# Student Selection into an Income Share Agreement

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**Abstract**

US student loan debt is 1.6 trillion dollars and rising. Income share agreements (ISAs) have been proposed as an alternative to student loans and have recently been introduced at a number of institutions. Adverse selection into ISAs and moral hazard by ISA participants are the major concerns. Using Purdue University administrative and survey data for 431 ISA participants and 319 non-participants who applied and were offered an ISA but chose not to participate, I estimate the extent of selection into the ISA by ability, academic performance, beliefs about future income, location preference, risk aversion, debt aversion, optimism, financial sophistication, and parent characteristics. The evidence suggests that selection into the ISA is driven by parent characteristics, salary differences across majors, and location preferences with no adverse selection on student ability. At this point, there is not enough data to form any meaningful conclusion about moral hazard, though the lack of adverse selection on ability will allow for an analysis of the effect of the ISA program on labor supply and earnings once enough of the ISA applicants have graduated.

**JEL Codes:** I22, D14, G23, G41

**Keywords:** Income Share Agreement, Student Loan Debt, Adverse Selection

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# I Introduction

Americans collectively hold 1.6 trillion dollars in student loan debt (US Federal Reserve, 2018). The media frequently describes the difficult financial situation of some recent college graduates who struggle to make student loan payments. This is widespread with only 74 percent of the total value of student loan debt currently in loans that are in good standing; 13 percent is in loans that are in default and 10 percent is in loans that are in forbearance (US Department of Education, 2018). Income share agreements (ISAs), 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] Friedman (1955) described an income share agreement 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."

Supporters argue that ISAs will result in fewer defaults because graduates with low earnings pay less as an ISA participant than they would have as a borrower. In this way, ISAs act like a partial insurance contract where the provider assumes a portion of the earnings risk of ISA participants (Lochner and Monge-Naranjo, 2015). ISA providers lose if the student experiences low earnings, but benefit if the student experiences high earnings. Supporters also argue that ISAs provide colleges with additional incentive to care about student financial success if the ISA is backed by the college rather than a private firm or the government.

ISAs have not, until recently, been used by students to pay for college, with the exception of the 1971-1778 ISA at Yale University.[2] There is concern about two anticipated problems: (1) adverse selection of lower-earning students into ISAs and (2) moral hazard for

[1] Income share agreements are also referred to as human capital contracts, 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.

ISA participants which reduces labor supply and human capital investment. The failure of the Yale University ISA and concern about adverse selection and moral hazard prevented other proposed programs from being implemented.[3] Despite there being no good empirical evidence on the magnitude of adverse selection and moral hazard, Purdue University began a large-scale ISA program in 2016.[4]

In this paper, I use Purdue University administrative and survey data to measure the adverse selection into the ISA program. Purdue's ISA program only serves domestic students on the main campus who have completed at least one year of college. Importantly, the terms of the ISA depend on the student's major and year in school. While these restrictions reduce the adverse selection across majors, they do not reduce the potential adverse selection on student ability within a major. Students of lower ability or those planning to go into a lower paying occupation, even within the same major, may be more likely to select into the ISA.

The identification strategy is a simple comparison of ISA participants to non-participants who applied and were eligible but chose not to take ISA funding. The justification for this approach is that the student applicants did not know the terms of the ISA until after they applied. This allows me to identify the full set of students who were both seriously considering this option and eligible. ISA participants and non-participants are similar in characteristics and they also have all exhausted their eligibility for direct federal student loans. While I will show some preliminary results on the effect of ISA participation on academic achievement and after-graduation salaries, the primary focus of this paper is not to estimate a causal effect of the program, but it instead to measure the level of adverse selection into the program.

Purdue frames their ISA as "not a loan" which seems designed to attract students with greater debt aversion. In a large survey of applicants, I find no evidence that participation is influenced by the debt aversion of the student. The program informational materials also

[3]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.

[4]Several liberal arts colleges introduced programs the following year including Point Loma Nazareen University in California, Lackawanna College in Pennsylvania, Norwich University in Vermont, and Clarkson University in New York.

emphasize the earnings insurance aspect of ISA participation, however, I find no evidence that risk aversion, time preference, or optimism affect the participation decision.

The data clearly shows that students in higher-paying majors are less likely to participate as are students offered a higher price (the income share percentage per $10,000). Surprisingly, I find no evidence of adverse selection on ability as measured by test scores and prior grades in college. I do find evidence of selection on parent characteristics and differences in salary expectations (some of which comes from differences across majors and some from location preferences). The data also suggests that experience with credit cards may discourage participation, though this finding is not as robust as the others.

