Student Selection into an Income Share Agreement

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Abstract

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JEL Codes: I22, I24, G41

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1 Introduction

The average wage return to a 4-year college education remains high (Ashworth and Ransom, 2019). However, going to college is an expensive and risky investment; less than two-thirds of students who enter a US college graduate within 6 years (Denning et al., 2022).[1] The high cost of college combined with low-wage employment for college dropouts are the primary drivers of the US student loan repayment crisis with less than 80 percent of the 1.6 trillion dollars in student loan debt currently in good standing (US Department of Education, 2022).

Some economists have proposed income share agreements (ISAs) – arrangements in which a student agrees to pay a fixed percentage of future earned income for a designated number of months in exchange for college funding – as an alternative to students loans.[2] The idea has been around for a long time; Friedman (1955) described income share agreements as an investor being able to "buy a share in an individual's earning prospects: to advance him the funds needed to finance his training on condition that he agree to pay the lender a specified fraction of his future earnings." But, with the exception of the failed 1971-1978 ISA at Yale University, only recently have ISAs been used to pay for college.[3] The lack of a clear regulatory environment makes managing an ISA program difficult for postsecondary education institutions. There are also two fundamental problems common to insurance contracts: (1) adverse selection into the ISA of students with lower earnings expectations

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[1]College completion rates have increased substantially growing from 52 percent in 1991 to 60 percent in 2010 with substantial heterogeneity across college type.

[2]Income share agreements are also referred to as "human capital contracts," "fixed-length income-dependent repayment plans," "graduation tax," and are sometimes referred to by one of the major ISA proposal names: "Tuition Postponement Option" or "Pay It Forward, Pay It Back."

[3]James Tobin created the Yale Tuition Postponement Option and 3,300 students signed up between 1971 and 1978. Students were placed into cohorts and, regardless of major, each agreed to pay 4 percent of their income for every $1,000 of funding received until their cohort's debt was paid off (or 35 years). At graduation, a student could pay 150 percent of the funding amount and leave the program immediately. Students with high-paying jobs at graduation disproportionately used the early payoff option. Yale ended and bailed out the program in 1999. Note also that A large number of ISA programs have been proposed, but not implemented (See Harnisch (2014) for a description of state-level legislation in 23 states to study or create a government-funded ISA programs). Krueger and Bowen (1993) describe and evaluate the Clinton-Gore (1992) income-contingent loan plan that was never adopted. In addition to Purdue University, other schools that have started ISA programs include: the University of Utah, Point Loma Nazareen University, Lackawanna College, Norwich University, and Clarkson University.

and (2) moral hazard which reduces human capital investment and work effort for ISA participants.

In the paper, I use administrative and survey data from a large public university ISA program, Purdue University's Back a Boiler, to measure the adverse selection into the program. The identification strategy is based on the way the ISA terms were provided to students. The contract length and the income share rate are determined based only on the student's major and year in school. However, students had no way to know their ISA contract terms without submitting an application. I observe all ISA program applications which allows me to identify the full set of students who were seriously considering using this option to pay for school, regardless of whether they decided to participate in the ISA program.

Results reveal that students are quite sensitive to the program terms. Conditional on the average expected earnings of the major, students offered worse ISA terms were less likely to choose to participate in the ISA. This suggests that students understand the program incentives and are sensitive to the income share rate. In nearly every other dimension, I find that ISA participants and non-participants are similar. Most surprisingly, there is no evidence of adverse selection on academic ability as measured by SAT score, college GPA, first-generation student status, and being a non-native English speaker. Additionally, using survey data, I find no evidence that ISA participation is correlated with measures of debt aversion, financial experience, future family expectations, risk aversion, time preference, optimism, and parent income. However, the evidence suggests that ISA participation is influenced by the degree of parent involvement in the student's financial decisions. This is not surprising as the parent PLUS loan program is the most commonly selected funding option for eligible non-participants.

The overall lack of adverse selection based on student ability and student characteristics into the ISA is fortunate. This suggests that after controlling for the ISA terms and parent financial involvement, the ISA participation decision may be as good as randomly assigned. Under this assumption, I estimate the effect of ISA participation on grades, graduation,

and post-graduation salary. The results show no effect of ISA participation on grades, a 3 percentage point increase in the likelihood of graduation, and a $5,000 lower starting salary. The lower starting salary could be the result of moral hazard from the increase in the effective marginal income tax rate faced by ISA participants, or could be due to adverse selection that is still unaccounted for after conditioning on the observables. I suspect that the truth is some mix of the two mechanisms.

There is a small and growing literature on ISAs including: Herbst and Hendren (2021), Jacobs (2021), Madonia and Smith (2019), Evans, Boatman and Soliz (2019), and Barr et al. (2017). However, this paper is the first to provide empirical evidence on selection into an existing college ISA program. That the evidence shows no adverse selection on student ability differences within a major suggests that limited college ISA programs that provide gap funding for students are viable. Zaber and Steiner (2021) describe the literature as having not yet provided an understanding of how ISA participation affects education, financial, and labor market choices. This paper also provides the first estimates of these effects. That the evidence shows a 3 percentage point increase in the graduate rate suggests that the ISA program helps some students overcome financial difficulties and complete their degree.

The paper proceeds as follows. In Section 2 I describe the institutional setting and the administrative data. In Section 3 I present a model in which students must choose between an ISA and a parent PLUS student loan and I use this model to calculate the expected payments, present discounted value of payments, and the valuation of the partial income insurance provided by the ISA. In Section 4, I describe the empirical strategy and results obtained from an analysis of the administrative data. The results from an analysis of the survey data is in Section 5. In Section 6, I report the estimated effect of the ISA program on various outcomes using a selection on observables approach. My conclusion is in Section 7.

2   Setting and Data

2.1   Institutional Background

Purdue University is a public university located in northwest Indiana with about 50,000 students, of which 75 percent are undergraduates. About 45 percent of the undergraduate students are Indiana residents, 35 percent are out-of-state students, and 20 percent are international students. In-state student annual tuition is $10,000 and the total cost of attendance is $23,000. Out-of-state domestic student tuition is $29,000 and the total cost of attendance is $42,000. International student tuition is $31,000 and the total cost of attendance is $46,000. The average SAT score for undergraduate students is 1260 (28 ACT) but varies considerably by major. Potential students apply to and are accepted by colleges within the university. More than 40 percent of undergraduate students begin in engineering or science, but many switch to a major in another college after the first year. While not impossible, administrative hurdles make it difficult for students to switch into engineering or science majors if they were not initially accepted into these colleges. Similar, but less insurmountable, hurdles exist for several other majors, including those in the business school.

2.2   ISA Program Description

Applications for the ISA program opened in the spring of 2016 for the 2016-2017 academic year. Students continued submitting applications through the summer and into the first weeks of the fall semester. Only domestic students who completed at least one year of college were eligible to participate. The application included a partial credit check and any student with a bankruptcy or who was currently in debt collection was not eligible. The ISA program administrators checked that the student had made substantial progress in the declared major with a realistic stated graduation date. If this was not the case, the student was asked to submit a revised application correcting the major or year in school. To be eligible, students must have demonstrated remaining financial need after exhausting

merit-based scholarships, grants, and direct federal student loans. Purdue presented its ISA program as an alternative to a parent PLUS loan or a private student loan.[4]

While ISAs are similar to income-based student loan repayment, the fundamental difference is that ISAs have no loan balance to pay down.[5] In the language of ISAs, the "funding amount" is the amount of money the student receives, the "income share" is the fixed percentage of earned income the student agrees to pay for the "contract length" after a 6-month post-graduation grace period, and the "payment cap" is the maximum amount the student would be obligated to pay, 2.31 times the funding amount. Payments are "deferred" if the participant exits the labor force and the contract length is extended up to the "deferment cap" of 5 years. Deferment applies if the ISA participate is not working to care for a family member or to go to graduate school. If monthly earned income drops below the "annual earned income threshold" of $20,000 or if the participant is unemployed and seeking employment, payments are forgiven and the contract length is not extended. The total amount the student pays over the contract length could be much more or much less than the funding amount and the ISA program does not allow for early exit from the contract unless the participant hits the payment cap.

Eligible applicants are sent a disclosure that describes the terms of the ISA program (Figure 1 is the first page of an example disclosure) and illustrates the partial income insurance provided by the ISA.[6] Eligible applicants would have also received a disclosure for a parent PLUS loan and may have received disclosures for private student loan offers. Each income share rate corresponds to a particular contract length as determined by the student's major

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[4]Private student loans are less common since the financial crisis, though there are still several large student loan providers including Chase, CitiBank, Wells Fargo, and Discover. Parent PLUS loans have higher interest rates than other federal student loan options and while the money goes to the student's education, it is the parent who is the borrower and responsible for payments. Private student loans generally have the highest interest rates of all student loan options.

[5]In an effort to reduce the student loan default rate, the US Department of Education has introduced several income-driven repayment plans where monthly payments are reduced to a certain percentage of discretionary income for an extended period of time or until the loan balance is repaid. See Abraham et al. (2020) for a comparison of student loan income-driven repayment plans and student income share agreements.

