Student Selection into an Income Share Agreement

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Abstract

Financing college expenses through an income share agreement (ISA) is an arrangement where the student agrees to pay a fixed percentage of his or her future earned income for a fixed period of time. Using administrative and survey data for ISA participants and non-participants who applied and were offered an ISA but chose an alternative source of college funding, I estimate the adverse selection into the ISA and the moral hazard caused by the ISA. The identification is based on being able to observe the full set of interested and eligible students due to the way ISA terms were provided to students. The evidence suggests that there is no adverse selection by student ability, demographics, risk aversion, time preference, or parent income. The evidence that selection into the ISA is not correlated with the observables motivates estimating the effect of ISA participation on subsequent college effort and starting salary after graduation. The results show no effect on grades but \$3,000 to \$5,000 lower starting salary. Implications for U.S. adoption of an expanded ISA program are discussed.

JEL Codes: I22, D14, G23, G41

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1 Introduction

Higher education in the US has a completion problem where one in three students who enroll never earn a degree (Denning, Eide and Warnick, 2019). The US also has a student loan repayment problem with only 77 percent of the 1.5 trillion dollars in student loan debt currently in good standing (US Department of Education, 2018). Income share agreements (ISAs), arrangements in which the student agrees to pay a fixed percentage of his or her future earned income for a fixed period of time in exchange for college funding, have been proposed as an alternative to students loans.[1] 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, It is only recently that ISAs have been used by to pay for college, with the exception of the failed 1971-1778 ISA at Yale University.[2] Today there are ISA programs at Arizona State University, Purdue University, the University of Utah, and several liberal arts college.[3]

ISAs provide student 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, 2015). Providers revenue increases in student participants' earnings. If the provider is the educational institution, the ISA would increase the weight that it puts on its students' future

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

[2] James Tobin created the Yale Tuition Postponement Option and 3,300 students signed up between 1971 and 1978. Students were placed into cohorts and each agreed to pay 4 percent of their income for every $1,000 received until their cohorts debt was paid off (or 35 years). At graduation, a student could pay 150 percent of the funding amount and leave the program immediately. Yale bailed out the program in 1999. A large number of ISA programs have been proposed, but no implemented. See Harnisch (2014) for a description of state-level legislation to study or create a government-funded ISA that was considered in 23 states. Krueger and Bowen (1993) describe and evaluate the Clinton-Gore (1992) income-contingent loan plan that was never adopted.

[3] Liberal arts colleges which have introduced programs include: Point Loma Nazareen University in California, Lackawanna College in Pennsylvania, Norwich University in Vermont, and Clarkson University in New York.

earnings in its own optimization problem. Replacing student loans with ISAs may decrease defaults because participants who earn less than expected would be required to pay back less than they had anticipated.

As with any type of insurance, there are two anticipated problems: (1) adverse selection of students with lower earnings expectations into ISAs and (2) moral hazard which reduces human capital investment and work effort for participants. In this paper, I use Purdue University administrative and survey data to measure the adverse selection into the university's ISA program and the effect on grades and starting salary. The identification strategy is based on the way information about ISA terms was provided to interested students. For the first two years of the program, students had no way to know the terms (the term length and share rate) without submitting an application. This allows me to identify the full set of students who were both seriously considering this option and eligible for the ISA.

I find that ISA participants and non-participants are similar in nearly every characteristic. Regression analysis shows no evidence of adverse selection on student ability as measured by SAT scores, prior grades, first-generation student status, and being a non-native English speaker. In a large survey of ISA applicants, I find no evidence that participation is correlated with measures of debt aversion, financial experience and sophistication, family expectations, location preference, risk aversion, time preference, and optimism. There is some evidence that ISA participation is influenced by the parents' involvement the student's financial decisions.

The lack of adverse selection into the ISA is both surprising and fortunate. This finding suggests that for this population of undergraduate students, the ISA participation decision may be as good as randomly assigned or if not, seems driven by parenting but uncorrelated with parent income, student ability, and student experiences. I perform an analysis of the effect of ISA participation on grades earned and starting salary after graduation. The results show no effect on grades earned but a \$3,000 to \$5,000 lower starting salary.

In a secondary analysis, I use the distribution of starting salaries for the full sample of Purdue students, 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 more than 90 percent of applicants would pay less in total by selecting the parent PLUS student loan option rather than the ISA option. However, when considering future earnings uncertainty and heterogeneity 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.

I describe the institutional setting and the administrative data in Section 2. In Section 3, I present a model in which students must choose between an ISA and a parent PLUS student loan and use this model to calculate the expected repayment, present discounted value of repayment, and the valuation of the insurance aspect of the ISA. I describe the empirical strategy and results using the administrative data in Section 4. Section 5 describes a survey that I administer to all ISA applicants and is designed to measure debt aversion, financial experience, employment experience, future earnings expectations, work expectations, family expectations, location preferences, risk aversion, time preference, optimism, and parent characteristics. I describe additional results in Section 6 and then conclude in Section 7.

2 Setting and Data

2.1 Institutional Background

Purdue University is a public university located in northwest Indiana with about 45,000 students of which 33,500 are undergraduates. Slightly more than 50 percent of the undergraduate students are Indiana residents and about 14 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 and the admissions cutoff differs significantly by college. 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 very difficult for students to switch into engineering or science majors if they were not initially accepted into those colleges as a first-year student. Similar, but less insurmountable, hurdles exist for many other majors including those in the business school.

Purdue's ISA program is called "Back a Boiler." The first year of the ISA program was the 2016-2017 academic year and the university offered the program to students in the final few months of the prior school year and over the summer. Interested students submit an application which includes permission to run a credit check. If the student has a bankruptcy or is currently in debt collection, they are disqualified. This is the only information the university requests as part of the credit check. To be eligible for the ISA, students must have remaining financial need after exhausting merit-based scholarships, grants, and opportunities for direct subsidized federal loans, direct unsubsidized federal loans, and Perkins loans. Purdue presents its ISA program as an alternative to a direct PLUS loan or a private student loan.[4] Direct PLUS loans have higher interest rates than the 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 have the highest interest rates of all student loan options.

While ISAs are similar to income-based student loan repayment, the fundamental difference is that ISAs have no loan balance that the borrower is paying down.[5] In the language of ISAs, the "funding amount" is the amount of money the student receives, the "income

[4]Since the financial crisis, private student loans are less common, though there are still several large providers that are active in the market including Chase, CitiBank, Sallie Mae, and Wells Fargo.