Using 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 94 percent of applicants would be better off choosing the parent PLUS loan if their starting salary is equal to the average for observationally identical recent graduates in their major. Note however, that the earnings projections for applicants are based only on their observables, so adverse selection on unobservable may bias upward the earnings and therefore repayments for ISA participants. The ISA option fares better under simulations where students receive an initial draw from the observed earnings distribution and face earnings risk over the subsequent 10 years.

I start by describing the Purdue University ISA program in Section II as the details of the program are important if one is to apply these findings to evaluate other proposed ISA programs. Section III describes the 668 students in the administrative data, the post-graduation survey of employment and salary, and the econometric model of ISA participation I use to estimate the level of adverse selection. Section IV describes a survey that I administer to ISA applicants 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. The adverse selection results are described in Section V along with a preliminary analysis of the effect of ISA participation on academic performance and salary. Section VI discusses the relevance of the Purdue program to other proposed ISA programs and concludes.

# II Purdue ISA Program Characteristics

Purdue University is a public university located in northwest Indiana with about 31,000 undergraduate students and 10,000 graduate students. Slightly more than 50 percent of the undergraduate students are Indiana residents and about 15 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.[5] 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.[6] 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 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

[5]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.

[6]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.

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.

Participants make no payments while they are in school nor during the 6 month grace period immediately following graduation. 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.[7] 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.

[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.

# III Data and Empirical Strategy

The 2016-2017 academic year was the first year of the program and only juniors and seniors were allowed to participate. Of the 320 eligible students who applied and received an ISA disclosure, 155 (48%) participated. For the 2017-2018 academic year, sophomores were also allowed to participate. Of the 434 eligible students who applied and received an ISA disclosure in the second year, 278 (64%) participated. In total, the university dispersed $6.1 million or about $14,000 per participant. Some students applied in both years and so are present in the data twice. In total there are 668 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 Black or Hispanic students than for the full student population. ISA applicants are also more likely to be first-generation students than for the student body at large. 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.

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. Participants are more likely to be Hispanic, have a higher prior-year GPA, are less likely to be an Indiana resident, and are more likely to be a prior ISA participant. Participants tend to be in lower-paying Majors, though the difference is not statistically significant. In terms of student ability, the prior-year GPA and SAT Math score suggest that the ISA participants are of higher ability, not lower as expected.[8] Overall, the ISA participants are very similar to the

[8]Many transfer students are not required to report SAT scores (or ACT scores which are converted into SAT scores) to Purdue. 51 of the 755 observations do not have reported SAT scores.

non-participants.[9]

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:

$$ISA_{itm} = \beta\, X_{itm} + \gamma_t + \delta\, prior_{it} + \theta_m + u_{itm} \tag{1}$$

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 as well as those obtained from the survey described in the next section. The $\gamma_t$ variable is a dummy for the academic year (only two so far, 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, $\theta_m$. 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 reported in the Results

[9]Citing federal privacy laws, Purdue University has not provided any financial information regarding the ISA applicants. All ISA applicants have federal student loans which means that the university has parent financial information and a calculated financial need for every student in my data. I have not been able to obtain this information.

section.

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. Additional regressions that incorporate survey responses are also reported in the Results section.

# IV 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.

## 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 2 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 2, 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 3, 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 4 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 5 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:[10]

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

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 6, 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 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 6, 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 6, 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 6, 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 7 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.

# V Results

In this section I report the results from the estimation of equation 1. The results are generally consistent with the findings reported in Tables 1 - 7. To work with the largest sample possible, I begin with the administrative data and exclude variables obtained from the survey.

Table 8 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 8 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 8 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 8 do suggest that the effect on ISA participation is positive as expected, though not statistically different than zero.

Column (4) of Table 8 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.

Table 9 also reports estimates of equation 1, 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 2 - 7, 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 that were no included in the first wave of the survey and so the sample size is cut in half. The parent variables are not statistically significantly related to ISA participation. However, preference for a large city does have a large and statistically significant effect on participation. Students who plan to move to a large city after graduation may view the ISA as less of a good deal given the higher cost of living and corresponding higher wages expected in a large city.

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 across all the various specifications I have tried 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.

Too few students have graduate from Purdue to provide strong evidence about the effect of ISA participation on salaries. However, I observe the student's GPA in the year for which the student applied for ISA funding as well as the next year for the juniors who applied in the program's first year. Table 10 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. Note that major fixed effects are included in all columns of Table 10. Column (3) shows that ISA participants take lower-paying jobs ($3,500 less) on average after graduation, though this difference is not statistically significant. The parameter estimate on the GPA of the ISA applicant the year before applying indicates that better grades do lead to higher salaries after graduation. We will need to wait for more ISA applicants to graduate for a more complete examination of the moral hazard effects of ISA participation.

