan options than their peers at higher income levels who had not borrowed. This demonstrates that general financial literacy

and student loan literacy are two distinct constructs, and suggests that the experience of borrowing, including financial aid counseling, may lead to better understanding of student loan terms.

The final major findings come from a regression analysis to disentangle contributing factors. Since factors like income, education, and background characteristics can be positively correlated with each other, it is not clear which ones predominate. Our analysis showed that all else equal, higher financial literacy scores were associated with financial security, having highly educated parents, being white, male, and seeking higher degrees in technical and business-related fields at more selective institutions. The characteristics related to student loan literacy were somewhat different. The regression analysis revealed that many characteristics associated with financial literacy like financial security, GPA, and field of study were not associated with student loan literacy. Conditional on all these characteristics, students who had take loans scored higher in student loan literacy, though they were no more financially literate than non-borrowers.

This study is the first to investigate these trends in a national sample of college students, allowing for insights and comparisons that could inform financial literacy education efforts and help predict adverse financial outcomes. The remainder of the paper provides greater detail on what financial literacy is, how it was measured in NPSAS, and explains in greater detail how we arrived at the findings discussed above.

2. What is financial literacy, and why do college students need it?

Literacy means competency: the ability to read and write the language, or to understand and act in a particular domain. Financial literacy then, means understanding money enough to act responsibly as a member of the economy. Researchers have studied financial literacy by measuring both knowledge and actions, a body of work that has been reviewed by Hastings et al. (2013), Fernandes et al. (2014), and Lusardi and Mitchell (2014). Financial actions can be hard to judge. Like in writing, there are some clear mistakes, but people also follow different styles and pursue different objectives. But individuals' knowledge of financial terms is well defined and measurable.

Beginning in 2004, the *big three* or *basic three* quiz questions have been widely used to measure financial literacy (Lusardi and Mitchell 2011). They appear in the box below. These questions cover three general domains: inflation, interest in a savings account, and risk diversification in investments. To get them all right, a person needs to be comfortable with definitions of key terms *interest rate*, *inflation*, *stock*, and *mutual fund*, and with the math concept of multiplying a percent times a base.

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1. Inflation
   Imagine that the interest rate on your savings account was 1% per year and inflation was 2% per year. After 1 year, how much would you be able to buy with the money in this account? If you are unsure of the answer, please provide your best guess.
   ○ More than today
   ○ Exactly the same
   ○ Less than today

2. Interest
   Suppose you had $100 in a savings account and the interest was 2% per year. After 5 years, how much do you think you would have in the account if you left the money to grow? If you are unsure of the answer, please provide your best guess.
   ○ More than $102
   ○ Exactly $102
   ○ Less than $102

3. Diversification
   Is this statement true or false? Buying a single company's stock usually provides a safer return than a stock mutual fund. If you are unsure of the answer, please provide your best guess.
   ○ True
   ○ False
   ○ Don't know

   Correct answers: 1. Less than today, 2. More than $102, 3. False.

When these questions were first fielded to a national sample of aging Americans, 75% of them were correct about inflation, 67% were correct about interest, 52% were correct about diversification, and just 34% got all three correct (Lusardi and Mitchell 2011). These

are multiple choice questions, so random guessing would produce 33% correct on each of the first two questions, 50% correct on the third, and a rate of 6% getting all three correct. By this standard, aging Americans did particularly poorly on the diversification question (52% versus 50%), but significantly better than random guessing overall (34% versus 6%). When the questions were fielded again to a national sample of American adults, 60% of the people with a college degree or making over \$100,000 a year answered all three correctly, demonstrating that much better scores were possible (Lusardi and Mitchell 2011).

Incomplete or imperfect as these questions may be, they capture the same general concepts as broader, alternative measures of financial literacy that have been tested. We know this from a group of American adults who answered several questionnaires on financial literacy over the course of a four-year period as part of the RAND American Life Panel (Hung et al. 2009). Whether it was these basic three questions, a hypothetical investing experiment, a 70-question battery, or a three-subject survey dealing with specific finance topics, the people who appeared financially literate on any given questionnaire tended also to do well on the others, suggesting stability and reliability of these measures. However there are mixed results linking financial knowledge measures to financial behaviors such as savings in some studies (Hilgert et al. 2003; Schmeiser and Seligman 2013, as examples).

The financial activities covered in these questions involve making investments over time and managing assets, calling into question their relevance to younger populations. College is an investment and student loans bear interest, but in general young people will not have significant experience in these domains, particularly diversification of an investment portfolio and choosing whether to buy company stock. In national surveys of young adults conducted in 2007 and 2009, 27% and 38% answered all three questions correctly (Lusardi et al. 2010; American Life Panel 2009). In the 2007 study just 47% answered the diversification question correctly, slightly worse than random guessing. This lack of knowledge does not appear to be a particular artifact of the basic three questions however, as other studies of financial knowledge in youth also show objectively low levels (National Council on Economic Education 2005; Mandell 2012).

In the broadest existing studies of college students, Chen and Volpe (1998; 2002) surveyed a thousand students at 14 colleges of varying types. Their analysis predated the basic

three questions, but in Chen and Volpe (1998) students averaged 67% correct on general questions, 55% correct on questions regarding savings and borrowing, 59% correct on questions regarding insurance, and 42% correct on questions regarding investments. In a more recent survey of financial aid officers, 75% rated their students' financial literacy as poor or fair (Webster et al. 2017). Several studies have focused on particular colleges to understand the causes and consequences of financial literacy, using various measures and approaches (Robb and Sharpe 2009; Shim et al. 2009; Robb 2011; 2017).

Findings in these older and college-specific studies may not be informative for current policy, given the large changes that took place in college financing during the late 2000s and 2010s. During this period, more students enrolled in college than ever before (Snyder et al. 2018, Table 305.10). The fastest growth came from first-generation college students and from low-income families (Cataldi et al. 2018; Snyder et al. 2018, Table 302.30). More students drew on more forms of financial aid, particularly student loans (Looney and Yannelis 2015; Snyder et al. 2018, Table 331.20). Borrowers also encountered more trouble repaying these loans. Of the cohort who left college in 2008–09, 28% had defaulted within five years, the highest rate since the early 1990s when borrowing was far less common (College Board 2016; Fry 2014). Besides creating a difficult labor market for new graduates trying to pay off loans, the economic recession changed the face of college financing and shifted more of the burden onto students through lower public support for higher education and higher tuition prices (Long 2012; Webber 2017).

The growth in debt and default were not evenly distributed across institutions or students. Default was highest among students who had attended for-profit institutions, about five times higher than the rates among students who had attended the most selective four-year institutions (Looney and Yannelis 2015). Black college graduates held $25,000 more in debt than white college graduates, four years after graduation (Scott-Clayton and Li 2016). The scale of borrowing and the widening gaps in borrowing behavior have greatly increased the importance of measuring what college students know about finances and how they make financial decisions.

Our study contributes new knowledge on financial literacy and college financing through some key advantages of the NPSAS:16 data. First, using the basic three questions allows

for comparison between today's college students and other populations who have answered the same questions in other surveys (see Section 3). Second, NPSAS:16 draws on a nationally representative sample that allows for inference about how financial literacy varies across different types of students (see Section 4). To our knowledge the NPSAS:16 is the largest sample ever to answer the basic three (Hastings et al. 2013). Third and most importantly, NPSAS:16 included measures of student loan literacy that are more specific to the college context.

2.2. *Student loan literacy items*

In addition to the basic three questions, NPSAS:16 posed additional items relating to student loans. In one question, respondents were asked to identify the consequences of failing to repay student loans. The question presented three options the federal government can take in the event of student loan default and the respondent was asked to check all that applied (all of them do apply). The survey also posed a question gauging familiarity with alternative repayment plans based on income. A student who positively indicates familiarity with all four of these items has an understanding of the range of outcomes possible when a borrower is unable to make payments on federal student loans: credit scores fall, wages are garnished, and tax refunds are withheld, which could potentially be avoided if the student enrolls in an income-driven repayment plan.

Income-driven repayment plans have the potential to shield borrowers from poor labor market outcomes by lowering monthly loan payments. As currently structured, they require enrollment and yearly recertification of income by students, administrative barriers that prevent many students from lowering their payments and stabilizing their finances (Herbst 2018).

1. Consequences of default
   If a borrower is unable to repay his or her federal student loan, what steps can the government take to collect the debt? If you are unsure of the answer, please provide your best guess.
   (Please check all that apply.)
   ❒ Report that the student debt is past due to the credit bureaus
   ❒ Have the student's employer withhold money from his or her pay (garnish wages) until the debt, plus any interest and fees, is repaid
   ❒ Retain tax refunds and Social Security payments until the debt, plus any interest and fees, is repaid

2. Income-driven repayment plans
   In thinking about repaying your student loans, have you heard of any income-driven repayment plans (e.g., Income-Based, Pay As You Earn, Income-Contingent Repayment Plans)?
   ○ Yes
   ○ No

   Correct answers: 1. Check all three, 2. Yes.

These questions too, are imperfect. Policymakers who design the loan program might also want to know if borrowers know interest rates on student loans, the fact that interest can be subsidized during school, that there are yearly and lifetime maximums on loan amounts, or if borrowers can estimate what their loan payments will be after exiting school. All of these concepts, in addition to those covered by the NPSAS:16 questions, are part of the student loan entrance counseling required of every borrower (Federal Student Aid 2014). The loan questions therefore act as a partial knowledge check for students who borrowed and saw this counseling.

Loan literacy, as a distinct component of financial literacy, and related to interest rate knowledge in the basic three questions, might have implications beyond student loans into other types of borrowing, like cars, homes, or credit cards. In a national sample in Lusardi and Tufano (2015), a group that scored highly on understanding interest rates had higher experience with borrowing and saving, including high rates of student loan borrowing. Robb (2011) found that financial knowledge was associated with responsible credit card use. Our analysis of a national sample of college students explores both knowledge and experience, and how they relate to both financial literacy and a measure of loan literacy that is specific

to student loans.

3. Financial literacy and student loan literacy in NPSAS:16

3.1. NPSAS:16

The National Postsecondary Student Aid Study (NPSAS) is the premier source of financial aid data on America's college students. It fulfills a congressional mandate to collect and disseminate data on how students and families pay for college. The NPSAS data are used by many researchers, policymakers, and educators to answer questions related to postsecondary education (https://nces.ed.gov/bibliography/ listed 958 books, articles, and reports using NPSAS as of June 2018).

The latest installment, NPSAS:16, draws on a survey of students, their institutional records, as well as administrative data from the Free Application for Federal Student Aid or FAFSA, the National Student Loan Data System, the National Student Clearinghouse, Veterans Benefits Administration, ACT, and the College Board.

All the results generated for this paper use weights created for NPSAS:16, which account for the two-stage sampling design, as well as institution, student, and item nonresponse. Most items from the interview, including those central to this analysis of financial literacy and student loan literacy, were stochastically imputed when students did not take the survey or did not answer the questions. After weighting, the sample is representative of all individuals who enrolled as undergraduates for some length of time during the 2015–16 academic year, at a Title IV college or university in the 50 states, the District of Columbia, or Puerto Rico (Title IV is the part of the federal Higher Education Act that relates to financial aid programs).

The overall response rates for the financial literacy and student loan literacy questions were all between 57% and 58%, with the exception of the income-driven repayment question having a response rate of 68%, and these rates varied by the type of institution attended (Wine et al. 2018). To fill in the missing responses, model-based imputations were performed that identified classes of individuals or characteristics that were related to the variable of interest, and then a "donor" student was identified within these classes to donate a valid response to a missing case. Donors could provide responses to multiple missing cases. The

results of the specific imputation models are not available to the public, though more information about the process can be found in Wine et al. (2018). The general assumption is that financial knowledge of the students who answered was representative of the financial knowledge of those who did not answer.

One risk of using imputed values in our analyses is that the variance may shrink and lead to inflated significance of some estimates or change the magnitude of regression coefficients when the fully imputed sample is used. To explore whether imputation influenced our results, we ran all our analyses excluding the imputed cases and found generally small differences between the non-imputed sample and the full sample. As expected, the variance was larger on average for the non-imputed sample. For these reasons, we discuss with caution results that differed markedly between the non-imputed and full sample results. Complete results using only the non-imputed cases are available from the authors upon request.