[6]Abraham et al. (2020) found that an insurance-focused framing for the ISA increases participation.

and year in school. Majors with higher average starting salaries were generally assigned into contract-term groups with more favorable income share rates and contract lengths. Seniors receive the most favorable terms and sophomores receive the least favorable terms. This reflects both the longer grace period for sophomores and the increased probability of switching to a lower-paying major. The ISA program income share rates are between 2.57 and 5.42 percent per $10,000 of funding for a contract length of between 88 and 116 months.

Students who choose to participate in the ISA must first earn a perfect score on an online quiz about how the ISA contract works (they can take the quiz unlimited times). Once they sign the contract, their university account is credited with the funding amount. The student then receives a check for the portion of the funding amount above the remaining university tuition and other fees on the student's account. Student who do not accept the offered ISA funding generally either take a parent PLUS loan, a private loan, or receive financial help from extended family members. Participants are allowed to sign up for subsequent years of funding through the ISA, up to a total income share of 15 percent across all income share agreements.

Participants made no payments while they were in school or during the 6-month grace period immediately following graduation or after choosing not to continue at the university. After graduation, participants provide the university with a pay stub to determine the monthly payment. The monthly payment is recalculated annually after the servicing partner receives the W-2 and 1099-MISC either from the participant directly or from the IRS.[7]

At the beginning of the program, the only way a student could learn their applicable income share rate and term length was by submitting an application and receiving a disclosure. ISA terms were not publicly available and students making inquiries were simply told to apply. This lead to a large number of students applying for an ISA and then choosing not to participate once they learned the terms. This creates a unique opportunity to identify selection into the ISA program. Most students at the university do not exhaust their

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[7]Participants are required to file US federal income taxes in each year of the income share agreement and are also required to file form 4506-T which gives Purdue access to the W-2 and 1099-MISC forms.

direct federal student loans and therefore do not consider the ISA program.[8] Students are not told about the ISA program when they are admitted to the university and the financial aid offices does not include an ISA as part of an incoming student's 4-year college financial plan. Instead, it is students who experienced a deviation from their 4-year plan who consider participating in the ISA program as a source of gap funding in order to remain in school. The important identification assumption for my analysis is that all students considering the ISA submitted an application.

2.3 Administrative Data

Over the first three years of the program, from the fall of 2016 to the summer of 2019, 1,459 eligible applications were submitted. The students submitting these applications were in 145 different majors across all the colleges at the university. As shown in Table 1, the ISA program had a 55 percent participation rate with 796 of the applications resulting in accepted ISA funding. In total over this period, the university dispersed $9.6 million in ISA funding.

Over this time period, eligible ISA applications were received from 1,094 unique students with some receiving ISA funding in multiple periods. As shown in Table 2, about 51 percent of students who submitted at least one eligible application accepted ISA funding (participants) with the other 49 percent having never accepted ISA funding (non-participants). For comparison, Table 2 also provides summary statistics for all sophomores, juniors, and seniors during the same time period who never submitted an eligible application (non-applicants). Observations for non-applicants are not used in the subsequent analysis.

Table 2 reports that ISA participants request larger funding amounts on average, perhaps because they have greater remaining financial need than non-participants.[9] Participants are more likely to be in majors that offered lower income share rates and also slightly lower

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[8]Annual federal student loan borrowing limits ranged from $5,500 to $12,500 per year with a total borrowing limit across all years as an undergraduate student of $31,000 to $57,500.

[9]Citing federal privacy laws, Purdue University has not provided FAFSA information for any students.

average starting salaries than non-participants.[10] To illustrate this, Figure 2 plots the major-specific ISA participation rate against the major-specific average starting salary. The figure provides strong evidence that students are sensitive to the offered income share rate and associated contract length, which indicates that most eligible applicants understand the ISA contract. In the figure, each color group represents a set of majors with the same ISA contract terms. Within each contract-term group, majors with higher average earnings have lower ISA participation rates on average. Looking across contract-term groups for the same average earnings, those majors with more favorable contract terms tend to have higher ISA participation rates.

Adverse selection would suggest that students with lower SAT scores and lower college GPAs would be more likely to participate in the ISA.[11] However, Table 2 reports the opposite: ISA participants have slightly higher SAT scores and college GPAs than non-participants. The differences between participants and non-participants are small and not statistically significant. In contrast, the differences between non-applicants and applicants are large. The general populations of students, mostly non-applicants, are on average in majors with higher starting salaries, have higher SAT scores, and have higher first-year GPAs than ISA applicants. Applicants are more likely to be Black or Hispanic, more likely to be a first generation college student, and more likely to have transferred to the university after having completed some college at another institution (usually a community college). This indicates that applicants are more likely to come from disadvantaged backgrounds and likely have a greater need for this type of gap funding to help them stay in college.

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[10]The income share rate is the income share per $10,000 of ISA funding. The major-specific average staring salary is obtained from five years of a university-administered survey of graduating students within the first six months after graduating. This "First Destination" survey is administered by the university's Center for Career Opportunities and has a 86 to 90 percent participation rate over this period. See purduecco.com/single-post/first-destination-survey for more information. The starting salaries are wage-inflation adjusted to 2019 and averaged for each major.

[11]There are large differences in grade distributions across majors. To account for this, I regress the GPA on indicators for the student's major and year in school and save the residuals. The prior-year GPA (relative to major) is the sum of the average prior-year GPA and the student-specific residual from this regression.

3 Model of Student Choice with Income Uncertainty

This model of student ISA choice focuses on the distribution of the student's expected earnings in the 10 years after graduation. I let $f(w_{it})$ represent the distribution of student i's subjective beliefs about his or her future earnings in year t. The mean of w_{it} is a natural measure of the student's expectation while the standard deviation of w_{it} is a natural measure of the student's uncertainty about his or her future earnings.

I assume that each student is presented with two options for funding their college education. Either option provides V_i, the same level of funding for college in year 0, but the two options require different repayment in years 1 through 10. Under the parent PLUS loan option, student i makes payment P in each year with

$$P = \frac{r\, V_i\, (1+z)(1+r)}{1 - (1+r)^{-10}}. \tag{1}$$

The interest rate, r, was 0.071 in 2019 and the fee imposed at disbursement, z, was 4.2 percent of V_i. The disbursement fee and the interest that accrues for the year before the student graduates and begins repaying the loan is capitalized into the principle of the loan. This implies that for a funding amount of $V_i = \$10,000$, the annual payment, P, would be $1,595.

The ISA option also provides the student with V_i in year 0. But the repayment amount in each year depends on the student's earnings. Under the ISA option, student i makes payment Q_{it} in each year until year T_i, the term length:

$$Q_{it} = s_i \left(\frac{V_i}{\$10,000} \right) w_{it} \tag{2}$$

To illustrate the repayment for the ISA option, I use a specific example before returning to the general formula. Mathematics majors at were offered an income share rate, s_i, of 3.0 percent per $10,000 for a contract term of 8 years. For a funding amount of $V = \$10,000$, the

annual payment would be $s_i w_t$ in years 1 through 8 and zero in years 9 and 10. The average starting salary, adjusting for wage inflation, across all graduating mathematics majors at Purdue who went directly to an employer rather than graduate school over the past 5 years is \$66,287. If we take this as the value for w_{i1}, the earnings in year 1, then the annual payment amount, $Q_{i1} = \$1,990$.

Which option is the better deal for the student? If we assume that earnings are kept constant, the total amount paid is almost exactly the same under the two options. That is,

$$\sum_{t=1}^{8} \$1{,}990 \approx \sum_{t=1}^{10} \$1{,}595.$$

One factor this simple calculation ignores is that under the student loan option, the student gets to spread out repayment over more periods. Payments made far in the future are discounted more heavily and therefore the student loan option looks better. Additionally, wage growth will increase the payment only for the ISA option and not for the student loan option. Accounting for both of these factors leads to this inequality:

$$\sum_{t=1}^{T_i} \left(\delta^t \, s_i \, w_1 (1+g)^{t-1} \right) > \sum_{t=1}^{10} \left(\delta^t \, P \right) \tag{3}$$

where w_1 is the starting wage, g is the annual rate of wage growth, δ is the discount rate, and T_i is the term length of the ISA contract for student i. If the inequality above holds, it implies that student i pays back more in present discounted value under the ISA than under the student loan. For example, a graphical representation of the present discounted value of ISA repayment for a mathematics major is given in Figure 3 for a range of starting salaries. This is contrasted with the present discounted value of parent PLUS loan payments which are the same regardless of the student salary.

Given that the two options are similar for the average salary in the mathematics major example, it must be that accounting for positive wage growth and discounting gives the ISA option a higher present discounted value of payments than the student loan option. Adding

these two factors to the calculation suggests that the student loan is the less costly option on average, as illustrated by the inequality in equation 3.