# VI 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, I believe that after additional students graduate and more outcome data becomes available, the data will likely show evidence of moral hazard.

I anticipate that students who participate in an ISA will be more willing to take a lower paying job, perhaps one that requires fewer hours or is located in a lower cost of living city. I will need to wait for additional data in order to have supporting evidence.

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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)

Table 1: Characteristics of ISA Applicants

| | | ISA Applicants | | |
|---|---|---|---|---|
| | All Students | Non-Participants | Participants | P-value |
| Sophomore | 0.288 | 0.262 | 0.260 | 0.939 |
| Junior | 0.294 | 0.420 | 0.385 | 0.337 |
| Senior | 0.418 | 0.318 | 0.355 | 0.287 |
| Female | 0.419 | 0.464 | 0.503 | 0.289 |
| Birth Year | 1995.5 | 1995.4 | 1995.7 | 0.148 |
| Black | 0.032 | 0.117 | 0.088 | 0.189 |
| Hispanic | 0.046 | 0.056 | 0.093 | 0.057* |
| Asian | 0.069 | 0.093 | 0.070 | 0.248 |
| First-Generation Student | 0.218 | 0.293 | 0.285 | 0.808 |
| Transfer Student | 0.276 | 0.131 | 0.132 | 0.965 |
| Non-Native English | 0.168 | 0.050 | 0.056 | 0.730 |
| International | 0.154 | 0.000 | 0.000 | - |
| prior-year GPA (relative to major) | 3.03 | 2.72 | 2.79 | 0.082* |
| SAT Math | 626.3 | 611.8 | 614.9 | 0.645 |
| SAT Reading | 623.7 | 604.3 | 601.8 | 0.722 |
| Funding Amount | - | $13,605 | $14,331 | 0.168 |
| Income Share Percentage | - | 3.877 | 3.874 | 0.947 |
| Average Salary of Major | $55,139 | $54,298 | $52,584 | 0.109 |
| Salary Std Dev of Major | $14,704 | $14,343 | $14,203 | 0.752 |
| Indiana Resident | 0.533 | 0.522 | 0.399 | 0.001*** |
| Prior ISA Participant | - | 0.019 | 0.153 | 0.000*** |
| Observations | 22,912 | 321 | 432 | |

This table reports student characteristics for all 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 final column reports the p-value for a t-test on the equality of means: * p< .10, ** p< .05, *** p< .01

Table 2: Debt Aversion Survey Responses

| | Non-Participants | Participants | P-Value |
|---|---|---|---|
| 1. There is no excuse for borrowing money | 1.810 | 1.658 | 0.047** |
| 2. Students have to go into debt (inverse) | 2.845 | 2.981 | 0.274 |
| 3. It is OK to borrow money in order to buy food (inverse) | 2.517 | 2.465 | 0.626 |
| 4. You should always save up first before buying something | 4.126 | 4.151 | 0.764 |
| 5. Debt is an integral part of todays lifestyle (inverse) | 2.445 | 2.377 | 0.507 |
| 6. Students should be discouraged from using credit cards | 2.822 | 2.854 | 0.780 |
| 7. Banks should not be surprised when students incur large debts (inverse) | 2.190 | 2.096 | 0.345 |
| 8. It is OK to have a checking account overdraft if you know you can pay it off (inverse) | 3.655 | 3.638 | 0.874 |
| 9. Once you are in debt it is very difficult to get out | 3.730 | 3.704 | 0.807 |
| 10. You should stay at home rather than borrow money to go out for the evening | 3.741 | 3.842 | 0.354 |
| 11. Taking out a loan is good because it allows you to enjoy life as a student (inverse) | 3.132 | 3.288 | 0.126 |
| 12. Owing money is basically wrong | 2.213 | 2.162 | 0.596 |
| Sum of questions 1 - 12 (higher indicates more debt aversion) | 35.25 | 35.22 | 0.948 |
| Observations | 174 | 260 | |