We define borrowing as taking student loans in 2015–16 or in prior years from federal, state, school, or private sources. We focus on students who have borrowed themselves, not counting as borrowers the rare cases where the only borrowing was through Parent PLUS (a higher cost option taken on behalf of students). We define quartiles of household income using weighted income distributions within the NPSAS sample by dependency status. For financial aid purposes, independent students are those who met any one of the following conditions: 24 years of age or older, married, had children or other individuals dependent on them for financial support, had served in the military, or were orphaned or homeless. Our measure of income therefore includes the student's income, adding the student's spouse, if applicable, for independent students, or adding the student's parents for dependent students. We then assign a student to an income quartile within either the independent or dependent student group.

Institutional selectivity levels were identified using the variable provided in NPSAS:16 (SELECTV3), which uses average SAT/ACT scores and admittance rates to rank 4-year institutions, then places each institution into four categories, the highest category for the most selective institutions and the lowest being for open admission institutions. Institutions that do not offer 4-year degrees are placed into a separate fifth category.

3.2. Overall financial literacy

Figure 1 shows how college students performed on the basic three financial literacy questions. Overall, 59.9% answered correctly about inflation, 83.5% answered correctly about interest, and 43.4% answered correctly about diversification, with 28.2% getting all three correct.
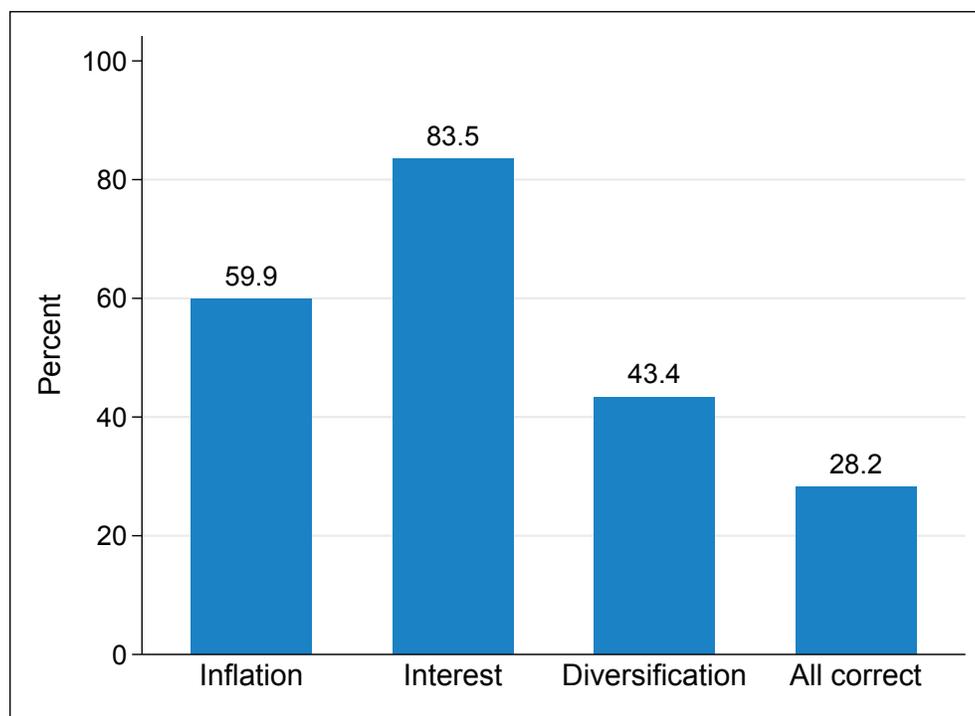

Figure 1: Percent of American college students giving correct answers to financial literacy items

Are college students financially literate? It helps to compare them to some other groups who have answered these same questions. Table 1 lists some groups who have answered the basic three questions, noting the survey they were part of and the year they answered the questions. The NPSAS:16 sample did worse overall than representative samples of American adults in the 2009 National Financial Capability Survey (NFCS, 39% correct) and a 2009 survey to the RAND American Life Panel (ALP, 53% correct), but better than college students in Chile where borrowing rates are much lower (10% correct).

College students are embedded in these other studies, but can only be identified by proxies such as age and education level. The rate at which college students in 2016 got all three questions correct (28%) aligns closely with the NFCS sample members who had

obtained only a high school degree (23%), with the ALP sample of adults ages 18 to 24 (29%), and with young adults in the National Longitudinal Survey of Youth (NLSY) of 1997 (27%). Thus, the overall rate of financial literacy is similar to what one may have guessed using proxies from earlier work. However, there are likely to be important variations within college students by individual characteristics, as shown for race/ethnicity, gender, and financial experience in the NFCS and ALP samples.

3.3. Overall student loan literacy

We now turn to the items unique to NPSAS:16 that measure student loan literacy. Students' awareness of issues related to student loans can be seen in Figure 2. Students answered correctly in 71.2% of responses that as a consequence of non-repayment, the government can report student loan debt as past due to the credit bureaus, 52.6% of responses that the government can garnish wages, and 62.5% of responses that the government can withhold tax refunds and Social Security Payments. Students were less aware of federal income-driven repayment plans, as only 32.2% indicated they were aware of these options. Just 14.7% of students correctly indicated all three default consequences and were aware of income-driven repayment programs.

4. Who is financially literate?

In this section we take a closer look at students' performance on the financial literacy items by associating responses with student and school characteristics. To do so, we collapse financial literacy into a binary measure: whether or not the student provided all three correct responses. We proceed with four main domains that have been shown to be associated with success in college and thus could be associated with financial literacy scores: socioeconomic status, educational attributes, demographics, and institutional characteristics. Table 2 below shows the frequency by selected subgroups within each of these domains. We include supplemental results in Appendix A that report the same correlations for the inflation and interest questions separately.

Figure 3 and its subplots indicate that income, parental education, and more immediate financial security each relate to financial literacy in a predictable way. Financial literacy is

Table 1: Financial literacy comparison of American college students to other groups

		Percent correct			
	Year	Inflation	Interest	Diversifi'n	All 3
U.S. college students (NPSAS:16)	2016	60	84	43	28
(55% have student loans)					
American young adults (NLSY97)	2008	54	79	47	27
American adults (NFCS)	2009	65	78	53	39
Men					49
Women					29
Less than high school					12
High school degree					23
Some college					40
College degree					60
Household income <$15,000					21
$15,000 - $24,000					26
$25,000 - $34,000					30
$35,000 - $49,000					36
$50,000 - $74,000					45
$75,000 - $99,000					55
$100,000 - $149,000					60
>$150,000					66
American adults (ALP)	2009	78	82	68	53
White non-Hispanic		84	85	71	58
Black non-Hispanic		46	74	60	36
Hispanic		71	66	51	37
Other race/ethnicity		88	94	84	70
Age 24 and under		54	77	47	29
25 - 34		70	69	63	43
35 - 44		78	90	71	59
45 - 54		85	84	68	56
55 - 64		84	88	77	63
65 and over		87	85	76	64
Has investments		87	87	82	67
Does not have investments		67	75	52	36
Americans age 50 and older (HRS)	2010	81	71	64	43
Americans age 50 and older (HRS)	2004	75	67	52	34
Chilean college students (TNE)	2012	36	45	52	10
(22% have student loans)					

Sources: NPSAS:16, American Life Panel (2009), Lusardi et al. (2010), Hastings et al. (2013).

Table 2: Frequency and rates of borrowing by selected subgroups

|	% of population	% with loans
All	100	55
Gender		
Male	44	51
Female	56	59
Income		
Bottom quartile	25	51
Lower-middle quartile	25	58
Upper-middle quartile	25	59
Top quartile	25	52
Race		
White	53	56
Black or African American	15	72
Hispanic or Latino	20	46
Asian	7	33
Other race/ethnicity	5	55
Parents' highest education		
High school or less	24	52
College, less than a BA	32	59
Bachelor's degree	24	56
Graduate degree	20	52
Degree sought		
Certificate	9	59
Associate's degree	41	42
Bachelor's degree	47	67
Undergraduate level		
1st year	40	48
2nd year	28	52
3rd year	12	64
4th year and above	19	68
Grade point average		
Below 2.0	13	53
2.0 - 2.99	33	57
3.0 - 3.99	47	56
4.0	7	46
Financial security		
Certainly could come up with $2,000	23	44
Probably could come up with $2,000	27	54
Probably could not come up with $2,000	25	59
Certainly could not come up with $2,000	25	63
Institution control		
Public	74	48
Private nonprofit	16	70
Private for-profit	10	83

Source: NPSAS:16.
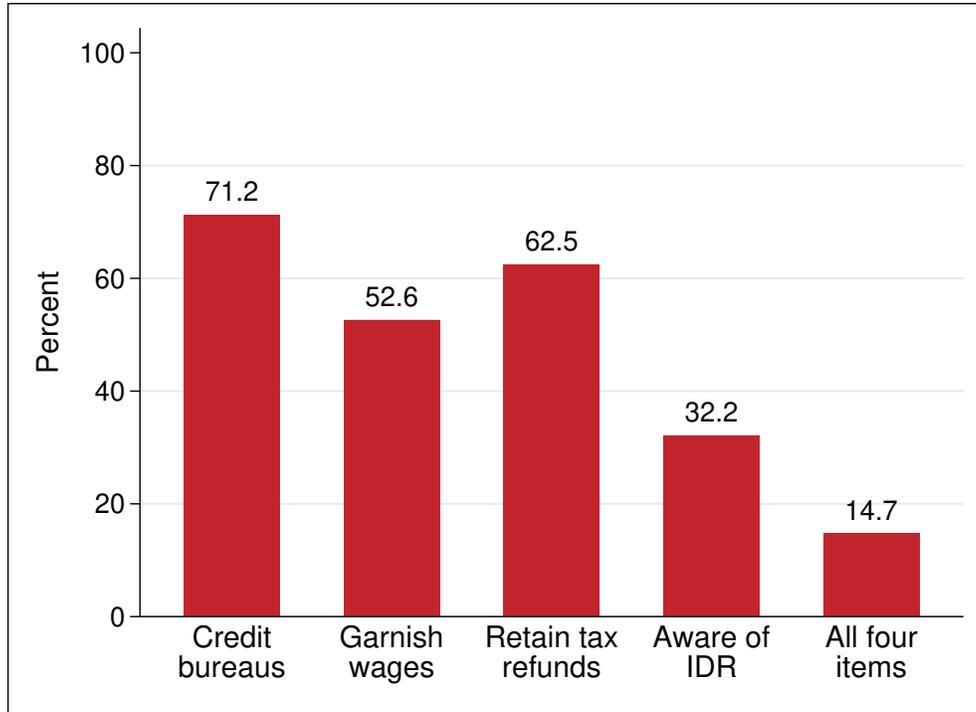
Figure 2: Percent of American college students giving correct answers to student loan literacy items

correlated with both having money and having access to social and cultural capital that comes from having highly educated parents. For example, 37% of students in the highest income quartile were correct on all three, while 24% of those in the lowest two quartiles were correct on all three. The gap between children of graduate degree holders and first-generation college students is nearly as large.

The ability to obtain $2,000 on short notice is correlated with income and parental education, but it measures a more immediate kind of financial security. The students who indicated they were certainly not able to come up with $2,000 in the next month were also the least financially literate of any subgroup in Figure 3. This relationship is consistent with national trends in Babiarz and Robb (2013).