However, this ignores the uncertainty student i faces in his or her future income as well as the insurance value of the ISA which provides participants with partial insurance against low future earnings. The ISA provider assumes part of the participants' earnings risk and earns lower revenue if the participants experience lower future earnings (Lochner and Monge-Naranjo, 2016). I deal with the uncertainty in w_{it} by integrating over distribution of earnings, $f(w_{it})$, and model the additional value the student derives from the partial income insurance by assuming a utility function, $U[.]$, that implies the student is risk averse. In this framework, student i will select the ISA option if the following condition holds:

$$\sum_{t=1}^{T_i} \delta^t \int_0^\infty U\left[w_{it}(1-s_i) + y_{it}\right] df(w_{it}) > \sum_{t=1}^{10} \delta^t \int_0^\infty U\left[w_{it} - P_i + y_{it}\right] df(w_{it}) \qquad (4)$$

where y_{it} is the non-earned income.

Performing insurance value calculations requires specifying a form of the utility function. For this exercise, I select the constant relative risk aversion (CRRA) utility function

$$U[C] = \frac{C^{1-\eta}}{1-\eta}$$

with a relative risk aversion of η. I use the average starting salary for student i's major and the standard deviation of starting salary for the major as parameters of the normal distribution for student i's beliefs about earnings, $f(w_{it})$.

Using the distribution of starting salaries for the full sample of Purdue students which includes both applicants and non-applicants, I estimate the distribution of earnings for ISA participants and non-participants and then simulate their future earnings over 10 years. I use these projections to compare the total repayments made under an ISA and the commonly-chosen alternative, a direct parent PLUS loan. These calculations show that about 90 percent of applicants would pay less by selecting the parent PLUS student loan option rather than

the ISA option. However, when considering future earnings uncertainty for risk-adverse students, the calculations show that the ISA provides additional value as insurance against low earnings and this justifies the higher level of participation.

4   Empirical Strategy and Results

Similar average SAT scores and GPA for participants and non-participants (as reported in Table 2) suggest that there is no adverse selection on student ability. However, differences in average ability across majors or interactions with other factors may be masking the adverse selection. To account for these other factors, I use a linear probability model to regress an indicator for ISA participation on the full set of student characteristics to see if higher prior-year GPA and SAT scores predict a lower probability of participation in the ISA. The model is specified as:

$$ISA_{itm} = \beta\, X_{itm} + \gamma_t + \lambda\, prior_{it} + \theta_m + u_{itm} \tag{5}$$

where ISA_{itm} is an indicator of ISA participation for student i in academic year t in major m. The set of X variables include those from Table 2. The γ_t variable is a dummy for the time period. Some specifications include a complete set of major fixed effects, θ_m. These capture differences in expected future wages, difficulty of the coursework, differences in grading standards, etc.

The goal of this analysis is to estimate the degree of adverse selection into the ISA program. The evidence is more convincing when the full set of major fixed effects are included as this accounts for many of the unobservable differences across students that may be correlated with other characteristics. However, since the ISA rate is a function of the major, including major fixed effects does not allow me to estimate the effect of the ISA rate. In every specification, I cluster the standard errors by major, which also captures correlation over time for students who apply in multiple periods. Table 3 reports the coefficient estimates

and standard errors. The results in column (1) are strong evidence of selection into the ISA based on the ISA rate and on the average salary of the major. Students in majors with higher offered income share rate are less likely to participate, holding the average salary for the major constant. Students in majors with higher average salaries are less likely to participate in the ISA holding the income share rate constant. Note that the 90-10 percentile salary ratio for the student's major has little effect on the participation decision. The point estimate is negative which suggests that greater income uncertainty does not increase ISA participation. Students with a higher requested funding amount are more likely to participate in the ISA, perhaps suggesting that they have a greater need for gap college funding.

In column (2) of Table 3, the point estimates on the math and verbal SAT scores and on first-year GPA are all small and estimated with enough precision to rule out large adverse selection on measured ability. The lack of evidence for adverse selection on student ability is robust to the inclusion of demographic controls in column (3) and the inclusion of major fixed effects in column (4). The estimates across all four columns are quite stable.

Throughout this analysis, it is striking to find no evidence for adverse selection into the ISA on student ability measures like GPA and SAT scores. The data indicate that students are paying attention to the ISA contract terms and yet the is no evidence of negative selection on observed ability. This mirrors the finding from Madonia and Smith (2019) of no adverse selection on poker-playing ability into an ISA for a poker tournament. However, they do find that poker players earn significantly less when participating in an ISA and conclude that the moral hazard impacts are much larger than the adverse selection impacts. In contrast, Herbst and Hendren (2021) suggest that students have a great deal of private information about their future earnings expectations and that adverse selection on this private information is so large that it would prevent private markets from offering ISA contracts.

The results presented here suggest that much of the variation in future earnings is observed in the student's major and that pricing the ISA differently by major captures this. If the university ISA program were to create more major groups with fewer majors in each

group, there would be even less student selection on these major-specific average earnings differences. But more importantly, I find no evidence of adverse selection on student ability measures which are an important component of a student's private information about their own future income. This does not rule out the important adverse selection role that other types of private information may have.

The observable characteristics reported in Tables 2 and 3 are not the only possible dimensions on which students may select into the ISA. The participation decision may depend on the degree of psychological aversion to debt, financial experience, employment history, future salary and employment expectations, marriage and family expectations, location preferences, risk aversion, time preference, optimism, and parent characteristics. To evaluate these other sources of student selection, I conducted a survey of both the ISA participants and the ISA non-participants. The following section describes the survey methods and questions.

5   Survey of Eligible Applicants

I designed a survey to measure additional individual characteristics and future expectations for ISA participants and non-participants. Each eligible ISA applicant received an invitation to complete my "paying for college" survey which explained that only selected Purdue University students were being invited and that I was conducting the survey to learn about how their "experiences, attitudes, expectations, and beliefs influence how they pay for college." The survey asked about parent characteristics, personality traits, expected income, debt aversion, affinity for the university, financial experience, employment experience, location preference, risk aversion, time preference, optimism, and how the student paid for college. I did not explain that I was specifically studying the ISA program as I did not want students to be thinking about the ISA program when answering the questions. All students who completed the survey were immediately given a $20 Amazon gift card code. Approximately

60 percent of ISA applicants chose to complete the survey.[12]

5.1   Parent Characteristics

The most commonly chosen alternative to the Purdue ISA is the parent PLUS loan, where the parent is directly responsible for the future loan payments. This suggests that it may be parents, more than students, who are driving the ISA participation decision. The survey asks students to report the educational attainment of their parents as well as their parents' combined annual income. It then asks questions related to parent willingness to potentially take on debt incurred by the student and their involvement in the student's financial decisions:

> If you asked your parent(s) to co-sign a loan to help you purchase a new car, what do you think they would say?
>
>   - definitely yes
>   - probably yes
>   - might or might not
>   - probably not
>   - definitely not
>
> How involved are/were your parents in financial decisions related to your college education?
>
>   - My parent(s) made my college financial decisions for me
>   - My parent(s) strongly influenced my college financial decisions
>   - My parent(s) somewhat influenced my college financial decisions
>   - My parent(s) were not involved in my college financial decisions

Table 4 shows that there are some important parent characteristic differences for ISA participants and non-participants. Fathers of participants are less likely to have graduated from college, though the difference in household income is not statistically significant. Non-participants believe that their parents are more willing to take on debt incurred by the

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[12]To account for potential non-response bias, I used propensity score weighting to weight the data by the inverse probability of responding. Very few observables affect the likelihood of responding to the survey and the weighting method does not change the results.

student, and correspondingly the parents have more influence on the student's finances. ISA participants report that their parents are less involved in their college-related financial decisions.

This suggests that the ISA participation decision may have more to do with certain characteristics of the parents than of the students. Holding parent income constant, some parents may be less willing to take on student loan debt using a parent PLUS loan and this may be what drives the student to the ISA alternative. In other instances, it may be the desire for financial independence by the student that is driving the decision to participate in the ISA. More work is needed to better understand this mechanism, but it does not seem to be driven by the overall frequency of communication between the parent(s) and student.

5.2   Income, Work, and Family Expectations

Participating in the ISA should be more attractive to students who expect to have lower salaries after graduation and less labor force participation. Survey participants are asked to report their "best guess" of what their annual salary would be if they were to accept a full-time job soon after graduation. Betts (1996) found that fourth-year college student knowledge of salaries in their own field were quite accurate, and these survey responses are consistent with this finding. Table 5 suggests that ISA participants have lower starting salary expectations (stated beliefs) than non-participants with a gap of about $5,000. The difference in the average earnings for the major is only about $1,000, suggesting that the remaining $4,000 difference is private information. After the student graduates, the actual difference in starting salary is about $6,000. While this difference is highly statistically significant, I find it striking how small the difference in actual salary is between the two groups. Again, this suggests that there is less adverse selection on private information than in Herbst and Hendren (2021).

There are no differences in expected plans for graduate school or for starting a business. This is surprising as the ISA program should be more attractive to students who will have

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the ability to defer more of their lifetime earnings to the period after the ISA contract has ended. It is surprising that non-participants expect to have more children than participants. This is not consistent with the hypothesis that the ISA should be more attractive to those who expect lower earnings because of family responsibilities.