[5]In an effort to reduce the default rate, the US Department of Education has introduced several income-driven repayment plans where monthly payment 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. (2018) for a comparison of student loan income-driven repayment plans and student income share agreements.

share" is the fixed percentage of earned income the student agrees to pay for the term length after a grace period, and the "payment cap" is the maximum amount the student would be obligated to pay in case of very high earned income. Payments are deferred if the participant exits the labor force or reduces hours of work below full-time employment and therefore the term length is extended up to the "deferment cap" of a specified time period. If earned income drops below the "earned income threshold" while the participant is working full time, the participant makes no payments and the term length is not extended. The amount the student pays back may be more or less than the funding amount and there is no way to buy out the contract other than simply paying the payment cap.

If Purdue finds the applicant to be eligible, he or she is sent a disclosure that describes the terms of the ISA program (see Figure 1). Prominently located at the top of the disclosure is the statement "this is not a loan." The disclosure also provides payment illustrations which indicate the insurance aspect of the ISA. This framing of the ISA may have a large effect on participation (Abraham et al., 2018). Eligible students also typically receive a disclosure for a direct PLUS loan and most students who do not participate in the ISA program choose a direct PLUS loan instead. In the Purdue ISA program, the income share is between 2.5 and 5.4 percent per \$10,000 of funding for a term of between 80 to 116 months. The income share percentage depends only on the student's major and year in school. 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 disclosure describes a "take it or leave it" funding offer. Students who choose to participate have their university account credited with the money at the beginning of the semester and receive a check for the portion above the remaining university tuition and fees. Student who do not accept the offered ISA either take a direct PLUS loan, a private loan, or self-finance their educational expenses in excess of their other federal student loans.

In the first two years of the program, the only way a student could learn the applicable income share and length of the agreement was by submitting an application and receiving a disclosure. No information about the terms was posted to the ISA program website 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. Before the third cohort considered applying, an income share agreement calculator was posted to the program website making it possible for interested students to see what terms they would be offered if they applied. This lead to a strong decrease in the number of applications from students who decided not to participate. My strategy for identifying adverse selection into the ISA program is based on the application being the only way to learn the ISA terms. My assumption is that all potentially interested students submitted an application.

Participants make no payments while they are in school nor during the 6 month grace period immediately following graduation or 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 every year in June after Purdue's servicing partner receives the W-2 and 1099-MISC from the IRS.[6] The payment cap is 2.5 times the funding amount. If annual earnings are less than the $20,000 earned income threshold, the participant makes no payments. Purdue extends the term for each month that is deferred, unless the participant is unemployed and actively seeking employment or is working 35 hours per week or more and earning less than $20,000. This means that students who exit the labor force to go to graduate school or to care for family members delay the payment term up to the 60 month deferment cap. Participants are allowed to sign up for subsequent years of funding through the ISA up to an income share cap of 15 percent across all income share agreements.

2.2 Administrative Data

Over the first two years of the program, 860 students submitted an application, were found to eligible, and received a disclosure. These students came from 125 different majors with a

[6]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.

wide range of grades. 442 students (51%) chose to participate while 418 chose an alternative way to pay their college expenses. In total, the university dispersed $5.7 million or about $13,000 per participant. Some students applied in both years and so are present in the data twice. In total there are 767 unique students.

Table 1 provides summary statistics for the ISA applicants who were eligible for the ISA and received a disclosure. This includes both the ISA participants and non-participants. Summary statistics for the universe of sophomores, juniors, and seniors at Purdue during this time period are also provided for comparison. A greater fraction of the ISA applicants are under-represented minority students than for the student body at large. ISA applicants are also more likely to be first-generation students. Only domestic students are eligible for the program which explains why ISA applicants are less likely to be transfer students and less likely to be non-native English speakers than for the full student population. ISA applicants also tend to have a lower prior-year GPA and SAT scores than the average for Purdue students.[7]

Table 1 also compares the administrative variable means for the ISA participants and non-participants and reports the p-value for the t-test of equality of means. Overall, the ISA participants are very similar to the non-participants. They have similar SAT scores, are in majors that have similar average starting salaries and similar standard deviation of starting salary, have similar fractions of transfer students and students where English in not their first language. The ISA participants also seem to be in a very similar financial situation as the non-participants. Not only did they both qualify for the ISA, with a remaining financial need of at least $5,000, but they also were offered similar income share percentages (the rate per $10,000 of funding) and were found to be eligible for very similar funding amounts.[8] Note also that all ISA applicants have federal student loans and have either hit the maximum

[7]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.

[8]Citing federal privacy laws, Purdue University has not provided me with FAFSA details on the ISA applicants. I continue to make requests, but have not been able to obtain this information.

amount that they can borrow for the year (which ranges from \$5,500 to \$12,500) or the maximum amount they can borrow as an undergraduate student (which ranges from \$31,000 to \$57,500).

There are also indications of differences between ISA participants and non-participants. Participants are more likely to be Hispanic, are less likely to be an Indiana resident, are more likely to be a prior ISA participant, and surprisingly have a higher prior-year GPA. Adverse selection suggests that the applicants who choose to participate in the ISA would be of lower, not higher, ability on average. However, 1 shows that the SAT scores and prior-year GPA are higher for the ISA participants, not lower as expected.[9] This apparent lack of selection on ability into the ISA program and lack of differences in most of the other characteristics calls for more careful analysis of student selection into the ISA.

3 Model of Student Choice with Income Uncertainty

The essential object of interest in a model of student ISA choice is 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 his or her college education. Either option provides V_i, the same level of funding for college in year 0, but they require different repayment in years 1 through 10. Under the student loan option, student i makes payment P in each year with

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

[9]Transfer students are not required to report SAT scores (or ACT scores which are converted into SAT scores) to Purdue.

The interest rate, r, for the student loan alternative to an ISA, a Direct PLUS Loan (commonly called a parent PLUS student loan), is currently 7.1 percent and the fee imposed at disbursement, z, is 4.2 percent of V_i, again for a parent PLUS loan. 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:

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

where To illustrate the repayment for the ISA option, I use a specific example before returning to the general formula below. In the first two-years of the program, mathematics majors at Purdue were offered an income share rate, s_i, of 3.0 percent per \$10,000 for 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 4 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,

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

But this is not how a forward-looking rational student would decide which option is better. 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 relatively better. Another factor ignored above is that 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 us 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, and T_i is the term length of the ISA 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 the the example of the mathematics major with a \$10,000 funding amount, a graphical representation of the present discounted value of ISA repayment is given in Figure 2 for a range of starting salaries. This 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.