As with the first construct, educational attributes shown in Figure 4 had unsurprising relationships with financial literacy. First, financial literacy appears to improve over time as students stay in college longer and advance to higher levels. Overall the samples of 2nd, 3rd, and 4th year students are not representative of a cohort of students who started college together, many of whom will have left school. In this cross-section, a student's year in college
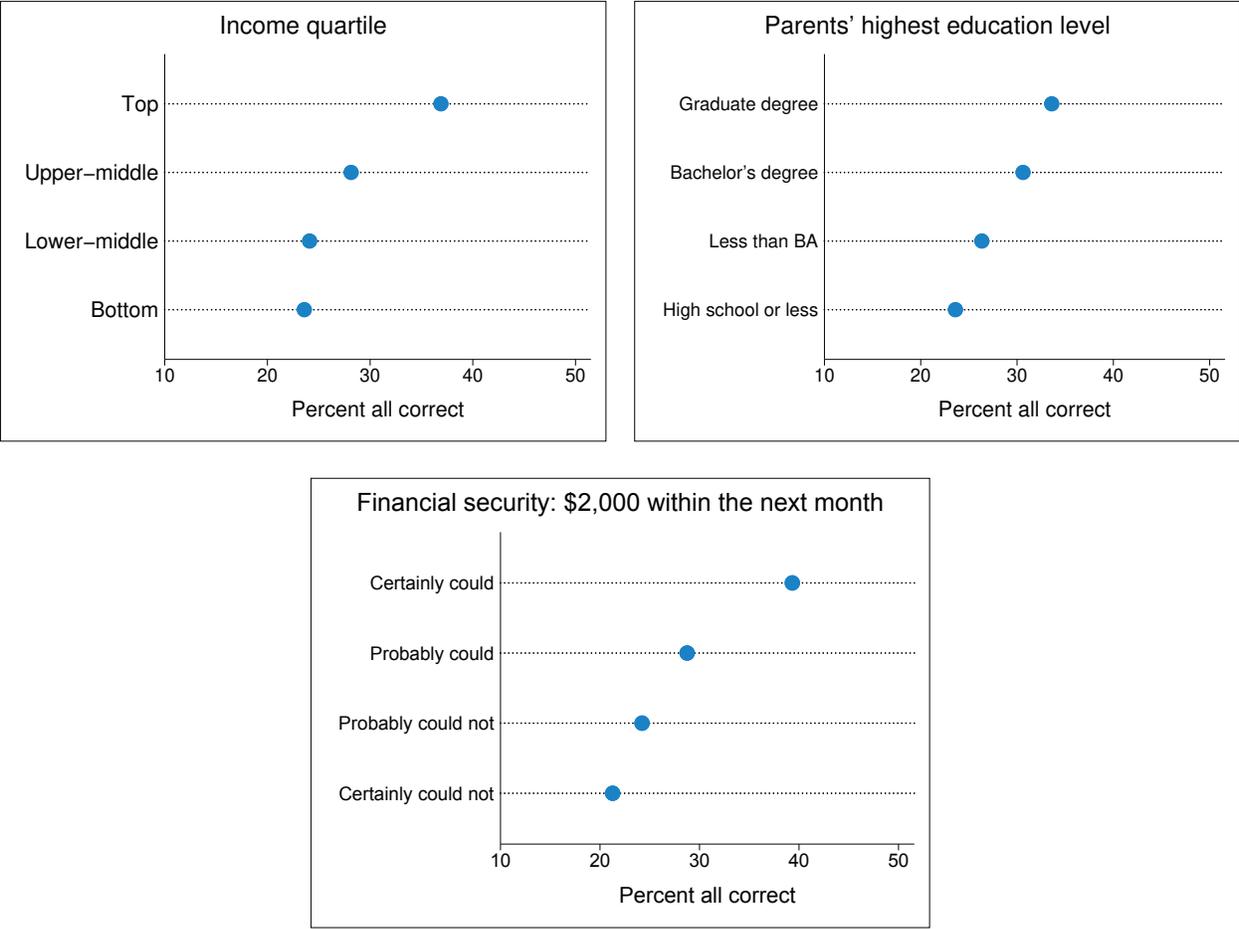
Figure 3: Socioeconomic factors associated with financial literacy

captures several things in these data. Students get older, obtain more college experience, and mechanically the first- and second-year students could be at two-year or four-year institutions while upper-year students are those who remain in college at 4-year institutions. Other graphs in this section disaggregate by type of institution, and the regression analysis in Section 6 controls for age, level, and institutional characteristics separately.

Second, students enrolled in bachelor's degree programs did better in terms of financial literacy than associate's degree and certificate seekers. Interestingly, students taking only classes outside of degree programs perform as well or better than the other degree types, but this is a small subgroup of students representing only 3% of the undergraduate population.

Third, students' grades and their field of study also related to financial literacy. Students with lower grades tended to score lower on financial literacy. Students majoring in STEM fields (science, technology, engineering, and math) and business or economics scored much higher in financial literacy on average than students majoring in other non-STEM and social science fields. Students majoring in social sciences other than economics did not score any differently from other non-STEM majors.

While less obviously connected to knowing financial concepts than socioeconomic background and academic skill, demographic characteristics were also found to be correlated with financial literacy. Figure 5 shows financial literacy was lower for traditionally underrepresented minority populations and for women. Younger students also had lower financial literacy. These findings are consistent with other studies of financial literacy of non-college student populations (Lusardi and Mitchell 2014).

The levels of financial literacy are particularly low for black students, who are several percentage points behind the lowest income quartile and behind first-generation college students. Women also trail the lowest income quartile and first-generation students. These stark differences motivate a multivariate analysis to explore whether demographic characteristics themselves are predictive of financial literacy, holding status and skills constant. This analysis is presented in Section 6.

We also observed interesting and significant relationships between institutional characteristics and financial literacy. Figure 6 shows that students attending for-profit colleges did much worse than students at public and private nonprofit institutions. Students at-
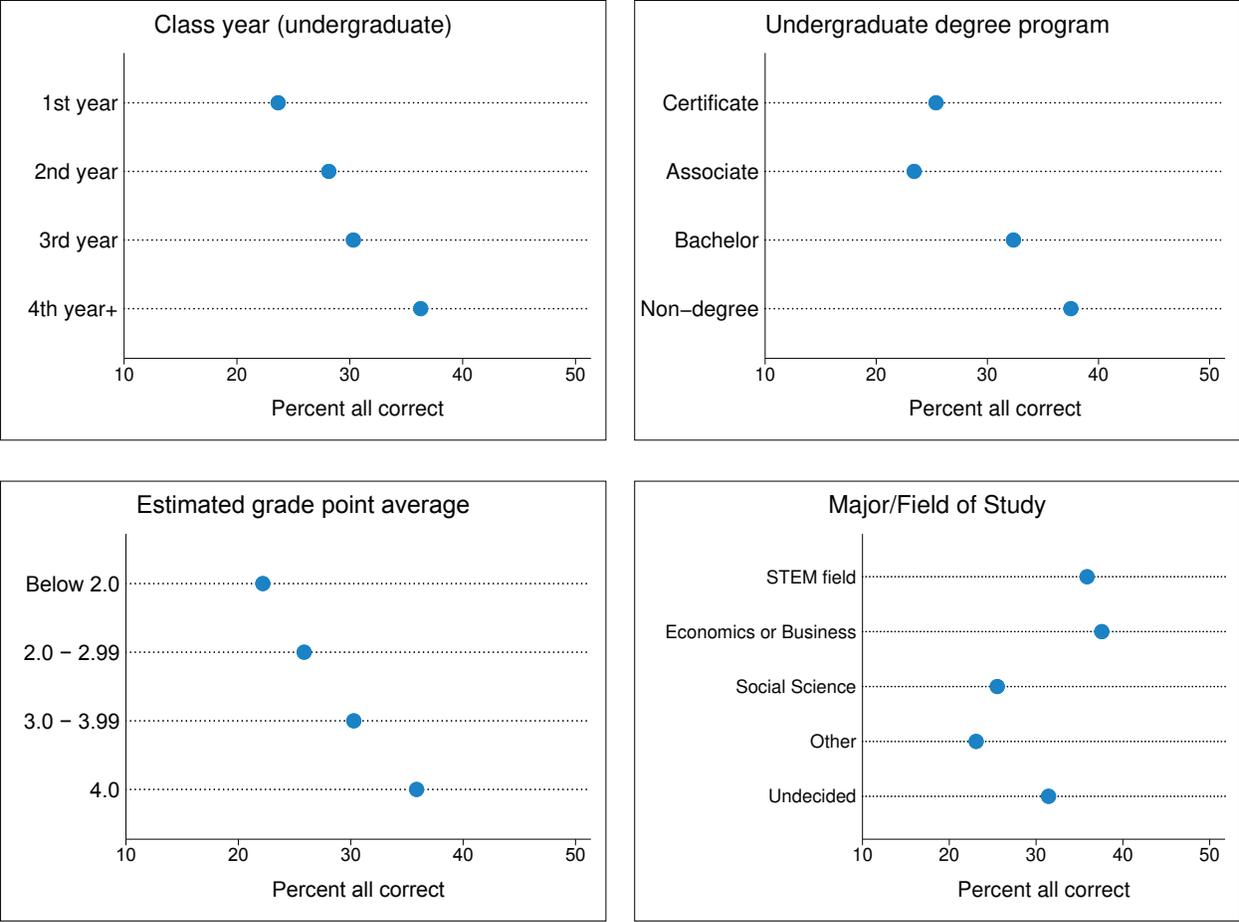
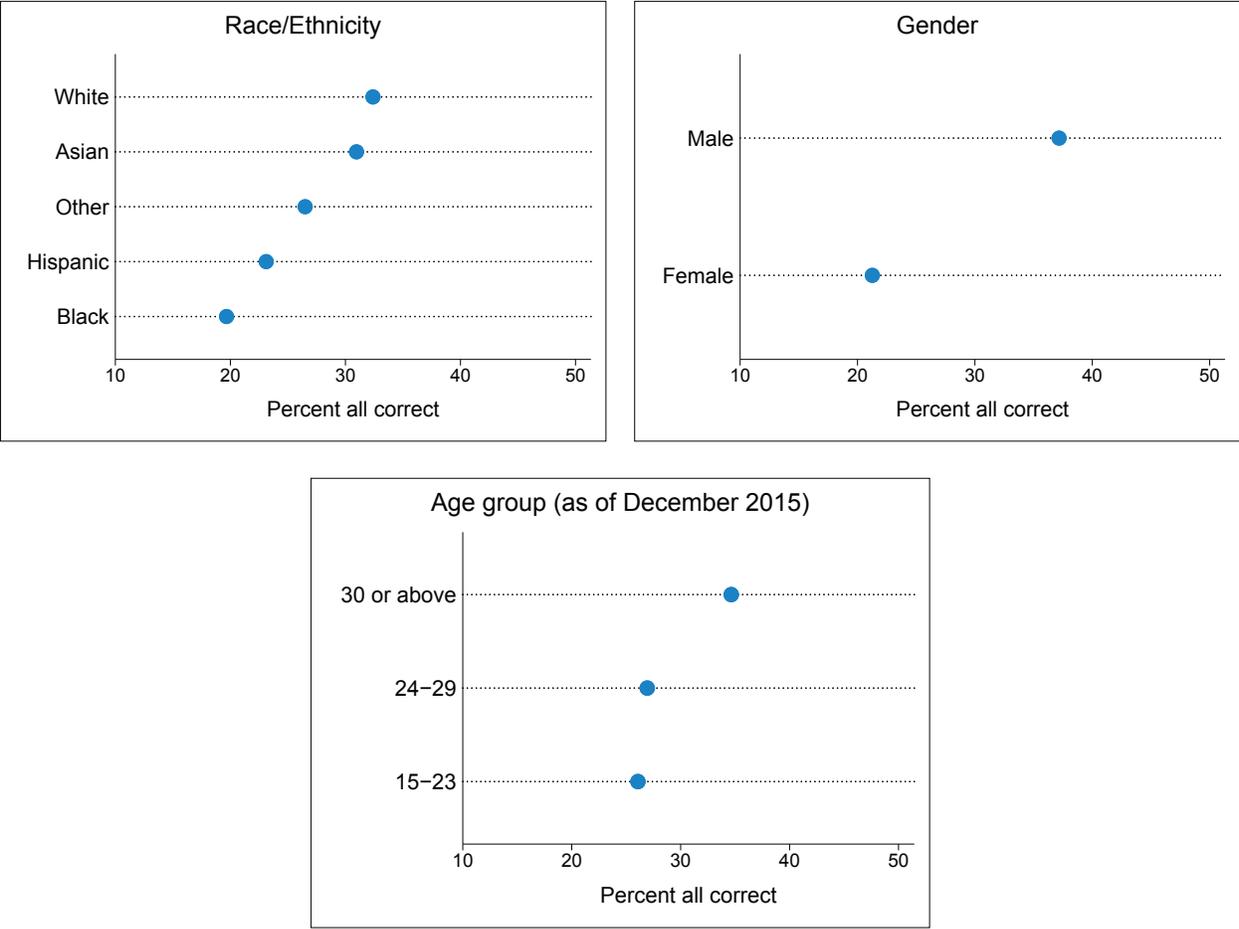Figure 4: Educational attributes associated with financial literacy