5.3   Other Student Characteristics

Debt Aversion

The survey asks students to rate a set of 9 statements about debt aversion. Caetano, Palacios and Patrinos (2019) show that framing a financial contract as a debt or as a loan affects the student's reported willingness to enter into the contract. My hypothesis is that students with greater aversion to debt will be more likely to choose to participate in the ISA. The debt aversion questions used in this survey were developed and tested for reliability by Davies and Lea (1995). Students were asked to report that they either strongly agree, somewhat agree, neither agree or disagree, somewhat disagree, or strongly disagree with each statement. Of the 9 statements, 5 are "pro" statements and 4 are "anti" statements. Values of 5 through 1 are assigned to the responses for ease of reporting with the scale reversed for "anti" statements. Therefore, for all statements, higher values indicate greater aversion to debt.

The questions are reported in the Appendix Table A1 along with the mean score (on a 5 point scale) for each question for participants and non-participants. The final column reports the p-value for a t-test of the equality of means. As shown in the Appendix Table A1, there is no evidence that ISA participants have greater debt aversion than ISA non-participants. In two of the three questions in which there is a statistically significant difference, it is the ISA non-participants who have greater levels of debt aversion. Perhaps it is not surprising that these ISA applicants have similar views on student debt as they nearly all report that they have large federal student loan balances. Debt aversion seems to have little impact on ISA program participation among this student population.

Affinity for the University

The survey asked students to rate a set of 7 questions about their affinity for the university to see whether students who have positive feelings about the university are more likely to sign up for the ISA program. Thinking that the university is looking out for them, a student could decide to participate in the ISA rather than a parent PLUS loan or a private student loan because they have greater trust in the university. The questions are reported in the Appendix Table A2 along with the mean score (on a 5 point scale) for each question for participants and non-participants. The final column reports the p-value for a t-test of the equality of means. As shown in Table A2, there is no evidence that ISA participants have greater affinity for the university than ISA non-participants.

Financial and Employment Experience

Financial experience and sophistication may impact which students decide to participate in the ISA program. To look for this, I ask survey participants to report their experience with checking and savings accounts, the stock market, car loans, and credit cards. As reported in the Appendix Table A3, ISA participants and non-participants have similar financial experience. Participants have 0.17 fewer credit cards than non-participants on average, but there are no other statistically significant differences in financial experience and there are no statistically significant differences in employment experience.

Location Preferences

Students who expect to live in cities with a high cost of living and higher wages after graduation should be less interested in participating in the ISA. The survey presents students with a list of 12 cities presented in a random rank order. Students are asked to imagine that they receive a job offer from a company with locations in each of the 12 cities and the company asks the student to rank the cities by where they would most like to work to where

they would least like to work.[13] Students are told that the salary does not depend on the location assigned. Students can drag the cities up or down the rank order list to reorder them. A rank of 1 is the most preferred location and a rank of 12 is the least preferred.

The 12 cities were selected to test for the importance of specific characteristics. Those who only rank high-population metro areas in their top 3 are defined as having a large city preference. Those who only rank low population metro areas in their top 3 are defined as having a small city preference. Students who prefer Indianapolis to Pittsburgh, Fort Wayne to Peoria, and Terre Haute to Topeka are defined as have an Indiana preference. Students who have the opposite ranking for all three of those city pairs are defined as having an outside Indiana preference. Finally, to directly test if higher location-based salaries affect ISA participation, I average the median household income for the three highest ranked metro areas for each student and report the average for participants and non-participants separately. As reported in the Appendix Table A4, across all these location preference variables, I only find weak evidence that ISA participants have a preference for small cities with even weaker evidence that non-participants have a preference for large cities.

Risk Aversion, Time Preference, and Optimism

Participating in an ISA is also a form of insurance against low earnings and therefore students with higher risk aversion may be more likely to participate. Time preference could influence the ISA participation choice. With a traditional student loan, a borrower can pay off the loan at any time without penalty. In contrast, an ISA is for a fixed period of time that cannot be ended early without hitting the payment cap. In addition, the payment amount will likely increase over time as the participant's income increases. Therefore, students with a lower discount rate may prefer the traditional student loan. Finally, optimism may influence beliefs about the student's future outcomes which could influence the student's view of participating

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[13]The students were asked to rank: Chicago IL, San Francisco CA, Boston MA, Washington DC, Indianapolis IN, Pittsburgh PA, Phoenix AZ, Fort Wayne IN, Peoria IL, Evansville IN, Topeka KS, and Terre Haute IN.

in an ISA. As shown in Appendix Table A5, there are no statistically significant differences in the measures of risk aversion, time preference or optimism between ISA participants and non-participants.

6   How the ISA Program Affects Student Outcomes

I observe four outcomes for ISA applicants: the student's GPA in the year for which the student applied for ISA funding, the student's GPA in the following year, an indicator for if the student graduated, and the student's starting salary at his or her first job. The results discussed above suggest that the income share rate and perhaps some parent characteristics are the only factors I observe that influence selection into the ISA. By controlling for the ISA terms with indicators for the majors in a contract-term group interacted with the student's year in school, I remove this source of selection. Under the assumption that this conditioning makes the ISA participation decision as good as randomly assigned, I can estimate the causal effect of participating in the ISA on these student outcomes. Other unobserved student characteristics that influence selection into the ISA may cause bias in these estimates, likely leading us to think that that the effect is due to moral hazard, when really the outcome difference is just due to unaccounted for adverse selection. While acknowledging this potential weakness, I proceed under the assumption of selection on observables. Figure 4 suggests that there is good overlap in the predicted probability of ISA participation for the participants and non-participants.

Table 6 looks for evidence of moral hazard by estimating the effect of ISA participation on current GPA. The results suggest that ISA participants do not earn lower grades than ISA non-participants. The point estimates suggest the opposite. Table 7 estimates the effect of ISA participation on grades in courses taken the academic year after the ISA application and again finds that while there is no statistically significant difference, ISA participants perform better in their future classes. This is evidence against the moral hazard prediction

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that ISA participation would cause a decrease in human capital accumulation.

Table 8 presents evidence of a large positive effect of ISA participation on graduation. The first column of Table 8 reports the estimate for the full population of eligible applicants with subsequent columns for selected demographic groups. The specification includes major fixed effects in order to account for differences in graduation rates by major. The specification also includes a full set of interactions between the ISA application period and the year in school. Students who did not enroll in classes in at least one of the three semesters after submitting their ISA application are dropped from the regression. The results suggest that ISA participants are 3 percentage points more likely to graduate than non-participants with stronger results for female, black, and Hispanic students. For comparison, Denning, Marx and Turner (2019) find that a $1,000 increase in Pell Grant award leads to a 5 percentage point increase in college graduation and Black et al. (2020) find that a $1,000 increase in the federal student loan borrowing limits leads to a 3 percentage point increase in college graduation. The results presented in Table 8 suggest that a $1,000 shift in funding from a parent PLUS student loan or other funding source to an ISA leads to a 0.3 percentage point increase in college graduation on average with larger increases for under-represented minorities. I suspect that for many of the ISA participants, something went wrong with their college funding plans and they maxed out their federal student borrowing. They must not have been able to rely on parents for money or to take out a parent PLUS loan or to be a co-signer on a private student loan. The income share agreement provides gap funding that does not rely on parents and helps the student stay in school.

Figure 5 shows the distribution of starting salary for the 572 ISA applicants who graduated, found employment, and self-reported their starting salary. It is clear from the figure that non-participants have higher average salaries than participants. Table 9 presents strong evidence that ISA participants take lower-paying jobs on average after graduation. The raw difference when controlling only for the income share percentage and funding amount is nearly $7,000. Controlling for the ISA contract-term group interacted with year-in-school

fixed effects reduces the estimated effect to about $6,000. Further controlling for major average starting salary and variance as well as the student's first-year GPA and SAT scores reduces the difference down to about $5,000. Under the selection on observables assumption, this $5,000 starting salary difference is a measure of the moral hazard of the ISA program where students decide to take lower-paying jobs (presumably with other compensating characteristics) because they face a higher effective marginal tax rate. It is a good thing that the ISA enables graduates to be less concerned about needing a high-salary job in order to pay back what would have alternatively been student loans. However, some or even most of this $5,000 difference in starting salary could be due to adverse selection on unobserved factors. My view is that even if the the entire difference was due to unobserved adverse selection, $5,000 is a relatively small difference that would not cause the college ISA market to unravel.

7   Discussion and Conclusion

The results suggest that selection in the ISA is driven primarily by the terms of the ISA contract and parent characteristics. Holding the income share rate fixed, students in higher-paying majors are less likely to participate in the ISA and students with parents who are moved heavily involved in their financial decision are also less likely to participate. The strongest finding is that there is no observed adverse selection into this ISA program on student ability measures or other student characteristics.