Given that the two options were approximately equal 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, 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. I deal with the uncertainty in w_{it} by integrating over distribution of earnings, $f(w_{it})$, and I deal with the additional value the student derives from the insurance against low earnings by assuming a risk-averse student with a utility function given by $U[.]$. In this framework, student i will select the ISA option if the following condition holds:

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

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. This leaves assuming a distribution for student i's uncertainty over earnings, $f(w_{it})$. With no additional information, 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. However, it is not just the uncertainty about earnings that is important. The heterogeneity across students in both their future salary expectations and the variance of their salary expectations is also important. Section 5 describes the survey of ISA applicants and how I elicit their future salary expectations.

4 Empirical Strategy and Results

Similar average SAT scores and prior-year GPA for participants and non-participants (as reported in Table 1) 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 for ISA participation for student i in academic year t in major m. The set of X variables considered is extensive and includes all variables from Table 1. The γ_t variable is a dummy for the academic year (2016-2017 and 2017-2018) and as described above, there are some students who were ISA applicants in both years. The dummy variable $prior_{it}$ indicates if the student was an ISA participant in the prior year. 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 see if there is evidence of 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 their other characteristics. In every specification, I cluster the standard errors by major, which also captures correlation over time for the small number of students who applied to the ISA program in both years. The results of this analysis are presented in table 2 reports the coefficient estimates for year in school, gender, race, first-generation student, transfer student, non-native English speaker, prior-year GPA (relative to the major average), SAT math and reading scores, Indiana residency at the time the student applied to Purdue, the amount of funding the student requested (could not exceed calculated remaining student need), and the offered income share percentage (based only on major and year in school). Every specification in Table 2 includes birth-year fixed effects. The results in column (1) indicate little evidence of selection into the ISA. The point estimates on GPA and SAT scores are all small and estimated with enough precision to rule out large adverse selection on measured ability. It is not surprising that prior ISA participants are more likely to participate again, nor is it surprising that the overall participation rate was higher in the 2nd year of the program. The large negative effect of being an Indiana resident could reflect differences in financial need or employment location preferences. The funding amount variable should capture some of the student's financial need.

Income share percentage is based on the student's major and year in school, but multiple majors are assigned into groups which all have the same income share percentage. For seniors, there are only 8 major groups which determine the income share percentage. The same is true for juniors and sophomores. This means we would expect to see selection of students no just within a major based on ability but also within a major group on major-specific average salary. Students in lower-paying majors would be more likely to select into the ISA while students from higher-paying majors would be more likely to select into the direct PLUS loan or one of the other alternatives. To test for this, I include the average starting salary of recent graduates from the student's major as a control variable in column (2). Note that this reduces the sample size slightly as Purdue has introduced a small number of new majors for which there are no graduates. The results reported in column (2) of Table 2 strongly suggest that adverse selection from lower-paying majors within an income share percentage major group is occurring. Program administrators could correct for this by increasing the number of groups used to assign income share percentages so that a smaller number of majors end up with the same rate. However, the relatively small point estimate suggests that we would only see a 6 percentage point reduction in the probability of participating in the ISA for a $10,000 increase in the average salary of the major relative to the other majors in the income share percentage major group.

The income insurance aspect of the ISA may be appealing to students in a major with a high starting salary variance. To test for this, I include the major-specific salary variance which is also calculated from the salaries of recent Purdue graduates. The results reported in column (3) of Table 2 do suggest that the effect on ISA participation is positive as expected, though not statistically different than zero.

Column (4) of Table 2 includes major fixed effects. The estimates across all four columns are generally quite stable. One exception is the effect of the income share percentage on the ISA participation decision. With the major-specific controls or with the major fixed effects included, an increase in the income share percentage is estimated to have a strong negative effect on participation. After the surprise of seeing so little adverse selection into the ISA, it is reassuring that this own-price effect is present.

The observable characteristics reported in Table 1 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.

Throughout this analysis, it is striking to have found so little evidence for adverse selection into the ISA on student ability measures like GPA and SAT scores. The data indicate strongly that negative selection on ability is not occurring. This is a similar to the finding by Madonia and Smith (2016) that there is no evidence of adverse selection into a poker tournament ISA. 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. The same may be true for students as the evidence I've presented suggests that adverse selection in this context is fairly limited. Figure 3 suggests that there is good overlap in the predicted probability of ISA participation for the participants and non-participants.

I observe three 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 for those students who continued at the university, and the student's starting salary at his or her first job. Table 3 looks for evidence of moral hazard by estimating the effect of ISA participation on current GPA, next-year GPA, and the starting salary for those who graduated. The point estimates suggest that ISA participants do not earn lower grades than ISA non-participants. In fact, the point estimates suggest that ISA participants perform slightly better in their future classes than the non-participants. This is evidence against the argument that ISA participation will cause a decrease in human capital accumulation.

Columns (3) and (4) of Table 3 present evidence that ISA participants take lower-paying jobs on average after graduation. With major fixed effects included, the estimate implies that ISA participants have an annual salary that is $4,750 less than observationally equivalent graduates of the same major. The smaller sample size is the result of having just 350 graduates with only 64 percent reporting that they are starting full-time employment.[10] About 80 percent of students who report they are starting full-time employment report their starting annual salary. There is no correlation between ISA participation and reporting the starting salary for graduates.

The evidence suggests that there is no selection on student ability into ISA participation. There is also no evidence of a reduction in human capital investment after the ISA decision. Therefore, we can think of the estimated $4,750 lower starting salary for ISA participants as being purely the result of moral hazard. This may indicate that ISA participation causes graduates to have an increased willingness to accept a lower salary in exchange for other employment amenities. Or, alternatively, it may be that ISA participants already had a stronger preference for employment characteristics or locations that are correlated with lower salaries. Eliciting student beliefs about their future salaries is essential to disentangling these two hypothesis.

5 Survey Description

I designed the survey to find evidence of differences in beliefs and future expectations for ISA participants and non-participants. Each ISA applicant received a survey invitation email which explained that only 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." 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. To account for potential non-response bias, I use propensity score

[10] A large fraction of students go directly to graduate school, some take internships, and others report that they are still seeking full-time employment.

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.

Debt Aversion

After answering a few standard demographic questions, the students were asked to rate a set of 12 statements about debt aversion. Caetano, Palacios and Patrinos (2011) 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 than students with less debt aversion. 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 12 statements, 6 are "pro" statements and 6 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 Table 4 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 4, there is no evidence that ISA participants have greater debt aversion than ISA non-participants. In fact, question 1 is the only question in which there is a statistically significant difference between ISA participants and non-participants, and surprisingly suggests non-participants have greater debt aversion.

Perhaps it is not surprising that the students in this study have similar views on debt as they all have federal student loans (if they did not, they would not have been eligible for an ISA through this program). Debt aversion seems to have little impact on ISA program participation among this student population.