Figure 5: Demographic characteristics associated with financial literacy

tending very selective colleges did much better than those attending less selective and open admissions institutions.
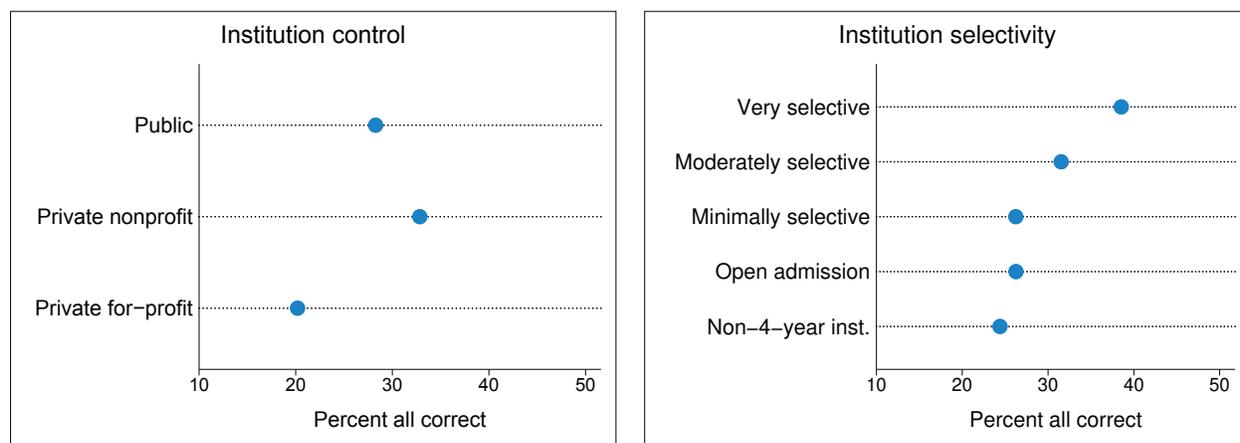

Figure 6: Institutional characteristics associated with financial literacy

Finally, we sought to understand whether borrowers of student loans had better or worse financial literacy than non-borrowers, since loans have become increasingly prevalent and associated with post-college outcomes. We disaggregated financial literacy by borrower status and present the differences in Figure 7 along with one covariate from each of the four groupings discussed above: income quartile, race, GPA, and institution control. These figures show little to no distinguishable difference in the financial literacy of borrowers versus non-borrowers, aside from students attending private non-profit institutions, where non-borrowers scored about 10 percentage points better than borrowers. We will revisit the distinction between borrowers and non-borrowers in the following sections.

5. Who is student loan literate?

We ran similar tabulations for a binary construct of familiarity with all four student loan items. Some of the large gaps between groups in terms of financial literacy diminished or switched sign altogether in terms of student loan literacy. This suggests that student loan literacy is a distinct construct from financial literacy. Overall, student loan literacy varied less than financial literacy along the student and institutional characteristics we observed.

We present only a subset of figures as were shown for financial literacy to establish the pattern of differences. Figure 8 includes one measure from each of our four domains:
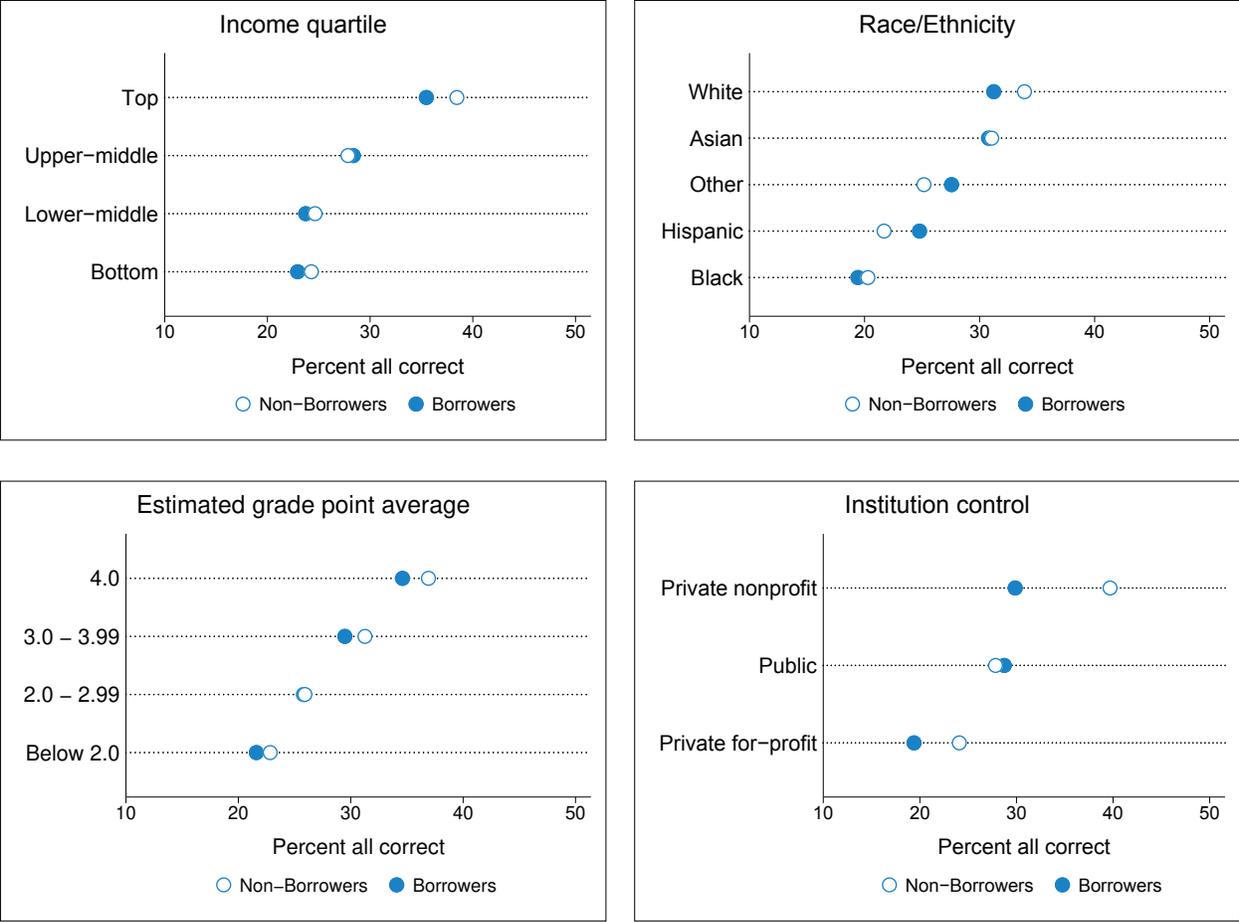
Figure 7: Financial literacy, by selected characteristics, by borrowing status

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socioeconomic status, educational attributes, demographics, and institutional characteristics. Both income and grade point average appear to matter far less in terms of student loan literacy than they did to financial literacy. In terms of race and ethnicity, black students performed the worst in terms of financial literacy, but the best in terms of student loan literacy. In terms of institutional control, we saw another inversion. For-profit students did the worst in terms of financial literacy, but the best in terms of student loan literacy compared to students attending public and private nonprofit institutions.
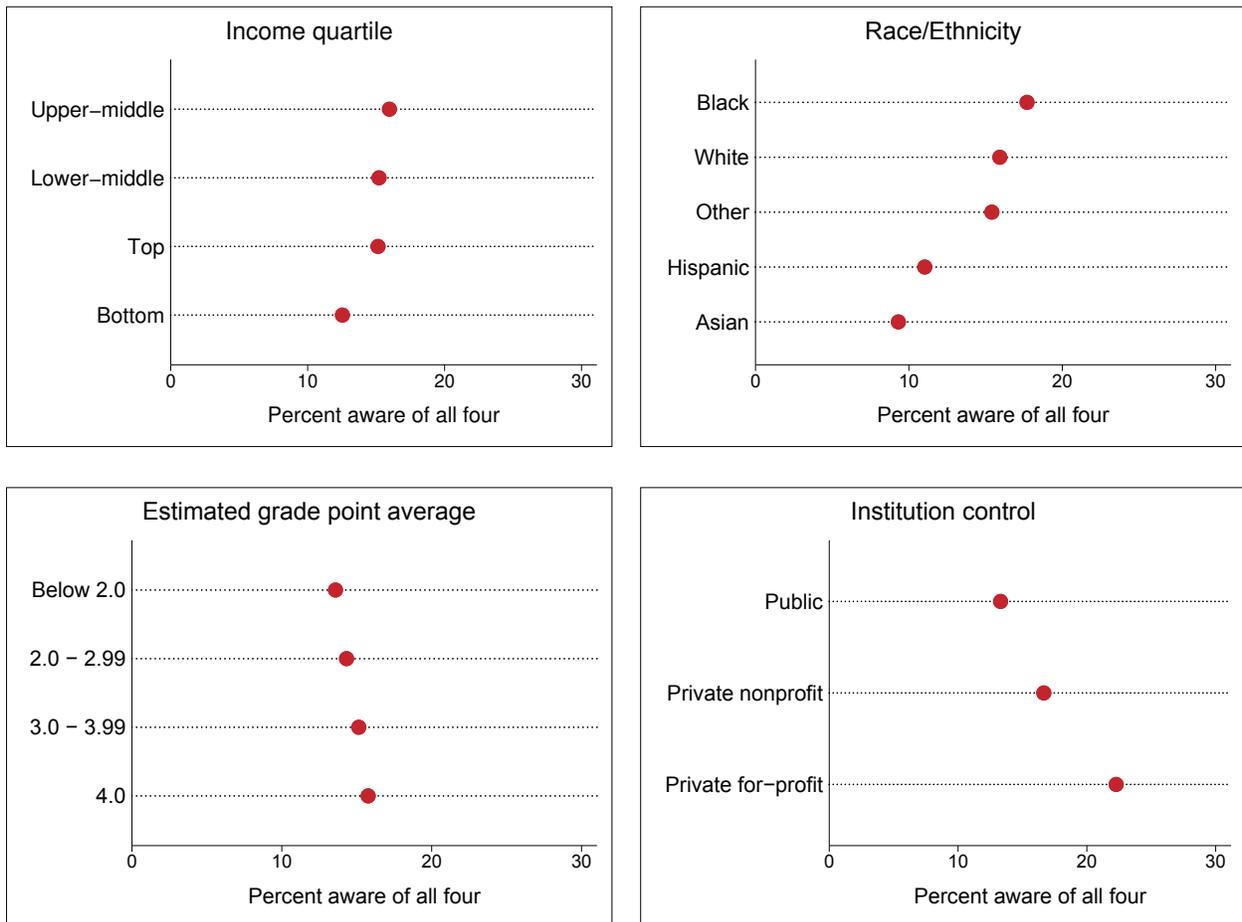

Figure 8: Student loan literacy, by selected characteristics

We present in Table 2 the most up-to-date and broad measures of borrowing rates available, coming from the NPSAS:16 sample. In the 2015–16 school year, 55% of all students took out student loans. Borrowing rates differ by student characteristics in multiple domains. Financially, the students with lower financial security borrowed more, though there was not

a clear trend among quartiles of family income. Demographically, black students borrowed at higher rates (77%), and women borrowed at somewhat higher rates (59% versus 51% among men). Institutional factors also played a role, with higher rates of borrowing among students seeking four-year degrees (67%) and among students at for-profit colleges (83%).