If this university ISA program has so little adverse selection and if it significantly increases graduation rates for at-risk students, why is it that so few colleges offer a similar ISA program to provide gap funding to students in need? One important factor is the lack of regulation for ISAs which makes offering this type of program risky for a university. In addition to the legal risks, the university takes upon itself some of the income risk for its graduates. A recession would decrease the flow of ISA payments to the university at the very time when

the university has greatest need for funds. However, the evidence presented in this paper suggests that this limited type of ISA program can be successful in helping students stay in school at very little cost the university. In fact, the university is projecting a 6 percent annual rate of return on the initial $9.6 million investment into the ISA program.

This income share agreement program has two important characteristics that reduce the expected adverse selection. First, eligibility for the program is restricted to sophomores, juniors, and seniors in an environment where it is more difficult to change majors than at most other universities. The second important program characteristic is that there are different income share rate groups that were largely based on the average earnings of graduates from each major. If a single income share rate were applied to all applicants equally, I believe that there would have been such strong adverse selection by major that only students in low-salary majors would choose to participate, leading to an unraveling of the program.

I caution that my finding of no adverse selection on student ability may not be (and probably is not) applicable to many other proposed ISA programs. Some proposed programs have an explicit goal of increasing access to college and would allow first-year students to participate. I think that this would dramatically increase the adverse selection and would make it very difficult to offer different income share rates based on expected future earnings. Allowing differential pricing based on observable student characteristics such as SAT scores, high school GPA, and other factors on the college admission application may help to reduce some of the anticipated adverse selection, though perhaps not enough to make a first-year ISA program viable.

Though there is no evidence that students put less effort into their coursework after choosing to participate in the ISA, there is evidence that ISA participants have lower starting salaries after graduation. Students who participate in an ISA are likely more willing to take a lower paying job, perhaps one that requires fewer hours or is located in a city with a lower cost of living. The evidence presented in this paper does not make it clear if participation in the ISA is causing the entire salary difference (pure moral hazard) or if it is caused by adverse

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selection on unobservable characteristics. Either way, the estimated $5,000 lower starting salary for ISA participants is relatively small and suggests that this type of university ISA program that provides gap funding to students with financial need is a viable way to help at-risk students.

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Figures and Tables

Figure 1: Income Share Agreement Disclosure

Income Share Agreement (ISA) Approval Disclosure

*** THIS IS NOT A LOAN ***

STUDENT:
[Student Name]
[Student Address]

FUNDER:
Back a Boiler – ISA Fund
1281 Win Hentschel Blvd
West Lafayette, IN 47906
(765) 588-5495

Income Share Agreement Terms

Funding Amount	**Income Share**	**Payment Term**	**Payment Cap**
[$12,000.00]	[4.00%]	[108 months]	[$30,000.00]
The amount of funds you will receive plus any funding charges.	The percent of your total earned income that you will share each month.	The number of months during which you will share your income.	The maximum amount you will pay over the payment term.

ITEMIZATION OF TOTAL FUNDING AMOUNT

Amount paid to you	$0
Amount paid to others on your behalf: • Purdue University	+ [$12,000.00]
Total amount provided	= [$12,000.00]
Initial funding charges: • Disbursement Fee	+ [$0]
Total Funding Amount	= [$12,000.00]

ABOUT YOUR INCOME SHARE
• **Your income share is the percentage of your future earned income you will owe in return for the funding you receive.** Your share is not an interest rate or annual percentage rate.
• **Your income share is fixed.** This means that your income share does not vary with your income and will never be lower or higher than the income share shown above.
• **Your payments will vary based on the amount of your earned income.** The total amount you will pay may be **more** or **less** than the funding amount you receive. The maximum you will pay is two and a half times (2.5x) your funding amount over the payment term, regardless of your earned income.

FEES
Application Fee: $0. **Disbursement Fee:** 0%. **Late Fee:** The lesser of $5 and 5% of the payment amount due if not received within 10 days of the due date. **Returned Payment Fee:** $20. **Prepayment Fee:** $0. **Check Processing Fee:** $0.

Income Share Agreement Payment Illustration

The total amount you will pay for this Income Share Agreement will vary depending upon your future earned income and may be **more** or **less** than the **funding amount** you receive. An ISA is different from a loan, which has principal and interest payments. An ISA requires you to pay a fixed percentage of your earned income each month for a fixed period of time. The table below shows illustrative monthly and total ISA payments for different levels of earned income.

Average Annual Earned Income	Estimated Monthly Payments Under Differing Levels of Earned Income	
	$[12,000] Income Share Agreement [4.00]% income share, [108]-month term	
	Monthly Payments	Total Payments
$ 10,000	$ 0.00	$ 0.00
$ 20,000	$ 66.67	$ 7,200.00
$ 30,000	$100.00	$10,800.00
$ 40,000	$133.33	$14,400.00
$ 50,000	$166.67	$18,000.00
$ 60,000	$200.00	$21,600.00
$ 70,000	$233.33	$25,200.00
$ 80,000	$266.67	$28,800.00
$ 90,000	$300.00	$30,000.00 (cap)
$ 100,000	$333.33	$30,000.00 (cap)

Examples if Income Increases by 5% per Year
[4.00]% income share, [108]-month term

• If your first job pays you: $ 20,000
Your total payments will be: $ 8,821

• If your first job pays you: $ 40,000
Your total payments will be: $ 17,643

• If your first job pays you: $ 60,000
Your total payments will be: $ 26,464

• If your first job pays you: $ 80,000
Your total payments will be: $ 30,000 (cap)

• If your first job pays you: $100,000
Your total payments will be: $ 30,000 (cap)

Figure 2: ISA Participation Rate by Major Average Salary
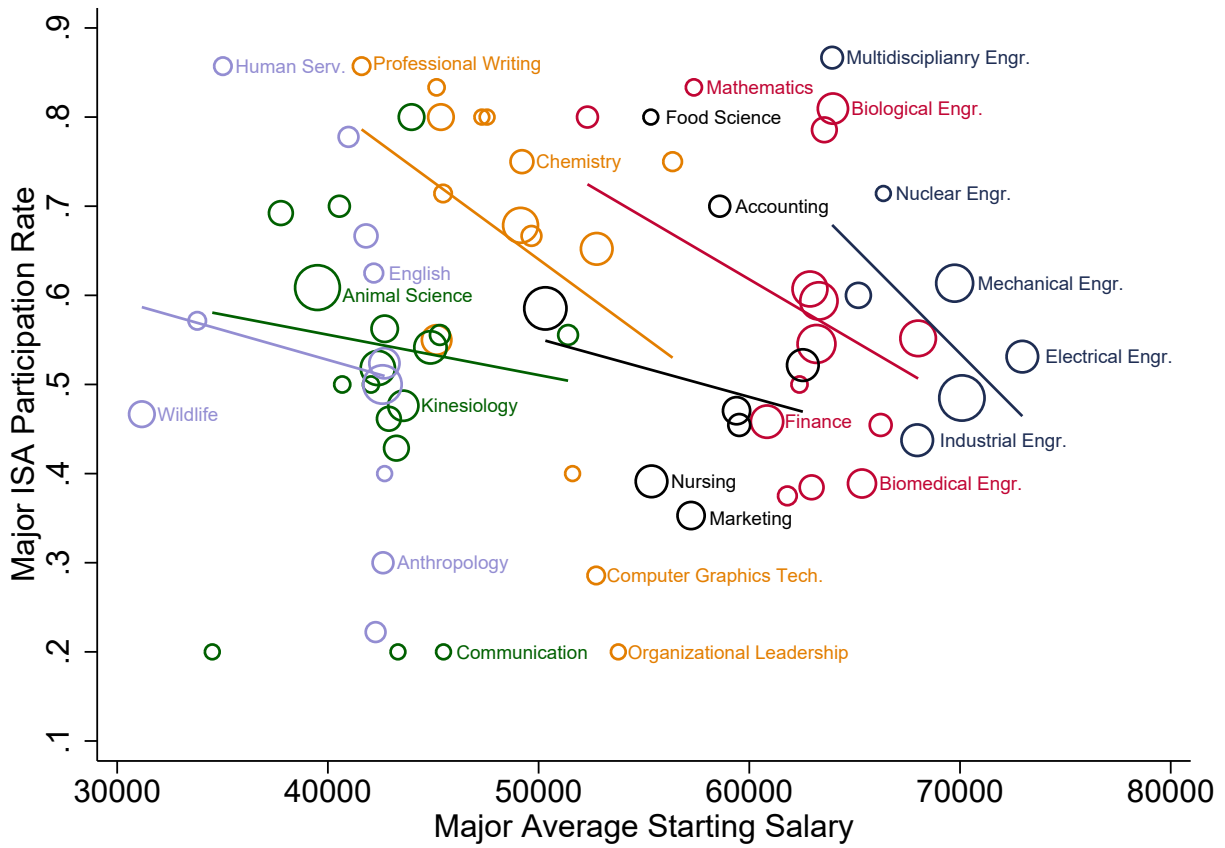
This figure depicts the fraction of students by their estimated probability of participation in the ISA where the propensity score is estimated from a probit of participation on all the administrative variables including the full set of indicators for the student's major.