Financial and Employment Experience

Financial experience and sophistication may impact which students decide to participate in the ISA program. To look for evidence of this, I ask survey participants to report their experience with checking and savings accounts, the stock market, car loans, and credit cards. Students were also asked a question to asses their knowledge about the power of compound interest that was introduced by Lusardi and Tufano (2015):

> Suppose you owe $1,000 on your credit card and the interest rate you are charged is 20% per year compounded annually. If you did not pay anything off, at this interest rate, how many years would it take for the amount you owe to double?
>
> - less than 2 years
> - 2 to 4 years
> - 4 to 6 years
> - 6 to 8 years
> - 8 to 10 years
> - 10 years or more
> - do not know

The correct answer is about 3.6 years. Students who understand simple interest but ignore or do not understand interest compounding would arrive at an answer of 4 to 6 years. Selecting an answer of less than 2 years or more than 6 years demonstrates a misunderstanding of how interest accrues. As reported in Table 5, about 40 percent of the students selected the correct answer of 2 to 4 years and a majority of the students with an incorrect answer selected 4 to 6 years. These are higher percentages than Lusardi and Tufano (2015) found in a nationally representative survey of adults. The largest difference is that ISA participants are 9 percentage points more likely to answer that they "do not know" how long it would take for the amount to double.

ISA participants and non-participants have similar financial experience in terms of types of accounts. Participants are 8 percentage points less likely to have a credit card and have .18 fewer cards than non-participants on average. There are no statistically significant differences in employment experience.

Future Salary, Work, and Family Expectations

The ISA should be more attractive to students who expect to have lower salaries after graduation and less labor force participation. One important source of differences in labor force participation is the timing of marriage and children. Given the gender difference in how children affect labor force participation, I would expect that women who anticipate having more children or having children earlier would find the ISA more attractive than men with similar family expectations. 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 student knowledge of salaries in their own field were quite accurate, and the survey responses are consistent with this. Questions which ask the student to report a percentage chance are elicited by moving a slider between 0 and 100.

Table 6 suggests that ISA participants have lower starting salary expectations than non-participants. This is as expected, though the difference is only about $3,000. The entire distribution of starting salaries seems to be lower for ISA participants. The difference in expected salaries shrinks over time as the non-participants expect a slightly lower rate of salary growth, though this difference is not statistically significant.

There is no difference in expected labor force participation between participants and non-participants. For both men and women, it is the non-participants who believe they are more likely to get married. Also surprising is that for women, it is again the non-participants who expect to have children sooner and have more children. Neither of these findings are consistent with the hypothesis that the ISA should be more attractive to those who expect lower earnings because of family responsibilities.

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 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. 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.

Table 7 presents the average rank for each city for participants and non-participants. For only 1 out of the 12 cities is there a statistically significant difference between the average ranking for participants and non-participants. It seems most likely that this is just due to chance rather than something special about Pittsburgh, though I construct a number of location characteristic measures to look for other differences.

The 12 cities were selected to be able to test for the importance of specific characteristics. Those who only ranked high-population metro areas (Chicago, Washington DC, San Francisco, Boston, and Phoenix) in their top 3 are defined as have a large city preference. Those who only ranked low population metro areas (Peoria, Fort Wayne, Evansville, Topeka, and Terre Haute) 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 (regardless of where each of these cities appears in the rankings) 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. An eastern preference is defined as ranking Boston and Washington DC above both San Francisco and Phoenix. The opposite ranking is defined as a western preference. Finally, to directly test if higher 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. Across all these location preference variables, I find no statistically significant evidence for differential selection into the ISA.

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. The survey contains a single two-part question designed to elicit the magnitude of risk aversion:[11]

> Suppose that a distant relative left you a share in a private business worth one hundred thousand dollars. You are immediately faced with a choice:
>
> **(a)** cash out now and take the $100,000 or
>
> **(b)** wait until the company goes public in one month which would give you a 50 percent chance of doubling your money to $200,000, and a 50 percent chance of losing one-third of it, leaving you with $66,000.
>
> Would you cash out immediately or wait until after the company goes public?
>
> - cash out
> - wait
> - don't know

If the student answers "wait" they are asked to make another "wait or cash out" choice where waiting gives a 50-50 chance of either doubling the money or reducing it by half, leaving them with $50,000. If the student answers "cash out" they are asked to make a different wait or cash out choice where waiting gives a 50-50 chance of either doubling the money or reducing it by 20 percent, leaving them with $80,000. This two-part question allows us to distinguish the most risk-loving as indicated by a "wait-wait" choice, from those that have higher levels of risk aversion indicated, in order of increase risk aversion, by "wait-cash out", "cash out-wait", and "cash out-cash out." As shown in Table 8, the student responses to this question do not suggest that participants are more risk averse than non-participants. However, the participants are more likely to answer "don't know" as compared with non-participants.

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, which

[11] This question is similar to a 2007 question from the Health and Retirement Survey

for the Purdue ISA is 2.5 times the funding amount. In addition, the payment amount will likely increase over time with an ISA as the participant's income increases. The opposite is true for a traditional student loan as the monthly payment amount is fixed. Therefore, students with a lower discount rate may prefer the traditional student loan. The survey has one question designed to elicit time preference:

> This question is about purchasing an appliance which costs \$1,000. To pay for this appliance, you are given the following two options:
>
> **(a)** pay 12 monthly installments of \$100 each
>
> **(b)** pay \$1,200 one year from now
>
> Which would you choose?
>
> - 12 monthly installments of \$100 each
> - \$1,200 one year from now
> - no preference

As shown in Table 8, more than 80 percent of the students selected the monthly installments option which is somewhat surprising given that the lump sum payment one year later is essentially an interest-free loan. The differences in the answers to this question between ISA participants and non-participants are not statistically significant.

The ISA participants have very similar grades and SAT scores to the non-participants. However, it could be that the non-participants are simply more optimistic and believe they will have higher earnings than the participants. The survey has one question designed to elicit optimism:

> Imagine that a coin will be flipped 10 times. Each time, if heads, you win \$10. What is your own estimation, according to your experience and your luck, of the number of times heads will occur, i.e. how many times (out of ten) do you think you are going to win (and get \$10)?

The question's emphasis on the role of experience and luck in determining the number of wins rather than simply asking for the expected number of wins encourages the student to give a response other than 5. As shown in Table 8, about 55 percent of student give an answer other than 5. About 34 percent select a number of wins that is less than 5 (pessimistic) and the remaining 21 percent select a number of wins that is greater than 5 (optimistic). There is no statistical difference between the participants and non-participants in the fraction of optimistic and pessimistic students.