To explore the relationship between borrowing and student loan literacy by subgroup, we present another set of visualizations, once again disaggregated by borrowers versus non-borrowers. Figure 9 shows that in every subgroup, borrowers had significantly higher student loan literacy than non-borrowers in the same subgroup. The gaps are typically consistent across subgroups, with borrowers enjoying a 10 to 12 percentage point advantage in the rate of being familiar with all four loan items, which is a stark contrast to the financial literacy results in Figure 7 where few noticeable differences were observed.
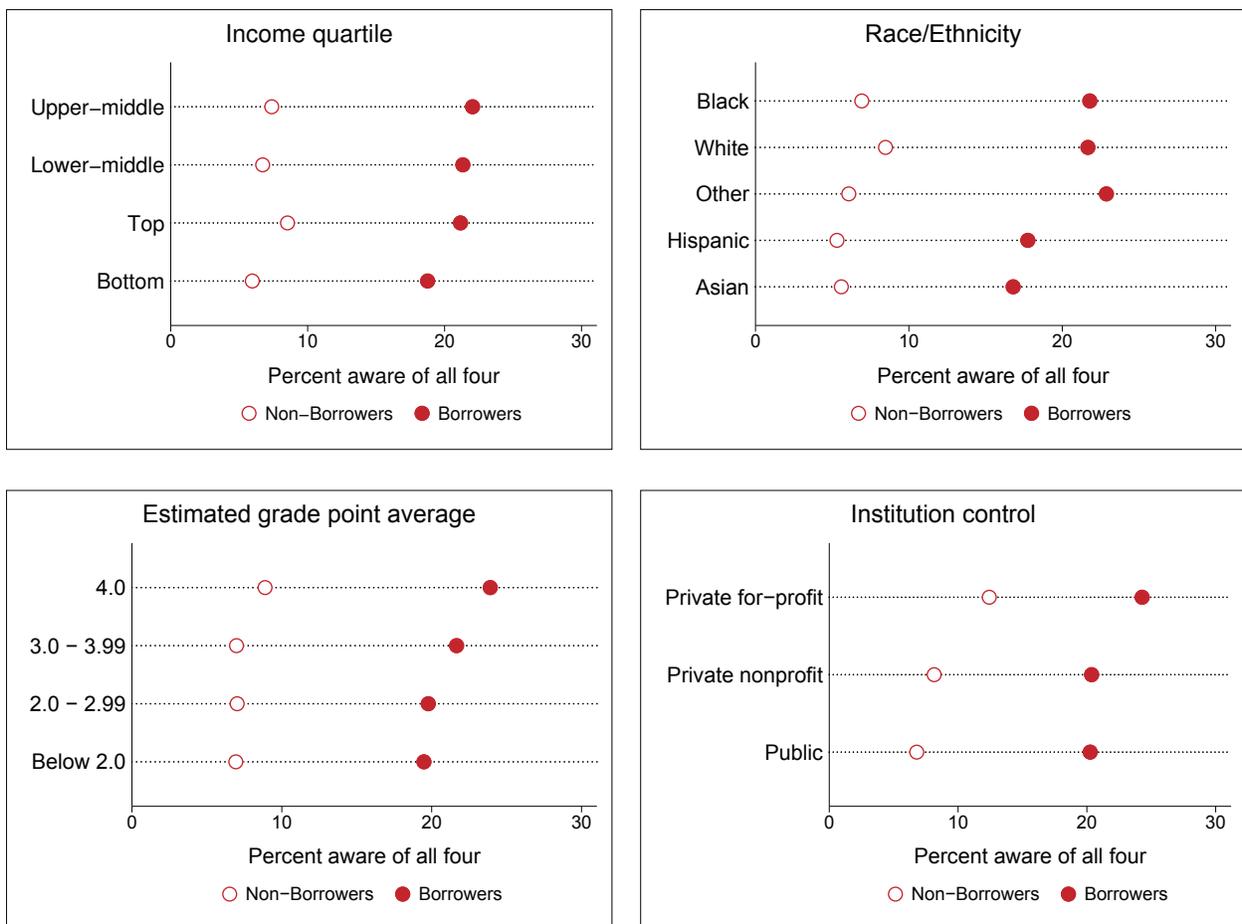

Figure 9: Student loan literacy, by selected characteristics, by borrowing status

6. Multivariate analysis

All the results presented thus far have been tabulations or visualizations showing unconditional differences observed in financial and student loan literacy for the college student population. Many of the student characteristics they highlight are related to one another and may not be significant differentiators of financial and student loan literacy when other characteristics are held constant. To help disentangle some of the more important contributing factors, we estimated logistic regressions for financial literacy and student loan literacy in turn. As regressors we included all of the characteristics explored above, plus citizenship, marital status, military status, receipt of need-based or merit-based financial aid in 2015–16, the number of years the student received a Pell grant, and indicators for the number of credit cards a student held. Variance estimation and standard errors were computed using 200 balanced repeated replicate weights included in NPSAS.

The estimates for selected predictor measures are presented in Table 3. The first thing to note is that many of the student characteristics we found to be related to financial literacy remain important when holding other characteristics constant.

These models also lend support to our finding that financial literacy and student loan literacy are separate constructs, as many factors related to financial literacy were not related to student loan literacy, or were related with the opposite sign. For example, parents' highest education and financial security both mattered greatly to a students' odds of getting all three financial literacy items right. In the regression, students whose parents had a bachelor's degree had odds 1.2 times that of students whose parents completed high school or less. Students who certainly could not come up with $2,000 had only 0.6 times the odds of being correct relative to those who thought they certainly could come up with that amount of money in a month. These relationships were much less pronounced for student loan literacy. They were not significantly different from no relationship (odds ratio of one), and we can reject that the coefficient estimates from the two regressions (two columns on the same row) are equal.

A similar pattern emerged for educational attributes, particularly for college grades. Students with a 4.0 grade point average had 1.5 times the odds of those with a grade point

Table 3: Logistic regression analysis: factors predicting financial literacy and student loan literacy

	Financial literacy		Student loan literacy	
	Odds ratio	(SE)	Odds ratio	(SE)
Borrower (excluded: non-borrower)				
Federal loans only	0.99	(0.03)	2.67	***(0.12)
Non-federal loans only	0.99	(0.09)	1.98	***(0.27)
Federal and non-federal loans	1.00	(0.06)	2.93	***(0.18)
Income quartile (excluded: bottom quartile)				
Lower-middle quartile	0.96	(0.03)	1.10	*(0.05)
Upper-middle quartile	0.98	(0.04)	1.12	*(0.05)
Top quartile	1.10	(0.05)	1.06	(0.06)
Parents' education (excluded: HS or less)				
College, less than BA	1.15	***(0.04)	1.12	*(0.05)
Bachelor's degree	1.21	***(0.05)	1.05	(0.05)
Graduate degree	1.31	***(0.05)	1.13	*(0.06)
Financial security (excluded: certainly could)				
Probably could find $2,000 in next month	0.74	***(0.02)	0.97	(0.04)
Probably could not	0.66	***(0.02)	0.91	*(0.04)
Certainly could not	0.61	***(0.02)	0.95	(0.04)
Grade point average (excluded: less than 2.0)				
2.0 to 2.99	1.04	(0.05)	0.95	(0.06)
3.0 to 3.99	1.19	***(0.06)	1.01	(0.06)
4.0	1.48	***(0.09)	1.13	(0.10)
Institutional control (excluded: public)				
Private nonprofit	0.97	(0.04)	0.97	(0.05)
Private for-profit	0.73	***(0.03)	1.18	***(0.06)
Major (excluded: all other non-STEM, non-SS)				
STEM field	1.35	***(0.05)	0.99	(0.05)
Economics or Business	1.66	***(0.07)	1.05	(0.05)
Other social sciences	1.12	(0.07)	1.07	(0.07)
Undecided/non-degree	1.04	(0.10)	1.01	(0.13)
Female	0.49	***(0.01)	0.87	***(0.03)
Race/ethnicity (excluded: white)				
Black or African American	0.66	***(0.03)	0.90	*(0.04)
Hispanic or Latino	0.82	***(0.03)	0.74	***(0.04)
Asian	0.93	(0.05)	0.78	**(0.06)
(additional race categories and other covariates not shown, listed in table note)				

* $p < 0.10$ ** $p < 0.05$ *** $p < 0.01$ Standard errors computed using 200 balanced repeated replicate weights included in NPSAS.

Not shown: indicators for additional race/ethnicity groups; undergraduate year and age group; indicators for having children/dependents, marital status; indicators for citizenship status; indicators for one or multiple credit cards; receipt of need-based grant aid, receipt of merit-based grant aid, number of years receiving a Pell Grant; indicators for active duty military, Reserves or National Guard, or veteran status; indicators for associate's, bachelor's, non-degree seeking; indicators for institutional selectivity levels.

Source: NPSAS:16.

average of 2.0 or lower of being correct on all financial literacy items. However, no such relationship existed for student loan literacy. Major field of study, as represented here by a STEM classification with business and economics majors categorized separately yielded similar conclusions. Students majoring in STEM fields had 1.3 times the odds of being correct on financial literacy compared to those majoring in other non-STEM, and non-social science fields. Economics and business majors, likely having taken courses related to the financial literacy items, had 1.7 times the odds of other majors for getting all three questions correct. In student loan literacy the differences in odds between these majors and others was indistinguishable from zero.

We found an even more extreme difference between financial and student loan literacy for students attending for-profit institutions. Their odds of all correct financial literacy answers were 0.7 times those of students attending public institutions, holding all else equal. This relationship was inverted for student loan literacy, where the odds of for-profit students were 1.8 times those of students at public schools. Conditional on borrowing and other factors like age and military status that vary by sector, for-profit students were less financially literate but knew more about student loans, specifically. This result was not robust to using only non-imputed responses: the relationship between for-profit students and student loan literacy was not significant in the non-imputed data, conditional on the other variables in our model. However, their performance on financial literacy items was still significantly lower and of similar magnitude. This suggests that students attending for-profit institutions were more certainly less financially literate than students attending public institutions, but we more cautiously conclude that these students were as familiar, though quite likely more familiar, with student loan terms.

One final finding from these models is that having borrowed does not have a distinguishable relationship with financial literacy, but has a strong positive relationship with student loan literacy. The NPSAS:16 data allow us to disaggregate borrowers of federal, non-federal, and both federal and non-federal loans. Non-federal loans come from private providers primarily, as well as some colleges and states. These lenders may have higher or lower levels of underwriting and screening. Importantly, all federal borrowers must undergo student loan entrance counseling.

Among borrowers, those who had taken out federal loans had higher student loan literacy than those who had borrowed only private or non-federal loans. Borrowers of non-federal loans have chosen to take out typically higher-cost loans with additional application requirements, in order to meet their costs. This regression controls for many observable characteristics, and therefore suggests that the experience of federal borrowing, including information given to students by financial aid officers and through entrance counseling, may make students more aware of what can happen when loans are not repaid. As shown in the prior section though, even among borrowers with perfect grades, just 25% got all four loan literacy items, suggesting that existing counseling has room for improvement.

7. Discussion and conclusion

How students make financial and loan decisions is an area of growing policy interest. States have implemented mandatory financial education in high schools, citing the importance of preparing students to pay for college (Urban et al. 2018). Some states have passed laws requiring yearly disclosures of loan amounts to college students (Wisconsin State Legislature 2015, for example). Colleges themselves are doing more to educate students on financial topics (Goetz et al. 2011), while private companies are providing services where students can monitor their loans and learn financial concepts online (see www.saltmoney.org or www.iontuition.com for examples).

So far, policy development has proceeded without an adequate understanding of the existing gaps in financial literacy or student loan literacy. This paper takes a step toward a better understanding of the state of financial knowledge in college, using the premier information source about college student finances. Our findings add nuance to our understanding of vulnerable student populations. For example, students at for-profit colleges have low financial literacy, but they understand loan terms as well and likely better than students at other institutions.