Figure 3: Present Discounted Value of ISA Payments by Starting Salary
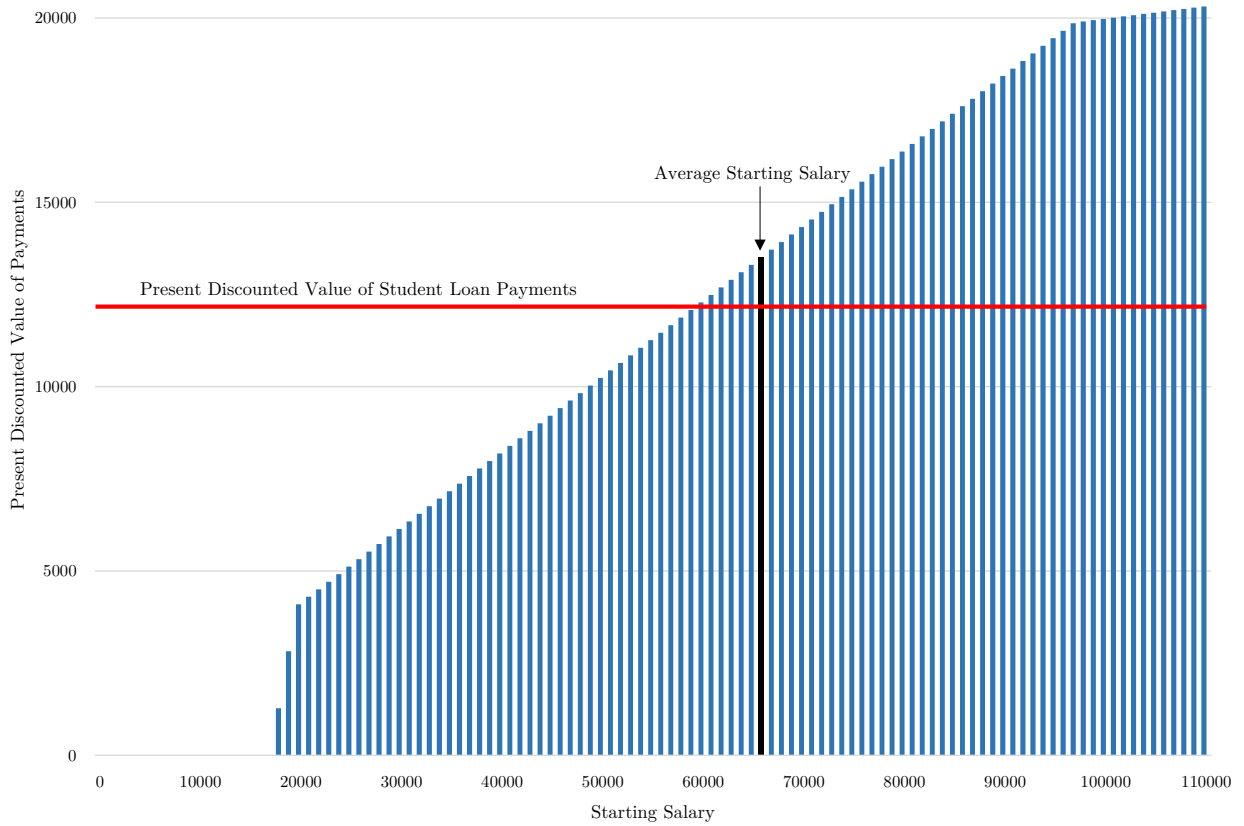
This figure reports the present discounted value of ISA payments for a $10,000 ISA funding amount with an income share of 3 percent and a term length of 8 years, the ISA terms for a mathematics major. These values are calculated assuming a wage growth rate of 2 percent and a discount factor of 0.95. The present discounted value of ISA payments depends on the starting salary and is contrasted with the present discounted value of student loan payments for a $10,000 parent plus loan with a disbursement fee of 4.2 percent and an interest rate of 7.1 percent. The average starting salary for Purdue graduates in mathematics is highlighted. Note that ISA payments are zero for the year if annual earned income is less than $20,000 and therefore the present discounted value of ISA payments is zero for low starting salaries. At high starting salaries, the student hits the payment cap of $25,000 in year 8. The present discounted value of ISA payments is still increasing in the starting salary because the higher salary pushes the repayment forward.

Figure 4: ISA Participation Propensity Score by Participation Status
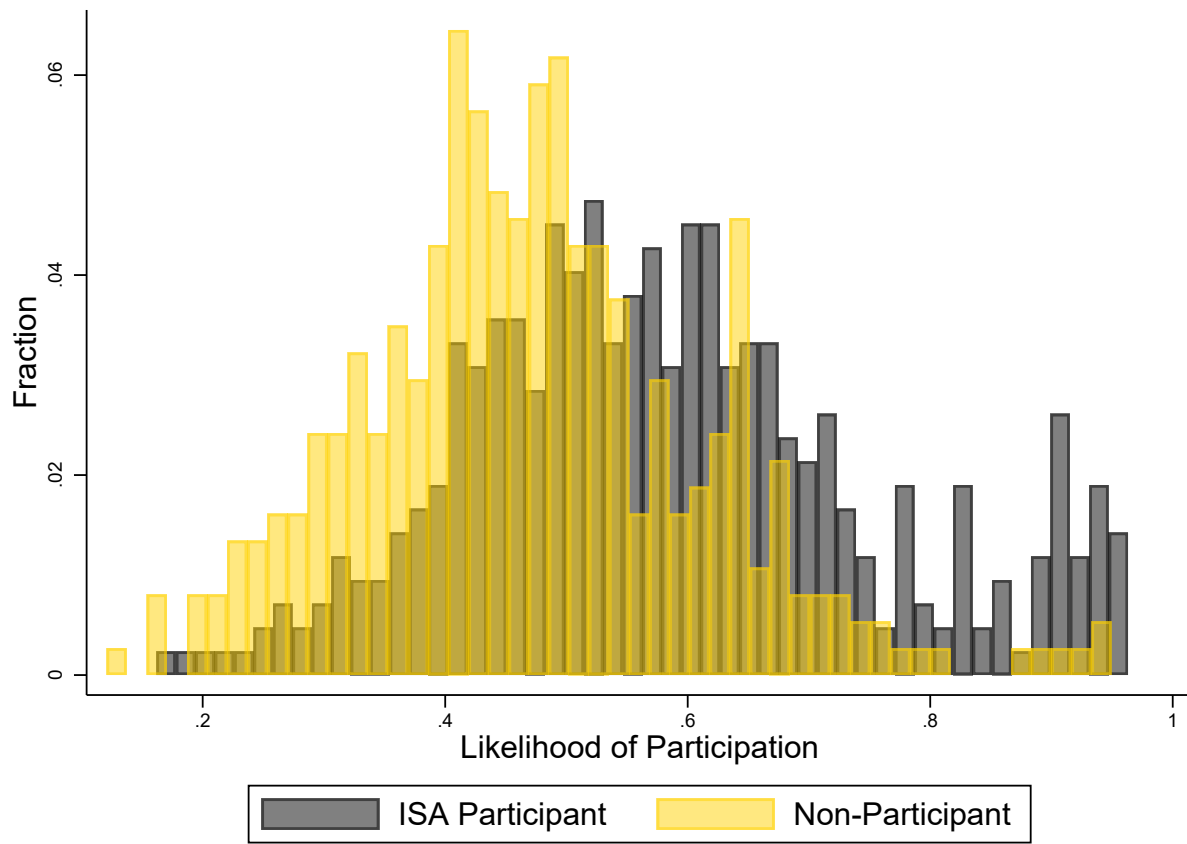
This figure depicts the fraction of students by their estimated probability of participation in the ISA where the propensity score is estimated from a probit of participation on all the administrative variables including the full set of indicators for the student's major.