A different form of optimism may be measured in a student's own assessment of his or her ability. The survey asks the students to imagine that there are 100 students in their major ranked in order from 1 (lowest) to 100 (highest) and asks where they believe they would rank in three areas: aptitude and intelligence, time and effort, and academic performance. As shown in Table 8, the participants and non-participants have very similar self-reported rankings. Perhaps this is not surprising as the participants and non-participants also have very similar SAT scores and GPAs.

Parent Characteristics

The most commonly chosen alternative to the Purdue ISA, is the direct PLUS loan which is a parent loan to pay for student college expenses. This suggests that it may be parents, more than the 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. The survey then poses a question related to parent willingness to potentially take on debt incurred by the student:

> 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

And finally, a question eliciting the parent involvement in financial decisions:

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 9 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 and correspondingly, parents of ISA participants have lower income. The non-participants believe that their parents are more willing to take on debt incurred by the 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 the characteristics of the parents than of the students. Some parents may be unwilling to take on student loan debt from a PLUS loan and this is 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 correlated with measures of student ability. If selection is driven by the parents, this may explain why there is so little evidence for adverse selection on most of the student characteristics considered.

6 Additional Results

Table 10 reports estimates of equation 5, but is restricted to the smaller sample of those who responded to the survey. Columns (1) and (2) include several survey variables for which there were relatively large differences between ISA participants and non-participants as reported in Tables 4 - 9, including the debt aversion index, the number of credit cards owned, the self-reported likelihood of being married within 7 years of graduating, the expected starting salary, parent income, and indicators for the student's father being a college graduate, a location preference for a large city (over 5 million population), and choosing a lump sum payment a year later rather than monthly payments. Columns (3) and (4) add the parent questions.

Table 11 reports matching estimates of the effect of ISA participation on GPA and Salary. The matching variables include indicators for year in school, gender, race and ethnicity, first generation student, transfer student, non-native English speaker, funding amount, income share percentage, birth year, parent income, parent co-sign loan, parent financial influence, time preference, and large city preference. The results are quite similar to those presented in Table 3, but are not statistically significant. However, the point estimates do not seem to be effected by including the parent variables which were the only important factors in explaining ISA selection. I view this as support for the claim that ISA participation is as good as randomly assigned in this population.

7 Discussion and Conclusion

This paper uses administrative and survey data to examine the factors which influence a student's decision to participate in the Purdue University income share agreement (ISA). The results suggest that there is no adverse selection into the ISA by student ability (GPA, SAT scores) and that selection is driven primarily by parent characteristics. There is also evidence that students are taking advantage of the groups used to set income share percentages; students in higher-paying majors within each group are less likely to participate than those in lower-paying majors. And finally, there is some evidence that students who would like to move to a larger city, where salaries are higher, are less likely to participate in the ISA.

My view is that the Purdue 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 percentage based on the average earnings of graduates from the student's major and on the student's year in school. If there were a single income share percentage applied to all students at the university, I believe there would be strong adverse selection by major and year in school.

I caution that my conclusion of very little adverse selection into the Purdue ISA may not be (and probably is not) applicable to many other proposed ISA programs. Many proposed ISA programs have an explicit goal of increasing access to college and would allow first-year students to participate. This would increase the adverse selection and would make it very difficult to offer different income share percentages based on expected future earnings when the student has not yet even taken any college courses. The estimated negative effect of the income share percentage on participation suggests that if a single common income share percentage were offered to all ISA applicants, only those planning to graduate in a low-paying major would participate. 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 it is simply speculation if this would be successful.

Though there is no evidence that students put less effort into their coursework after choosing to participate in the Purdue 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 lower cost of living city. It isn't clear if the ISA participation is causing this differences in preferences (pure moral hazard) or this if is adverse selection on unobservable characteristics. My view is that the evidence points to the moral hazard explanation, though more work is needed.

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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

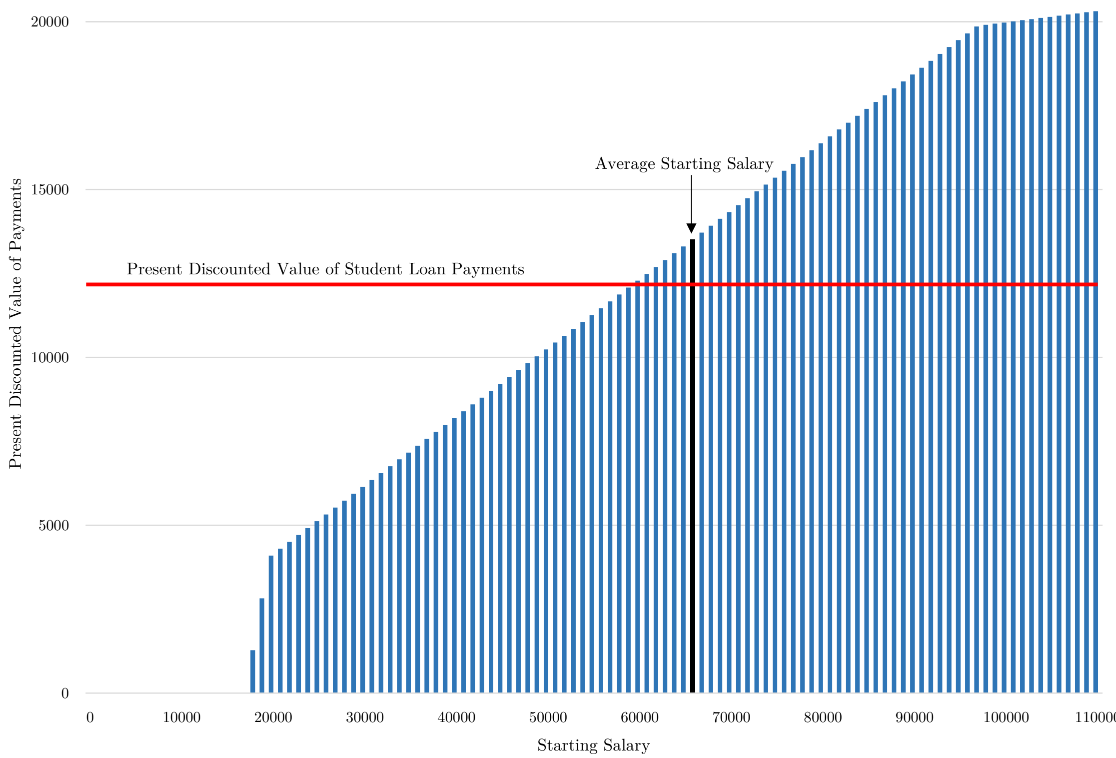
• If your first job pays you: $ 40,000
Your total payments will be: $ 17,643