Our core findings, that general financial literacy does not equate to context-specific student loan literacy and that different populations struggle with each, can directly help guide policymakers interested in supporting student financial decision-making. Informational interventions to support decisions have a mixed record of success, and identifying and targeting

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gaps is therefore important to maximize the chances of making an impact. Some findings suggest targeting resources to particular groups, like particularly high-borrowing students who are aware of student loan terms but with low levels of general financial literacy that could adversely affect repayment. Interventions in the college population may also benefit from a heavier focus on student loan literacy, embedding topics related to interest rates, monthly loan repayment schedules, and repayment options, in place of more traditional "financial" literacy topics. Opting to focus on loans rather than topics less directly applicable to college students like investment options may see higher returns by way of improvement in students' financial outcomes during or immediately after college.

NPSAS:16 only allows us to explore these issues at a single point in time. It is just as important to know the student loan literacy of borrowers at the time they make the decision to borrow, as it is to know their literacy during college, and at the time they exit and begin repayment. A large subsample of NPSAS:16 respondents who completed a bachelor's degree in 2015–16 will be followed longitudinally over the next decade in the Baccalaureate and Beyond Longitudinal Study, at least adding observations of college exit and loan repayment. It will be important to examine how general financial literacy and student loan literacy develop, and how they correlate with outcomes in the labor market and in household finances.

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A. Supplemental results

This appendix replicates the figures from Section 4 and Section 5 with more granular measures of students' answers to financial literacy and student loan literacy questions. For financial literacy we disaggregate the results into the rate of correct answers on the inflation question only, and on the interest rate question only. For student loan literacy we disaggregate the results into the rate of selecting all three consequences of default correctly, and the rate of stating familiarity with income-driven repayment plans.

In general, we observed the same patterns in terms of students' knowledge of inflation as with the combined measure of financial literacy. For students' knowledge of interest, we saw higher overall scores and smaller gaps in the percentage of students providing correct responses across our subgroups. For example, students in all the race/ethnicity groups answered correctly between 80 and 86 percent of the time. The narrower distribution suggests interest may be an easier concept to grasp for college students, regardless of background.

When analyzing default and awareness of income-driven repayment separately, we observed similar patterns to those found when combining these two items. Students attending for-profit institutions still exhibited exceptional knowledge of student loans compared to students at other institutions. GPA and income subgroups had only marginal differences in student loan literacy across the two measures. In terms of race/ethnicity, Asian students were least aware of both default consequences and income-driven plans. While black students were the most aware of income-driven plans, they were only as aware or less aware of default consequences compared to white students and non-Asian, non-Hispanic students.
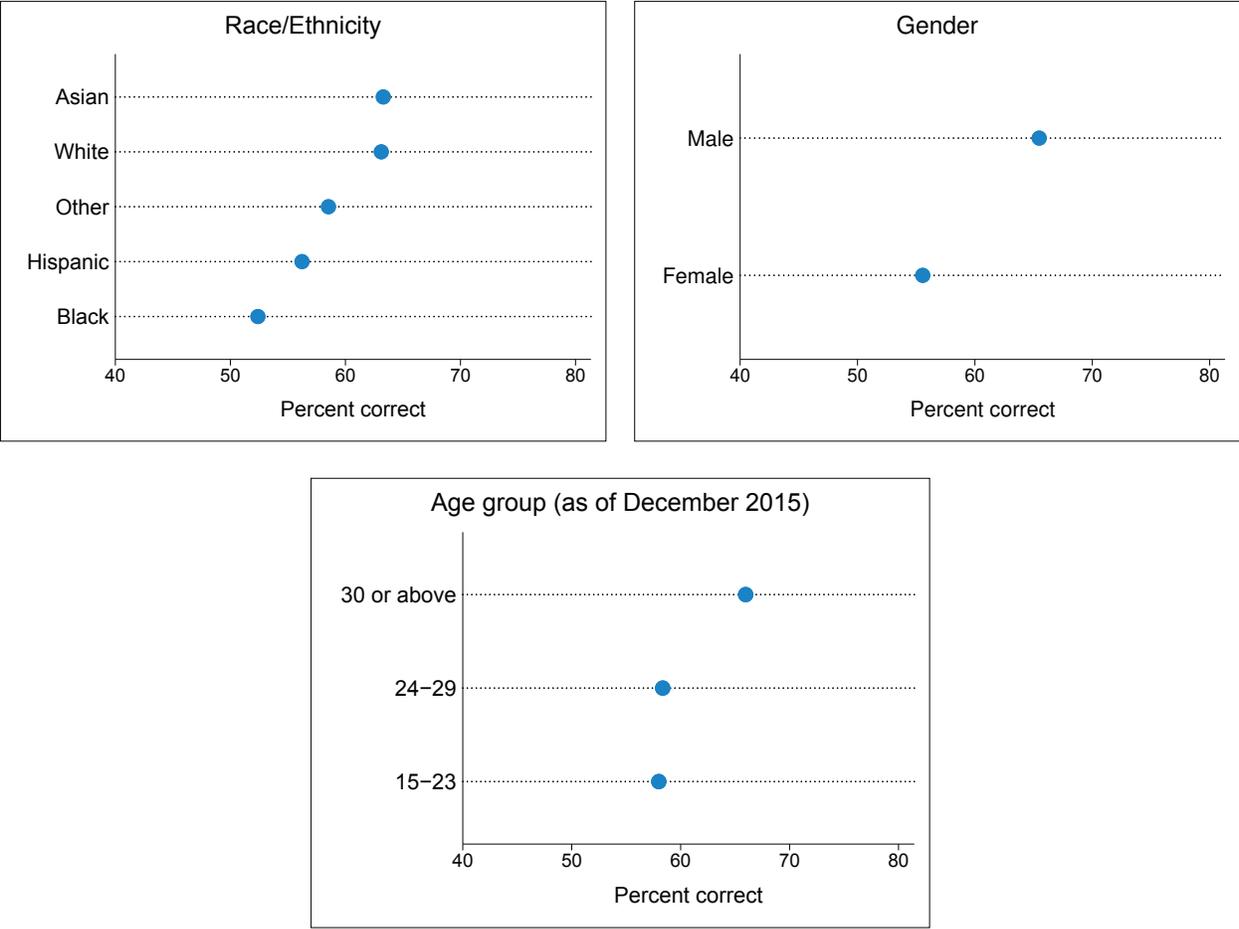
Figure 10: Demographic characteristics associated with inflation knowledge
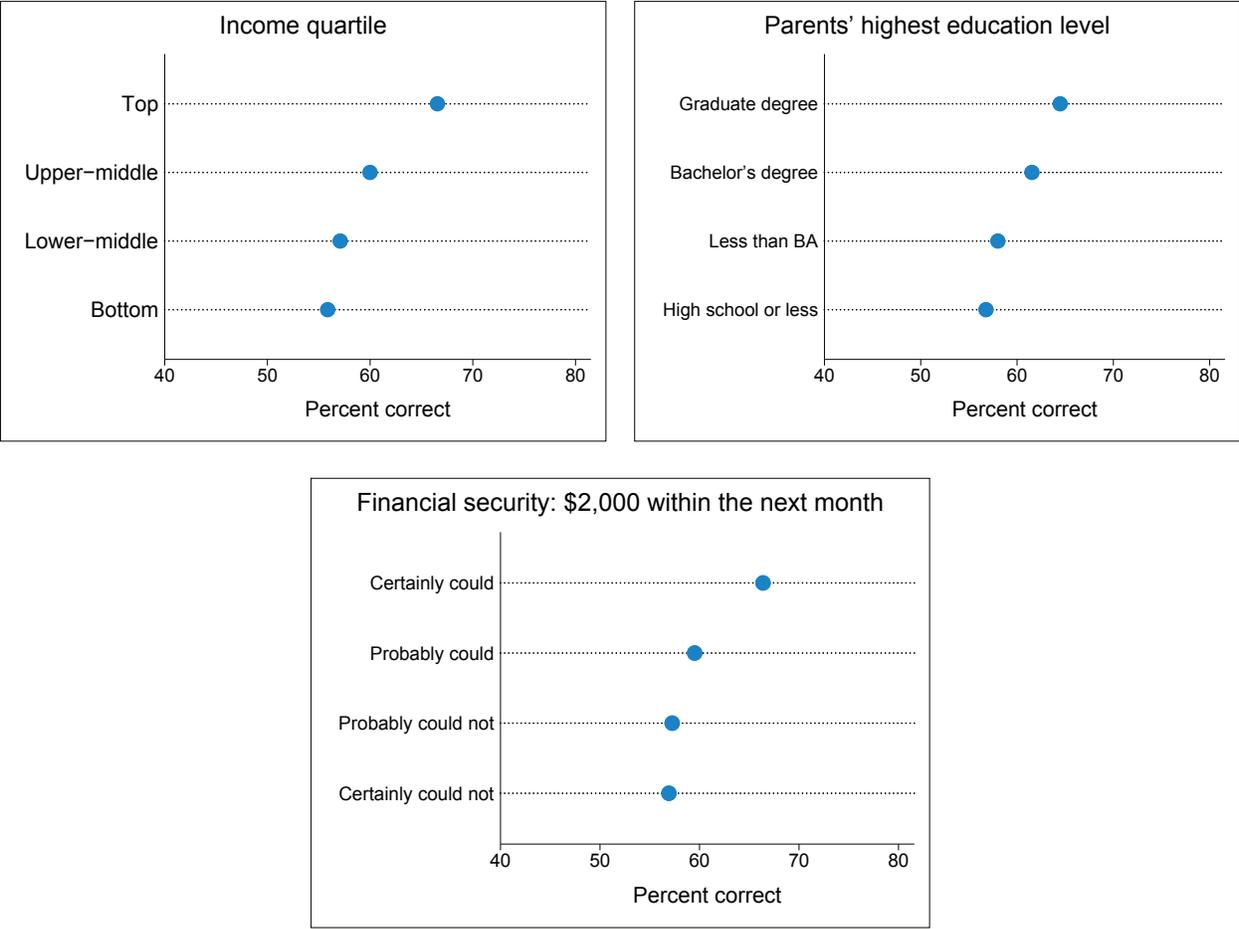
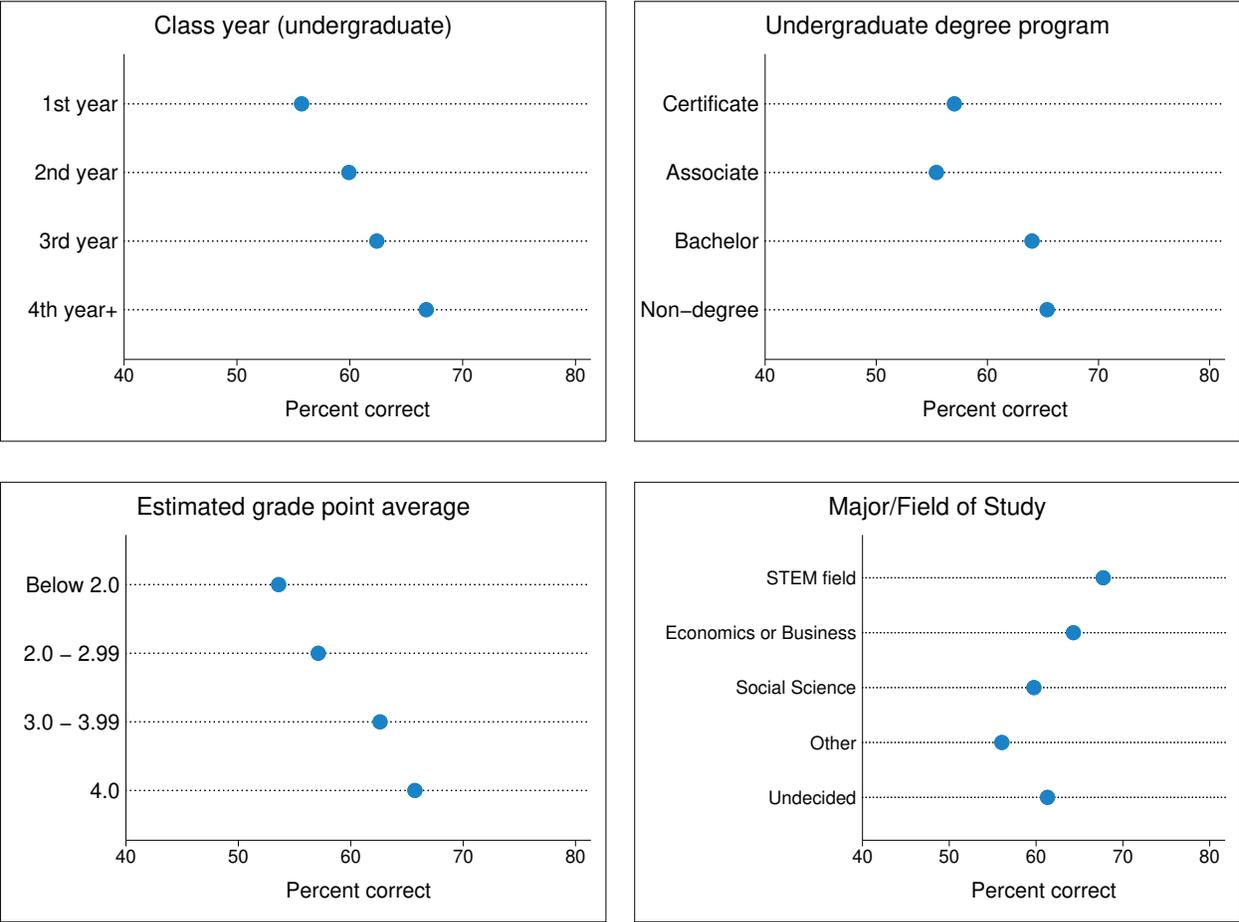Figure 11: Socioeconomic factors associated with inflation knowledge