Figure 5: Starting Salary by ISA Participation
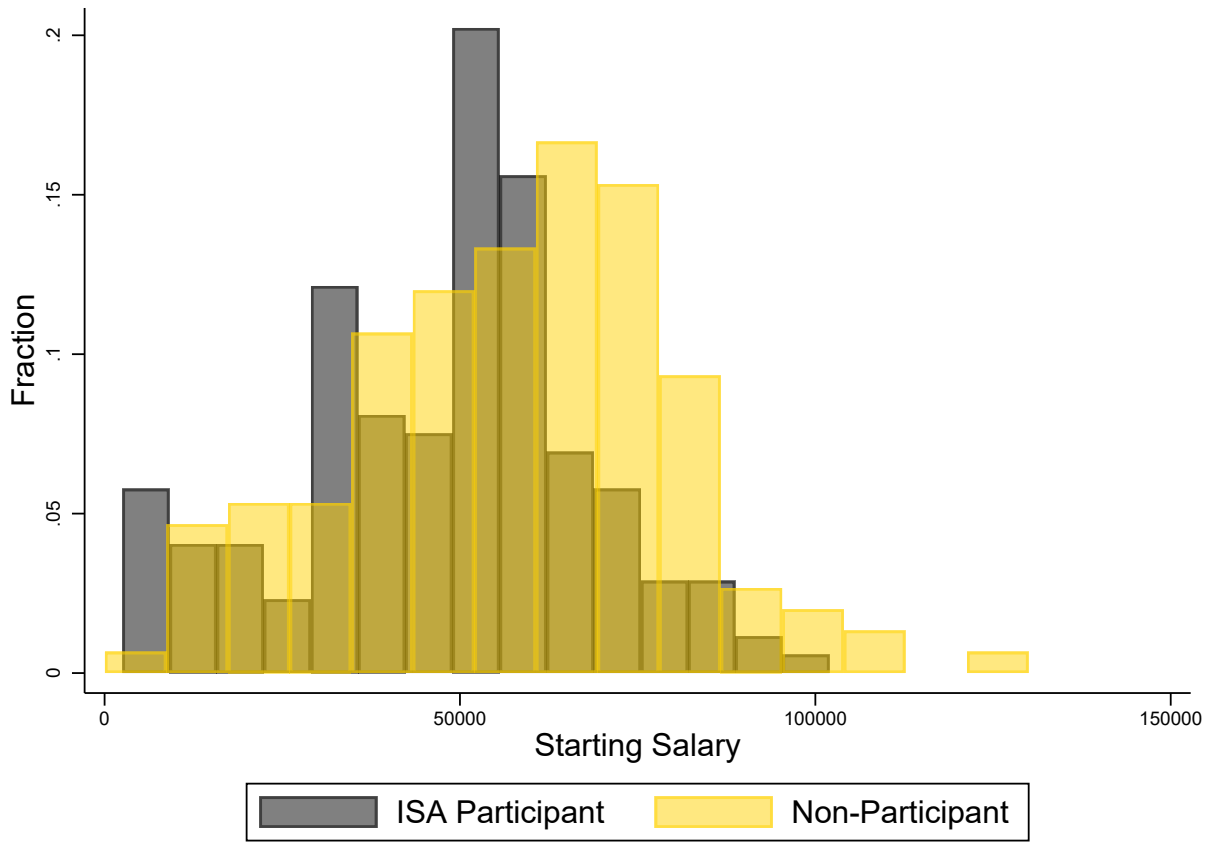
This figure depicts the fraction of students by their estimated probability of participation in the ISA where the propensity score is estimated from a probit of participation on all the administrative variables including the full set of indicators for the student's major.

Table 1: Number of Eligible ISA Application by Period

	Non-Participants	Participants	Total Applications
2016-2017	164	141	305
2017 summer	18	20	38
2017-2018	217	288	505
2018 summer	15	16	31
2018-2019	202	293	495
2019 summer	47	38	85
Total	663	796	1,459

This table reports the number of eligible ISA applications from the 2016-17 to the 2018-19 academic years by time period. It also show how many of the eligible applicants decided to not accept ISA funding after being provided with the terms (non-participants) as well as the number that accepted ISA funding (participants).

Table 2: Characteristics of ISA Applicants

	Non-Applicants	Eligible ISA Applicants Non-Participants	Participants
Funding Amount	.	9,091	11,582
ISA Rate	.	3.93	3.73
Average Salary for Major	58,853	56,023	55,287
Median Salary for Major	57,774	55,148	54,444
90-10 Salary Ratio for Major	2.021	2.102	2.072
SAT Math	645.2	611.9	616.8
SAT Verbal	615.2	602.9	607.8
Cumulative GPA	3.19	3.06	3.07
First-Year GPA	3.18	3.02	3.07
Female	0.441	0.474	0.495
Black	0.031	0.095	0.104
Hispanic	0.049	0.078	0.094
Asian	0.071	0.097	0.061
First Generation	0.201	0.290	0.274
Transfer Student	0.098	0.125	0.109
Indiana Resident	0.452	0.520	0.444
International	0.213	0.000	0.000
Unique Students	68,701	538	556

This table reports student characteristics for all Purdue University sophomores, juniors, and seniors who did not submit an eligible application to the ISA program from the 2016-17 to 2018-19 academic years in the first column. The first column is provided for comparison only; these observations are not used in the subsequent analysis. The next two columns report the characteristics for students who submitted an eligible ISA application separated into two groups, those that never participated in the ISA program and those that participated in the ISA at least one time. The prior-year GPA (relative to major) is the average prior-year GPA plus the student-specific residual from a regression of GPA on major and year in school. This table reports the number of eligible ISA applications from the 2016-17 to the 2018-19 academic years by time period. It also show how many of the eligible applicants decided to not accept ISA funding after being provided with the terms (non-participants) as well as the number that accepted ISA funding (participants).

Table 3: Student Selection into the Income Share Agreement

	(1)	(2)	(3)	(4)
ISA Rate	-0.1041***	-0.1010***	-0.1547***	
	(0.0249)	(0.0261)	(0.0302)	
Funding ($1,000s)	0.0115***	0.0120***	0.0129***	0.0126***
	(0.0018)	(0.0019)	(0.0020)	(0.0021)
Major Avg Salary ($1,000s)	-0.0074***	-0.0075***	-0.0094***	
	(0.0015)	(0.0017)	(0.0018)	
Major 90-10 Salary Ratio	-0.0261	-0.0214	-0.0262	
	(0.0161)	(0.0197)	(0.0201)	
SAT Math		0.0001	0.0003	0.0004
		(0.0002)	(0.0002)	(0.0003)
SAT Verbal		0.0001	-0.0001	0.0002
		(0.0002)	(0.0002)	(0.0002)
First-Year GPA (Major adj)		0.0482	0.0341	0.0203
		(0.0305)	(0.0314)	(0.0328)
Demographics	No	No	Yes	Yes
Major Fixed Effects	No	No	No	Yes
Observations	1,419	1,419	1,419	1,419
R-Squared	0.056	0.061	0.096	0.191

The data includes all sophomores, juniors, and seniors who submitted an eligible application to the ISA program during the 2016-17 to 2018-19 period. This table reports the parameter estimates and standard errors from a linear probability model where an indicator for participation in the ISA is the dependent variable. The funding amount and major-specific average salary are reported in thousands of dollars. Students in new majors that do not have a 5-year history of graduates are excluded because the major-specific average salary is missing. Standard errors are clustered on major: * p< .10, ** p< .05, *** p< .01

Table 4: Parent Characteristics

	Non-Participant	Participant	P-Value
Parent Income	$113,806	$109,558	0.294
Parent College			
Mother attended college, did not graduate	0.177	0.187	0.668
Mother graduated from college	0.673	0.661	0.678
Mother attended graduate school	0.212	0.229	0.482
Father attended college, did not graduate	0.146	0.220	0.001**
Father graduated from college	0.631	0.546	0.003***
Father attended graduate school	0.241	0.216	0.305
Parent Cosign Auto Loan			
Parents unlikely to cosign loan	0.176	0.221	0.093*
Parents likely to cosign loan	0.492	0.516	0.476
Parents definitely would cosign	0.332	0.262	0.021**
Parent Involvement in Finances			
Parents not involved in finances	0.114	0.112	0.935
Parents somewhat influenced finances	0.295	0.357	0.066*
Parents strongly influenced finances	0.423	0.413	0.739
Parents made my financial decisions	0.198	0.158	0.091*
How often communicate with parents	4.93	4.92	0.934

The data includes all eligible applicants who responded to the survey. The sample mean for the non-participants and participants are reported in the first two columns, respectively. The final column reports the p-value for a t-test on the equality of means: * $p < .10$, ** $p < .05$, *** $p < .01$

Table 5: Expected Income and Future Plans

	Non-Participant	Participant	P-Value
Major Avg Salary	$55,847	$54,603	0.037***
Starting salary belief	$51,708	$46,682	0.007***
Starting salary actual	$56,198	$50,467	0.001***
Plan to go to graduate school	0.458	0.470	0.798
Plan to start own business	0.306	0.264	0.246
Number of children expected	1.987	1.877	0.046**

The data includes all eligible applicants who responded to the survey. The sample mean for the non-participants and participants are reported in the first two columns, respectively. The final column reports the p-value for a t-test on the equality of means: * $p < .10$, ** $p < .05$, *** $p < .01$.