• 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)

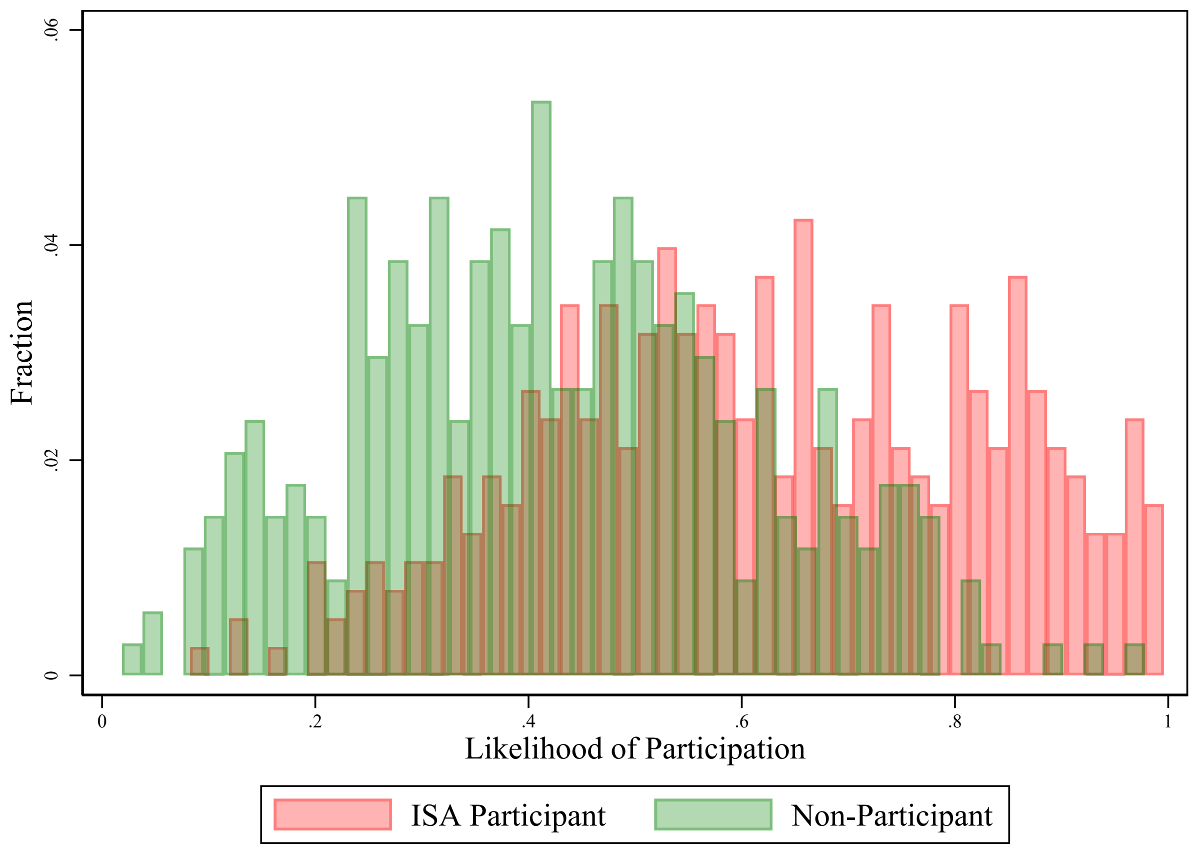
• If your first job pays you: $100,000
Your total payments will be: $ 30,000 (cap)

Figure 2: 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 3: Histogram of Propensity Score for ISA Participation 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.

Table 1: Characteristics of ISA Applicants

		ISA Applicants		
	All Students	Non-Participants	Participants	P-value
Sophomore	0.288	0.287	0.219	0.022**
Junior	0.294	0.373	0.432	0.079*
Senior	0.418	0.330	0.348	0.572
Female	0.419	0.477	0.505	0.423
Birth Year	1995.5	1995.7	1995.8	0.533
Black	0.032	0.104	0.0995	0.844
Hispanic	0.046	0.070	0.113	0.029**
Asian	0.069	0.111	0.0701	0.037**
First-Generation Student	0.218	0.294	0.281	0.657
Transfer Student	0.276	0.139	0.127	0.603
Non-Native English	0.168	0.062	0.059	0.836
International	0.154	0.000	0.000	-
prior-year GPA (relative to major)	3.03	2.855	2.922	0.068*
SAT Math	626.3	613.9	616.4	0.691
SAT Reading	623.7	602.3	605.7	0.587
Funding Amount	-	$13,189	$13,000	0.686
Income Share Percentage	-	3.919	3.884	0.484
Average Salary of Major	$55,139	$54,616	$53,554	0.298
Salary Std Dev of Major	$14,704	$13,731	$13,552	0.610
Indiana Resident	0.533	0.504	0.396	0.002***
Prior ISA Participant	-	0.024	0.147	0.000***
Observations	22,912	418	442	

This table reports student characteristics for all Purdue University sophomores, juniors, and seniors in the first column. The first column is provided for comparison only as these observations are not used in the analysis. The next two columns report the characteristics for the ISA Applicants separated into ISA Non-Participants and ISA Participants. 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. The final column reports the p-value for a t-test on the equality of means: * p< .10, ** p< .05, *** p< .01

Table 2: Selection into the Income Share Agreement (Administrative Data)