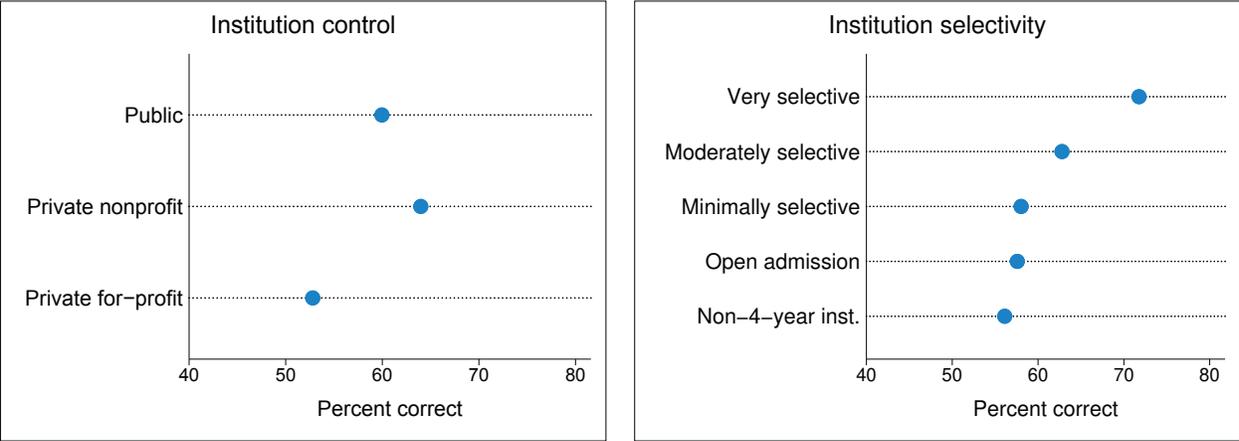Figure 12: Educational attributes associated with inflation knowledge

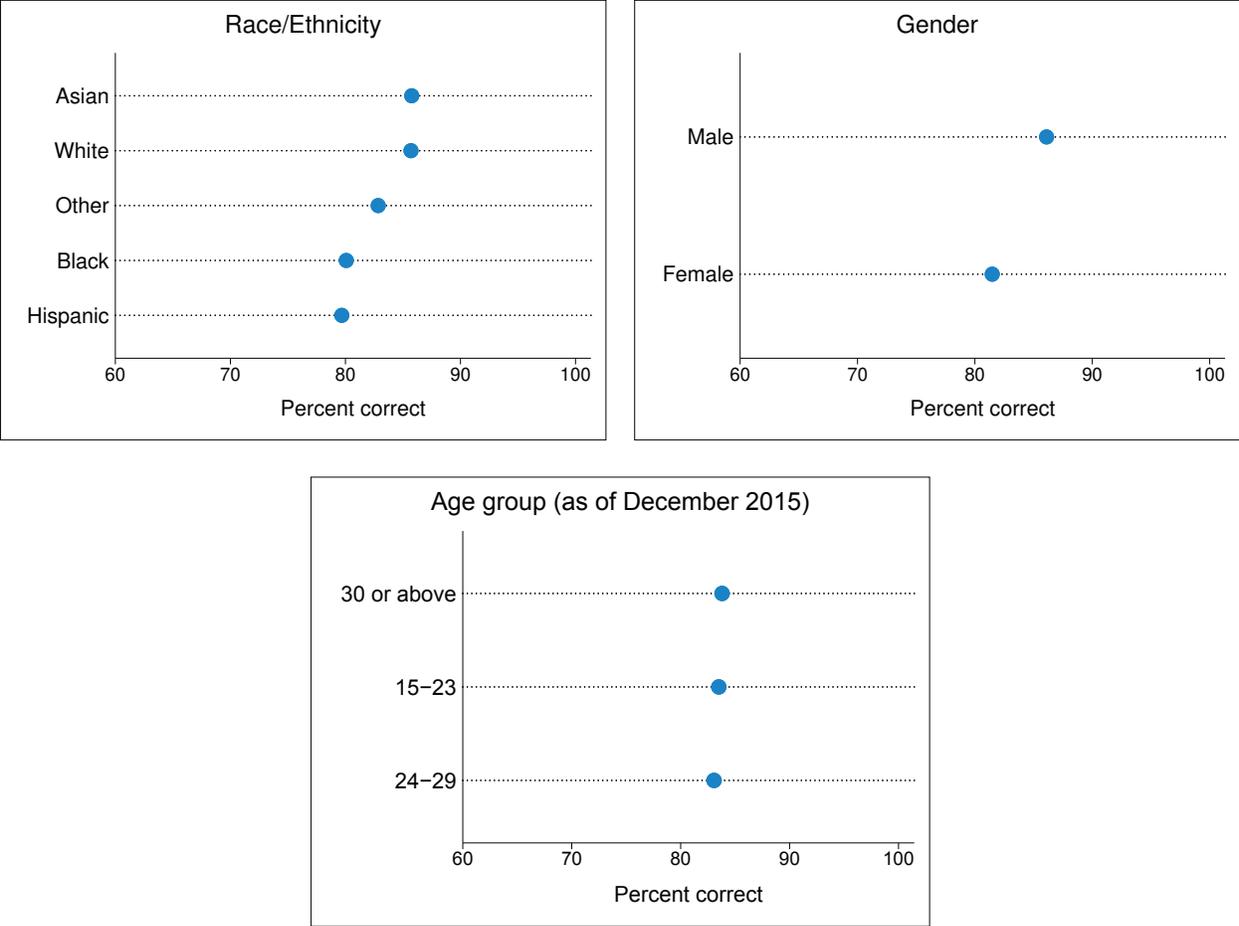Figure 13: Institutional characteristics associated with inflation knowledge

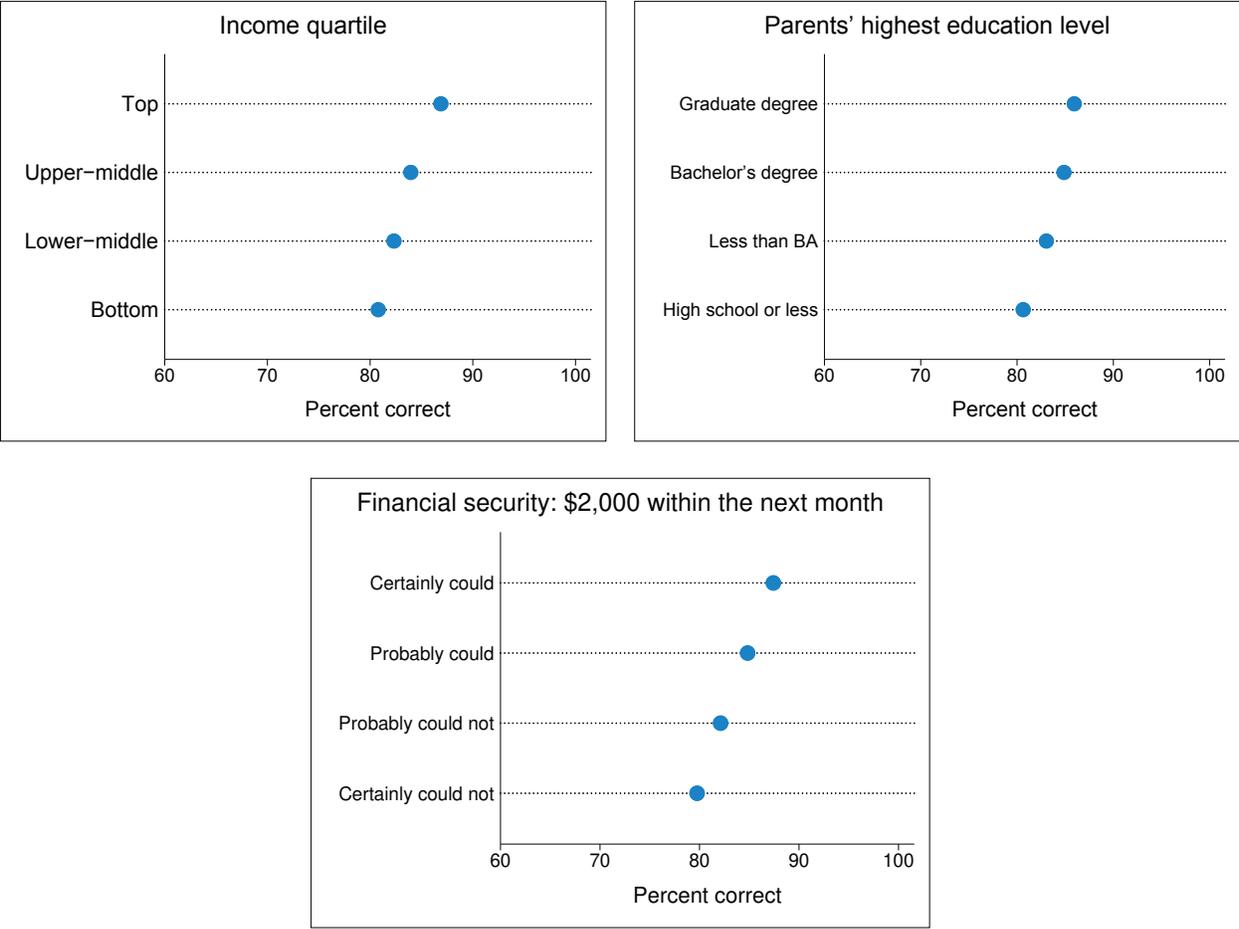Figure 14: Demographic characteristics associated with interest rate knowledge