Table 6: Effect of ISA Participation on Current GPA

	(1)	(2)	(3)	(4)
ISA Participant	0.0212	0.0116	0.0014	0.0063
	(0.0289)	(0.0296)	(0.0279)	(0.0295)
Funding Amount ($1,000s)	-0.0021	-0.0037*	-0.0036*	-0.0033
	(0.0021)	(0.0022)	(0.0019)	(0.0020)
Income Share Percentage	0.0106			
	(0.0193)			
Major Avg Salary ($1,000s)			-0.0061***	-0.0056***
			(0.0016)	(0.0016)
Major Std Dev Salary ($1,000s)			-0.0042**	-0.0038**
			(0.0017)	(0.0017)
Prior Year GPA, Relative			0.5361***	0.5343***
			(0.0270)	(0.0279)
Rate Group by Class FE	No	Yes	Yes	Yes
Student Demographics	No	No	No	Yes
Observations	1,419	1,419	1,419	1,419
R-Squared	0.001	0.043	0.285	0.293

The data includes all sophomores, juniors, and seniors who submitted an eligible application to the ISA program during the 2016-17 to 2018-19 period. This table reports the parameter estimates and standard errors from a model where the GPA in the academic year immediately following the ISA application is the dependent variable. The funding amount and major-specific average salary are reported in thousands of dollars. Students in new majors that do not have a 5-year history of graduates are excluded because the major-specific average salary is missing. Standard errors are clustered on major: * $p < .10$, ** $p < .05$, *** $p < .01$

Table 7: Effect of ISA Participation on Next Year GPA

	(1)	(2)	(3)	(4)
ISA Participant	0.0661*	0.0399	0.0350	0.0370
	(0.0370)	(0.0382)	(0.0399)	(0.0412)
Funding Amount ($1,000s)	-0.0017	-0.0023	-0.0024	-0.0039
	(0.0029)	(0.0029)	(0.0030)	(0.0031)
Income Share Percentage	0.0751***			
	(0.0269)			
Major Avg Salary ($1,000s)			-0.0060***	-0.0043*
			(0.0022)	(0.0024)
Major Std Dev Salary ($1,000s)			-0.0060**	-0.0051*
			(0.0029)	(0.0029)
Prior Year GPA, Relative			0.3844***	0.3654***
			(0.0401)	(0.0411)
Rate Group by Class FE	No	Yes	Yes	Yes
Student Demographics	No	No	No	Yes
Observations	1,244	1,244	1,098	1,080
R-Squared	0.011	0.085	0.207	0.221

The data includes all sophomores, juniors, and seniors who submitted an eligible application to the ISA program during the 2016-17 to 2018-19 period. This table reports the parameter estimates and standard errors from a model where the GPA in the academic year immediately following the ISA application is the dependent variable. The funding amount and major-specific average salary are reported in thousands of dollars. Students in new majors that do not have a 5-year history of graduates are excluded because the major-specific average salary is missing. Standard errors are clustered on major: * p< .10, ** p< .05, *** p< .01

Table 8: Effect of ISA Participation on Graduation

	(1) All	(2) Female	(3) Male	(4) Black	(5) Hispanic
ISA Participant	0.031*	0.051*	0.018	0.061	0.167*
	(0.017)	(0.026)	(0.025)	(0.059)	(0.095)
Major FE	Yes	Yes	Yes	Yes	Yes
Year and Class FE	Yes	Yes	Yes	Yes	Yes
Student Demographics	Yes	Yes	Yes	Yes	Yes
Observations	1,457	731	726	155	140
R-Squared	0.362	0.417	0.407	0.658	0.766

The data includes sophomores, juniors, and seniors who submitted an eligible application to the ISA program during the 2016-17 to 2018-19 period if they also enrolled in classes in at least one of the subsequent three semesters following the ISA application. All specifications include controls for race, gender, and indicators for the student's major, application period, year in school, and the full set of interactions between application period and student year in school.

Table 9: Effect of ISA Participation on Starting Salary

	(1)	(2)	(3)	(4)
ISA Participant	-6739***	-5904***	-5263**	-5447**
	(1745)	(1720)	(1651)	(1802)
Funding Amount ($1,000s)	-129.4	-61.7	-24.8	-136.3
	(114.7)	(113.1)	(113.9)	(121.6)
Income Share Percentage	-10688***			
	(1180)			
Major Avg Salary ($1,000s)			922***	942***
			(93)	(96)
Major Std Dev Salary ($1,000s)			-251*	-233*
			(142)	(133)
Prior Year GPA, Relative			2039	1436
			(1760)	(1752)
SAT Math			36.43**	34.37*
			(12.95)	(13.72)
SAT Verbal			4.94	-2.29
			(12.04)	(12.53)
Group by Class FE	No	Yes	Yes	Yes
Student Demographics	No	No	No	Yes
Observations	572	572	517	502
R-Squared	0.136	0.295	0.445	0.468

The data includes all sophomores, juniors, and seniors who submitted an eligible application to the ISA program during the 2016-17 to 2018-19 period and subsequently graduated and provided a self-reported starting salary.

Table A1: Debt Aversion Survey Responses

	Non-Participants	Participants	P-Value
1. There is no excuse for borrowing money	1.781	1.639	0.002***
2. Students have to go into debt (inverse)	3.004	3.114	0.152
3. It is OK to borrow money in order to buy food (inverse)	2.502	2.446	0.387
4. You should always save up first before buying something	4.156	4.072	0.105
5. Debt is an integral part of today's lifestyle (inverse)	2.450	2.439	0.872
6. Students should be discouraged from using credit cards	2.638	2.806	0.017**
7. Banks not surprised students incur large debts (inverse)	2.136	1.986	0.012**
8. OK to have account overdraft (inverse)	3.681	3.653	0.673
9. Once you are in debt it is very difficult to get out	3.708	3.737	0.654
Sum of questions 1 - 9 (higher indicates more debt aversion)	26.07	25.89	0.453

Observations 656

The mean for each question by group is reported where the assigned values are 5 for "strongly agree," 4 for "somewhat agree," 3 for "neither agree or disagree," 2 for "somewhat disagree," and 1 for "strongly disagree." For a question using an inverse scale, the order of the values is reversed. The final column reports the p-value for a t-test on the equality of means: * $p < .10$, ** $p < .05$, *** $p < .01$

Table A2: Affinity for Purdue University

	Non-Participants	Participants	P-Value
1. Purdue is one of the best universities in the country	0.814	0.830	0.602
2. I am satisfied with my education at Purdue in general	0.823	0.813	0.765
3. Purdue is the perfect school for people like me	0.557	0.502	0.315
4. professor at Purdue made me excited about learning	0.885	0.896	0.795
5. Purdue prepared me well for life outside of college	0.760	0.643	0.106
6. I had a mentor who encouraged me to pursue my goals	0.298	0.292	0.954
7. I would suggest my friends attend Purdue	0.799	0.788	0.783
Affinity Index (higher indicates greater affinity)	2.413	2.395	0.841

Observations 656

The mean for each question by group is reported where the assigned values are 5 for "strongly agree," 4 for "somewhat agree," 3 for "neither agree or disagree," 2 for "somewhat disagree," and 1 for "strongly disagree." The final column reports the p-value for a t-test on the equality of means: * p< .10, ** p< .05, *** p< .01

Table A3: Financial and Employment Experience

	Non-Participants	Participants	P-Value
FINANCIAL EXPERIENCE			
Do you have a Checking Account?	0.935	0.915	0.418
Have you own Stocks or a Mutual Fund?	0.146	0.142	0.894
Have you ever had an Auto Loan?	0.111	0.0943	0.552
How many credit cards do you have?	0.980	0.808	0.003***
I have never had a credit card	0.349	0.400	0.222
EMPLOYMENT EXPERIENCE			
Do you currently have a job?	0.614	0.594	0.680
Do you plan to work this summer?	0.892	0.908	0.583
Did you have a job last semester?	0.597	0.598	0.982
Did you have a job last summer?	0.869	0.851	0.583
working more hours than this time last year	0.408	0.356	0.277
working less hours than this time last year	0.207	0.180	0.487

Observations 656

The sample mean for the ISA non-participants and ISA participants are reported in the first two columns, respectively. The final column reports the p-value for a t-test on the equality of means: * $p < .10$, ** $p < .05$, *** $p < .01$

Table A4: Location Preferences

	Non-Participants	Participants	P-Value
LOCATION CHARACTERISTIC			
Household income (top 3)	$74,522	$73,323	0.208
Large city preference	0.466	0.409	0.112
Small city preference	0.018	0.047	0.037**
Indiana preference	0.192	0.194	0.962
Outside Indiana preference	0.171	0.183	0.670
East Coast preference	0.149	0.161	0.658
Western US preference	0.192	0.233	0.178
Mid-West preference	0.253	0.271	0.579

Observations 656

The sample mean for the ISA non-participants and ISA participants are reported in the first two columns, respectively. The final column reports the p-value for a t-test on the equality of means: * p< .10, ** p< .05, *** p< .01

Table A5: Risk Aversion, Time Preference, and Optimism

	Non-Participants	Participants	P-Value
RISK AVERSION			
wait-wait	0.527	0.481	0.366
wait-cash out	0.183	0.173	0.787
cash out-wait	0.183	0.173	0.787
cash out-cash out	0.053	0.076	0.367
don't know	0.053	0.097	0.107
TIME PREFERENCE			
monthly installments	0.820	0.827	0.838
lump sum after one year	0.052	0.090	0.146
no preference	0.128	0.0824	0.126
OPTIMISM			
1 win	0.014	0.008	0.739
2 wins	0.041	0.017	0.320
3 wins	0.054	0.093	0.328
4 wins	0.230	0.220	0.880
5 wins	0.446	0.449	0.966
6 wins	0.149	0.161	0.819
7 wins	0.054	0.042	0.711
8 wins	0	0.008	0.430

Observations 656

The sample mean for the ISA non-participants and ISA participants are reported in the first two columns, respectively. The final column reports the p-value for a t-test on the equality of means: * p< .10, ** p< .05, *** p< .01