	(1)	(2)	(3)	(4)
Sophomore	-0.1114	-0.0880	-0.0890	-0.3087**
	(0.0846)	(0.0823)	(0.0826)	(0.1249)
Junior	0.1235*	0.1379**	0.1376**	0.0664
	(0.0670)	(0.0660)	(0.0661)	(0.0765)
Female	0.0445	0.0176	0.0179	0.0243
	(0.0388)	(0.0413)	(0.0412)	(0.0503)
Black	-0.0104	-0.0121	-0.0087	-0.0018
	(0.0547)	(0.0542)	(0.0534)	(0.0636)
Hispanic	0.0821	0.0838	0.0850	0.0449
	(0.0604)	(0.0599)	(0.0605)	(0.0756)
Asian	-0.1859***	-0.1863***	-0.1849***	-0.1245
	(0.0598)	(0.0609)	(0.0627)	(0.0795)
First-Generation Student	-0.0009	0.0010	0.0011	0.0147
	(0.0371)	(0.0385)	(0.0384)	(0.0462)
Transfer Student	-0.0706	-0.0847	-0.0843	-0.0868
	(0.0604)	(0.0603)	(0.0602)	(0.0790)
Non-Native English	0.0549	0.0763	0.0792	0.0991
	(0.0673)	(0.0652)	(0.0646)	(0.0794)
Prior Year GPA, Relative	0.0250	0.0188	0.0192	0.0227
	(0.0362)	(0.0366)	(0.0363)	(0.0384)
SAT Math	0.0003	0.0003	0.0003	0.0002
	(0.0002)	(0.0002)	(0.0002)	(0.0003)
SAT Verbal	-0.0002	-0.0002	-0.0002	-0.0001
	(0.0002)	(0.0002)	(0.0002)	(0.0003)
Funding Amount ($1,000s)	0.0016	0.0029	0.0027	0.0010
	(0.0030)	(0.0030)	(0.0030)	(0.0035)
Income Share Percentage	0.0379	-0.0859*	-0.1224**	-0.2290**
	(0.0371)	(0.0503)	(0.0557)	(0.0929)
Major Avg Salary ($1,000s)		-0.0066***	-0.0084***	
		(0.0021)	(0.0026)	
Major Std Dev Salary ($1,000s)			0.0039	
			(0.0029)	
Indiana Resident	-0.1267***	-0.1301***	-0.1309***	-0.1698***
	(0.0360)	(0.0365)	(0.0366)	(0.0418)
Prior ISA Participant	0.3595***	0.3694***	0.3710***	0.2789***
	(0.0612)	(0.0616)	(0.0614)	(0.0768)
2017-2018 Academic Year	0.1053*	0.0962*	0.0949*	0.1170*
	(0.0557)	(0.0557)	(0.0555)	(0.0630)
Major FE				✓
Observations	789	760	760	789
R^2	0.114	0.118	0.118	0.260

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. Every specification includes birth year fixed effects. The funding amount and major-specific average salary are reported in thousands of dollars. Standard errors are clustered on major: * p< .10, ** p< .05, *** p< .01

Table 3: Effect of ISA Participation on GPA and Salary

	(1) GPA_t	(2) GPA_{t+1}	(3) $Salary_{t+1}$	(4) $Salary_{t+1}$
ISA Participant	0.0161	0.0305	-2497.94	-4757.65**
	(0.0344)	(0.0532)	(2159.40)	(2265.32)
Prior Year GPA, Relative	0.5641***	0.3815***	3738.61*	2375.54
	(0.0304)	(0.0467)	(1998.59)	(1944.75)
SAT Math	0.0006*	0.0009*	29.50	28.52
	(0.0003)	(0.0005)	(19.05)	(23.92)
SAT Verbal	0.0003	0.0003	-17.39	14.56
	(0.0003)	(0.0004)	(16.33)	(20.96)
Funding Amount ($1,000s)	0.0000	0.0025	-12.73	-16.42
	(0.0026)	(0.0044)	(146.01)	(145.00)
Major Avg Salary ($1,000s)	-0.0222	-0.0304	874.39***	
	(0.0171)	(0.0233)	(98.49)	
Indiana Resident	0.0290	0.0865	-2055.65	-3738.44
	(0.0404)	(0.0622)	(2569.24)	(2748.19)
Major FE	✓	✓		✓
Observations	747	541	182	182
R^2	0.517	0.423	0.534	0.810

* p¡.1, ** p¡.05, *** p¡.01

The dependent variable in column (1) is the GPA in the year for which the student applied for ISA funding. The dependent variable in column (2) is the GPA in the year after (which is only observed for students who applied for the fist year of the program and then did not graduate after the first year. The dependent variable in columns (3) and (4) is the self-reported starting salary for students who graduated and started working. Every specification includes indicators for year in school, gender, race and ethnicity, first generation student, transfer student, non-native English speaker, funding amount, income share percentage, and birth year. Standard errors are clustered on major: * p< .10, ** p< .05, *** p< .01

Table 4: Debt Aversion Survey Responses

	Non-Participants	Participants	P-Value
1. There is no excuse for borrowing money	1.772	1.659	0.116
2. Students have to go into debt (inverse)	2.886	2.966	0.490
3. It is OK to borrow money in order to buy food (inverse)	2.550	2.488	0.531
4. You should always save up first before buying something	4.124	4.110	0.854
5. Debt is an integral part of todays lifestyle (inverse)	2.433	2.410	0.811
6. Students should be discouraged from using credit cards	2.807	2.799	0.939
7. Banks should not be surprised when students incur large debts (inverse)	2.178	2.102	0.415
8. It's OK to have an account overdraft if you know you can pay it off (inverse)	3.713	3.645	0.499
9. Once you are in debt it is very difficult to get out	3.658	3.717	0.566
Sum of questions 1 - 9 (higher indicates more debt aversion)	26.15	25.89	0.491
Observations	201	292	

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 5: Financial and Employment Experience

	Non-Participants	Participants	P-Value
FINANCIAL EXPERIENCE			
Do you have a Checking Account?	0.927	0.927	0.990
Do you have a Savings Account?	0.854	0.805	0.189
Have you own Stocks or a Mutual Fund?	0.163	0.162	0.983
Have you ever had an Auto Loan?	0.124	0.0888	0.241
Have you ever had a Title Loan?	0.0281	0.0309	0.866
How many credit cards do you have?	1.064	0.833	0.014**
I have never had a credit card	0.320	0.400	0.069*
I always pay credit card in full each month	0.277	0.268	0.826
COMPOUNDING INTEREST			
less than 2 years	0.030	0.058	0.307
2 to 4 years	0.410	0.387	0.721
4 to 6 years	0.380	0.321	0.349
6 to 8 years	0.070	0.044	0.384
8 to 10 years	0.010	0.015	0.756
do not know	0.070	0.161	0.036**
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	201	292	

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 6: Future Salary, Work, and Family Expectations