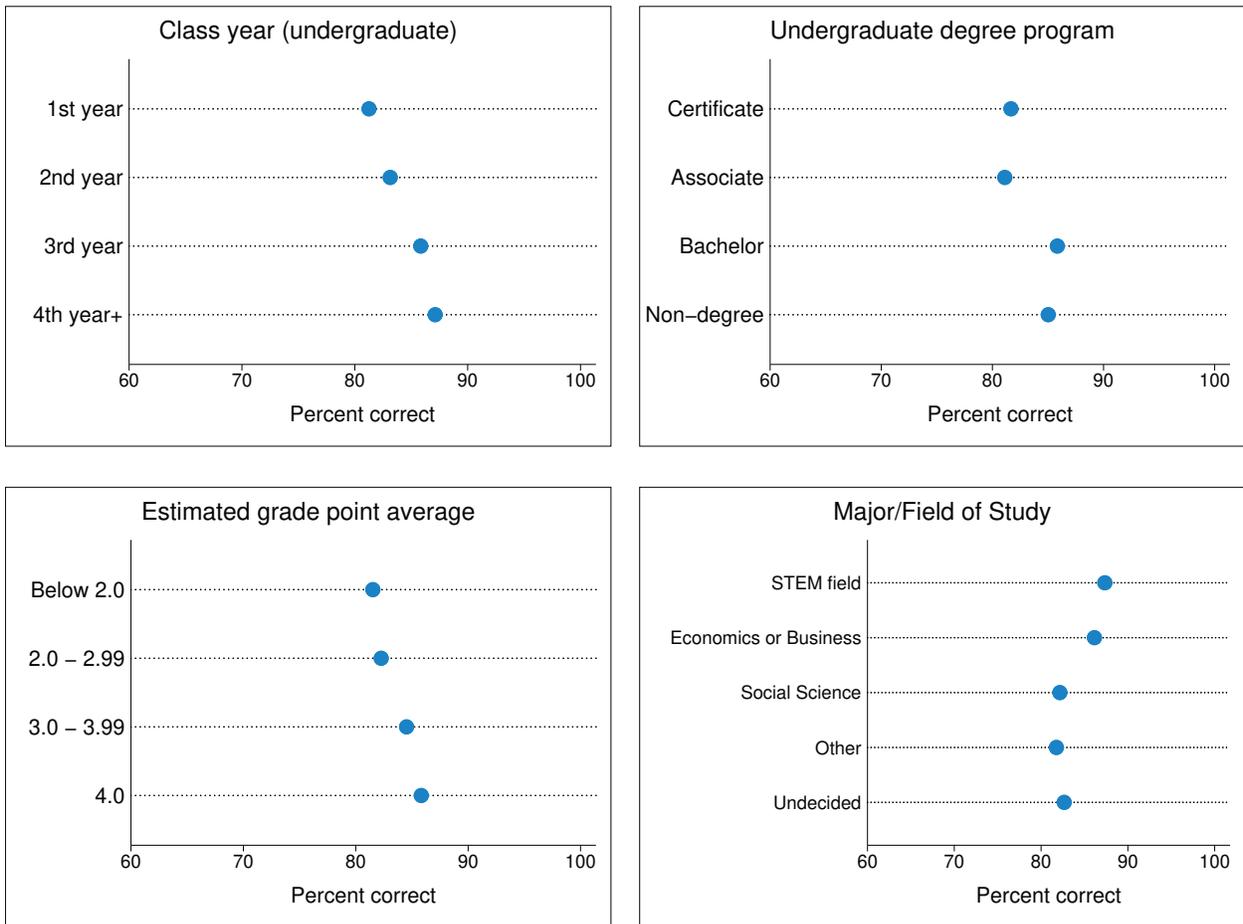Figure 15: Socioeconomic factors associated with interest rate knowledge

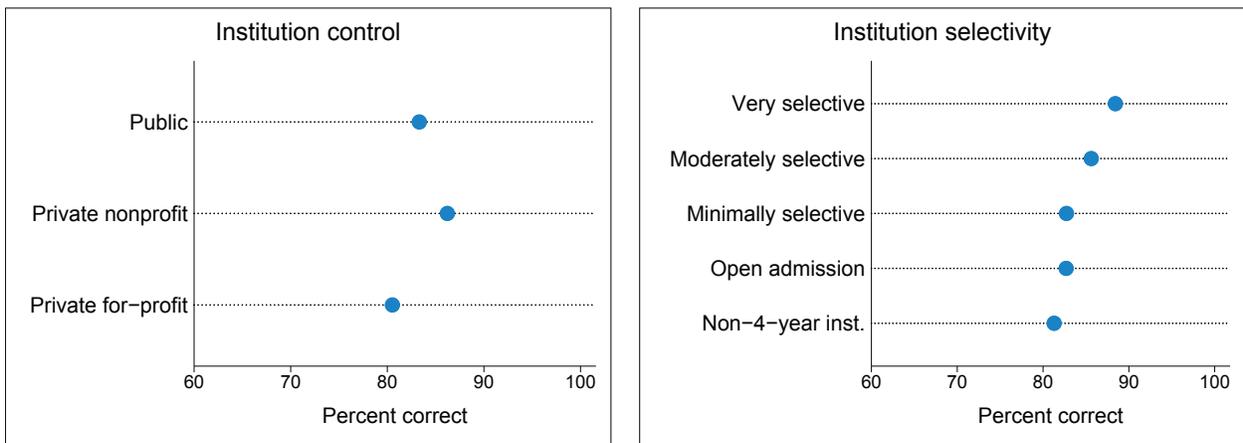Figure 16: Educational attributes associated with interest rate knowledge

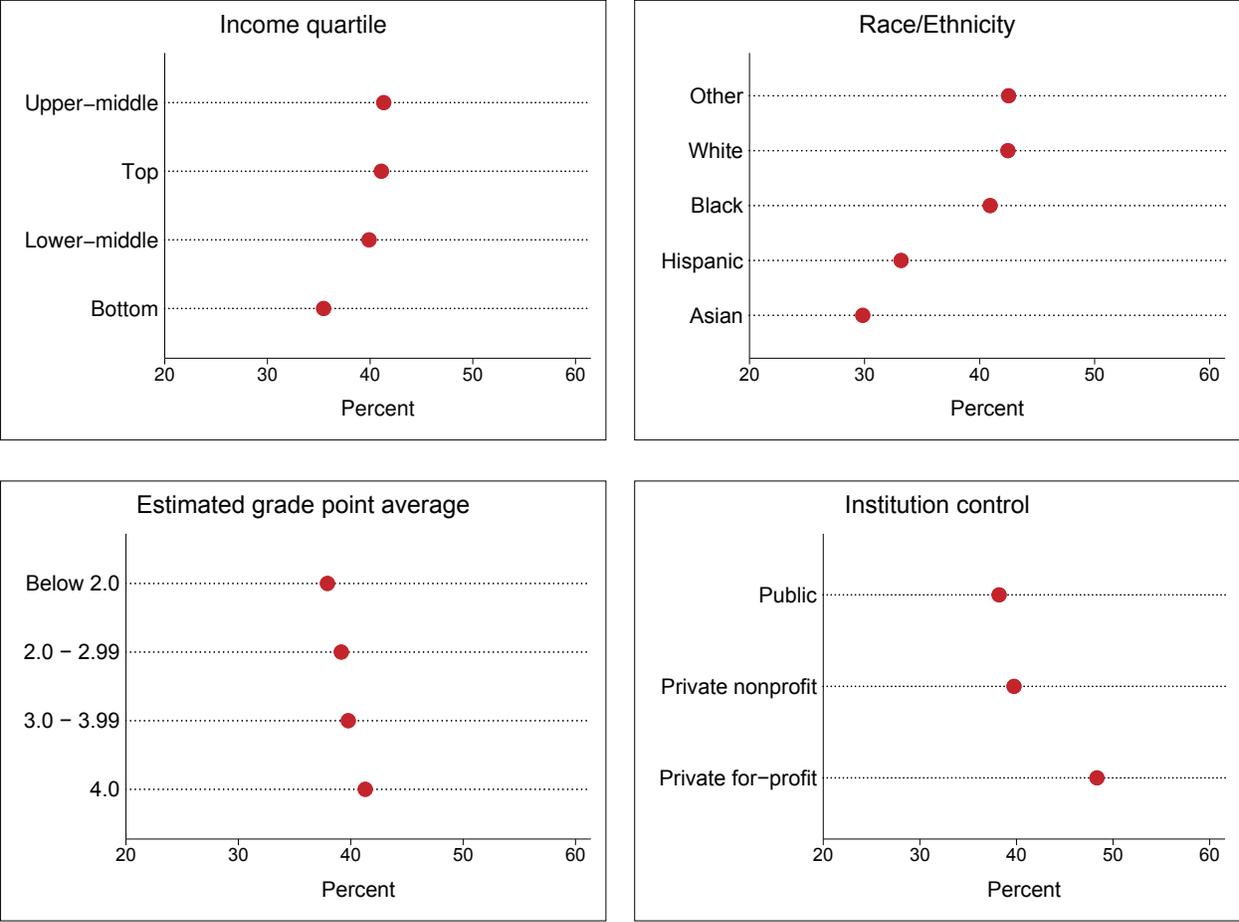Figure 17: Institutional characteristics associated with interest rate knowledge

Figure 18: Familiarity with consequences of default, by selected characteristics
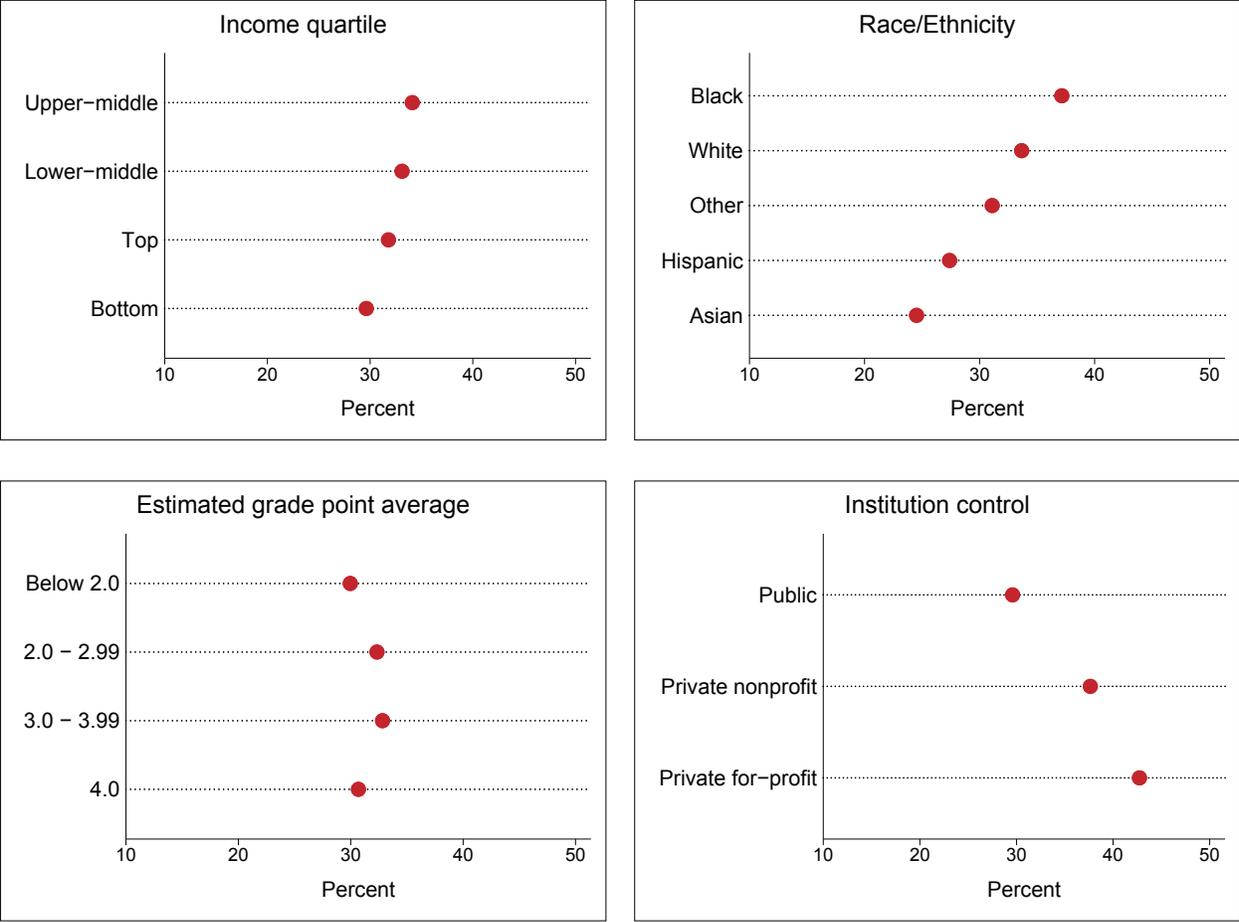
Figure 19: Familiarity with income-driven repayment, by selected characteristics