	Non-Participants	Participants	P-Value
Expected starting salary	57350.1	56856.8	0.805
Percent chance salary greater than $38,000	81.25	79.55	0.447
Percent chance salary greater than $51,000	63.70	60.88	0.323
Expected salary 2 years after graduation	$55,806	$53,886	0.344
Expected salary 4 years after graduation	$65,184	$63,298	0.383
Expected salary 6 years after graduation	$77,271	$76,599	0.834
Expected salary 8 years from graduation	$91,011	$90,709	0.972
Calculated salary growth rate	0.537	0.603	0.621
Likelihood working full time 2 years after grad	68.30	69.96	0.613
Likelihood working full time 4 years after grad	76.48	76.77	0.913
Likelihood working full time 6 years after grad	78.71	80.03	0.601
WOMEN ($n = 256$)			
Ideally, would you like to be married someday?	0.952	0.954	0.963
At what age would you like to get married?	26.38	26.46	0.808
Likelihood married 3 year after graduation	47.33	41.16	0.139
Likelihood married 7 year after graduation	76.87	71.95	0.148
Do you want to have children?	0.857	0.841	0.726
number of children expected 10 years after grad	2.267	2.055	0.084*
Expected age at first child	28.68	28.86	0.585
Likelihood first child 3 years after graduation	24.27	18.43	0.098*
Likelihood first child 7 years after graduation	69.84	62.24	0.046**
MEN ($n = 232$)			
Ideally, would you like to be married someday?	0.979	0.986	0.698
At what age would you like to get married?	27.28	27.57	0.450
Likelihood married 3 year after graduation	37.85	33.96	0.305
Likelihood married 7 year after graduation	71.20	67.67	0.301
Do you want to have children?	0.809	0.848	0.434
number of children expected 10 years after grad	1.829	1.812	0.897
Expected age at first child	29.80	30.01	0.621
Likelihood first child 3 years after graduation	14.74	14.06	0.799
Likelihood first child 7 years after graduation	51.48	52.66	0.788
Observations	201^{+}	292^{+}	

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. $^{+}$ Of the 256 women who answered the marriage and family questions, 147 are ISA participants and 109 are non-participants. Of the 232 men who answered the marriage and family questions, 138 are ISA participants and 94 are non-participants.

Table 7: Location Preferences

	Non-Participants	Participants	P-Value
MSA RANK (lower is better)			
Chicago, IL	3.796	3.651	0.551
San Francisco, CA	4.050	4.097	0.878
Boston, MA	4.682	4.550	0.605
Washington DC	5.030	5	0.906
Indianapolis, IN	5	4.997	0.989
Pittsburgh, PA	6.478	5.886	0.007***
Phoenix, AZ	5.488	5.910	0.121
Fort Wayne, IN	8.100	8.131	0.907
Peoria, IL	8.114	8.294	0.457
Evansville, IN	8.647	8.924	0.314
Terre Haute, IN	9.463	9.232	0.354
Topeka, KS	9.154	9.329	0.464
LOCATION CHARACTERISTIC			
Household income (top 3)	$74,303	$73,924	0.750
Large city preference	0.478	0.467	0.820
Small city preference	0.0249	0.0346	0.540
Indiana preference	0.229	0.208	0.575
Outside Indiana preference	0.194	0.159	0.317
Eastern preference	0.164	0.201	0.308
Western preference	0.209	0.197	0.751
Observations	201	292	

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 8: 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
SELF-REPORTED ABILITY			
Academic Aptitude	70.09	69.89	0.908
Study Effort	61.80	61.30	0.825
Academic Performance	64.65	63.38	0.541
Observations	201	292	

The optimism question was added to the second wave of the survey. The observation counts for this question are 118 participants and 74 non-participants. 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 9: Parent Characteristics

	Non-Participants	Participants	P-Value
PARENT EDUCATION			
Mother did not go to college	0.151	0.161	0.720
Father did not go to college	0.205	0.215	0.738
Mother attended college	0.131	0.152	0.442
Father attended college	0.154	0.224	0.025**
Mother graduated from college	0.714	0.679	0.319
Father graduated from college	0.618	0.542	0.048**
Mother attended graduate school	0.228	0.233	0.884
Father attended graduate school	0.236	0.232	0.916
Parent Income	$111,767	$110,833	0.910
CO-SIGN LOAN			
definitely not	0.0828	0.157	0.028**
probably not	0.0897	0.114	0.427
might or might not	0.200	0.160	0.297
probably yes	0.366	0.324	0.381
definitely yes	0.262	0.244	0.674
FINANCIAL DECISION INVOLVEMENT			
not involved	0.112	0.122	0.740
somewhat influenced	0.211	0.313	0.019**
strongly influenced	0.447	0.400	0.327
made my decisions for me	0.191	0.131	0.089*
Observations	201	292	

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 10: Selection into the Income Share Agreement (Survey Data)

	(1)	(2)	(3)	(4)
Prior-year GPA, relative	-0.0201	-0.0176	-0.0158	-0.0265
	(0.0376)	(0.0414)	(0.0479)	(0.0569)
Major Avg Salary ($1,000s)	-0.0029*		-0.0010	
	(0.0016)		(0.0019)	
Married within 7 years	-0.0011	-0.0007	-0.0004	0.0002
	(0.0009)	(0.0011)	(0.0015)	(0.0022)
Salary expectation ($1,000s)	0.0001	0.0012	0.0018**	0.0020*
	(0.0008)	(0.0011)	(0.0007)	(0.0012)
Large city preference	-0.0355	-0.0454	-0.0125	-0.0191
	(0.0336)	(0.0444)	(0.0430)	(0.0577)
Time preference - lump sum	-0.0470	-0.0531	0.0297	0.0697
	(0.0660)	(0.0819)	(0.0691)	(0.0844)
Father attended college, did not graduate	0.0740	0.1115*	0.0571	0.0805
	(0.0500)	(0.0671)	(0.0548)	(0.0774)
Parent income ($1,000s)			-0.0006	-0.0006
			(0.0007)	(0.0013)
Co-sign loan - probably yes			-0.0058	-0.0063
			(0.0559)	(0.0758)
Parents somewhat influence finances			0.0845*	0.1455**
			(0.0461)	(0.0722)
Major FE		✓		✓
Observations	430	430	220	220
R^2	0.138	0.384	0.143	0.458

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. Every specification includes indicators for year in school, gender, race and ethnicity, first generation student, transfer student, non-native English speaker, funding amount, income share percentage, and birth year. The starting salary expectation and parent income are reported in thousands of dollars. Standard errors are clustered on major: * p< .10, ** p< .05, *** p< .01

Table 11: Matching Estimates of the Effect of ISA Participation on GPA and Salary

	(1) GPA_t	(2) GPA_{t+1}	(3) Salary
ISA Participant	**0.0960**	**0.1778**	**-3296.49**
	(0.0740)	**(0.1863)**	**(2395.37)**
Observations	396	209	102

The dependent variable in column (1) is the GPA in the year for which the student applied for ISA funding. The dependent variable in column (2) is the GPA in the year after (which is only observed for students who applied for the fist year of the program and then did not graduate after the first year. The dependent variable in column (3) is the self-reported starting salary for students who graduated and started working. The method matches on indicators for year in school, gender, race and ethnicity, first generation student, transfer student, non-native English speaker, funding amount, income share percentage, birth year, parent income, parent co-sign loan, parent financial influence, time preference, and large city preference. Standard errors are clustered on major: * p< .10, ** p< .05, *** p< .01