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 3: Financial and Employment Experience

| | Non-Participants | Participants | P-Value |
|---|---|---|---|
| FINANCIAL EXPERIENCE | | | |
| Do you have a Checking Account? | 0.933 | 0.927 | 0.838 |
| Do you have a Savings Account? | 0.854 | 0.805 | 0.189 |
| Have you own Stocks or a Mutual Fund? | 0.163 | 0.160 | 0.942 |
| Have you ever had an Auto Loan? | 0.124 | 0.099 | 0.422 |
| Have you ever had a Title Loan? | 0.021 | 0.034 | 0.714 |
| How many credit cards do you have? | 1.029 | 0.851 | 0.087* |
| I have never had a credit card | 0.326 | 0.408 | 0.079* |
| I always pay credit card in full each month | 0.258 | 0.256 | 0.949 |
| 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 |
| 10 years or more | 0 | 0 | . |
| 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 | 178 | 262 | |

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 4: Future Salary, Work, and Family Expectations

| | Non-Participants | Participants | P-Value |
|---|---|---|---|
| Expected starting salary | 58,119 | 55,402 | 0.170 |
| Percent chance salary greater than $38,000 | 82.90 | 78.03 | 0.051* |
| Percent chance salary greater than $51,000 | 65.08 | 59.90 | 0.089* |
| Expected salary 2 years after graduation | 55,625 | 52,837 | 0.162 |
| Expected salary 4 years after graduation | 64,301 | 61,989 | 0.292 |
| Expected salary 6 years after graduation | 76,460 | 74,521 | 0.573 |
| Expected salary 8 years from graduation | 90,112 | 88,153 | 0.841 |
| Calculated salary growth rate | 0.537 | 0.603 | 0.621 |
| Likelihood working full time 2 years after grad | 68.30 | 69.96 | 0.613 |
| Likelihood working full time 4 years after grad | 76.48 | 76.77 | 0.913 |
| Likelihood working full time 6 years after grad | 78.71 | 80.03 | 0.601 |
| WOMEN ($n = 224$) | | | |
| Ideally, would you like to be married someday? | 0.966 | 0.948 | 0.522 |
| At what age would you like to get married? | 26.42 | 26.59 | 0.638 |
| Likelihood married 3 year after graduation | 47.39 | 41.84 | 0.215 |
| Likelihood married 7 year after graduation | 77.91 | 72.24 | 0.118 |
| Do you want to have children? | 0.876 | 0.822 | 0.276 |
| number of children expected 10 years after grad | 2.205 | 2.099 | 0.412 |
| Expected age at first child | 28.74 | 28.77 | 0.929 |
| Likelihood first child 3 years after graduation | 25.25 | 20.22 | 0.202 |
| Likelihood first child 7 years after graduation | 68.59 | 63.15 | 0.175 |
| MEN ($n = 206$) | | | |
| Ideally, would you like to be married someday? | 0.976 | 0.983 | 0.722 |
| At what age would you like to get married? | 27.06 | 27.56 | 0.196 |
| Likelihood married 3 year after graduation | 39.45 | 34.71 | 0.247 |
| Likelihood married 7 year after graduation | 71.68 | 66.91 | 0.185 |
| Do you want to have children? | 0.800 | 0.843 | 0.426 |
| number of children expected 10 years after grad | 1.882 | 1.824 | 0.674 |
| Expected age at first child | 29.72 | 30.01 | 0.518 |
| Likelihood first child 3 years after graduation | 15.40 | 14.50 | 0.750 |
| Likelihood first child 7 years after graduation | 52.04 | 52.94 | 0.849 |
| Observations | 174+ | 256+ | |

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 224 women who answered the marriage and family questions, 135 are ISA participants and 89 are non-participants. Of the 206 men who answered the marriage and family questions, 121 are ISA participants and 85 are non-participants.

Table 5: Location Preferences

| | Non-Participants | Participants | P-Value |
|---|---|---|---|
| MSA RANK (lower is better) | | | |
| Chicago, IL | 3.561 | 3.629 | 0.785 |
| San Francisco, CA | 3.902 | 4.145 | 0.463 |
| Boston, MA | 4.740 | 4.559 | 0.501 |
| Washington DC | 5.023 | 4.895 | 0.637 |
| Indianapolis, IN | 5.168 | 4.957 | 0.437 |
| Pittsburgh, PA | 6.480 | 5.852 | 0.008*** |
| Phoenix, AZ | 5.601 | 5.941 | 0.246 |
| Fort Wayne, IN | 8.197 | 8.219 | 0.939 |
| Peoria, IL | 7.983 | 8.371 | 0.124 |
| Evansville, IN | 8.642 | 8.934 | 0.324 |
| Terre Haute, IN | 9.422 | 9.211 | 0.431 |
| Topeka, KS | 9.283 | 9.289 | 0.982 |
| LOCATION CHARACTERISTIC | | | |
| Household income (top 3) | 74,021 | 73,587 | 0.704 |
| Large city preference | 0.503 | 0.449 | 0.276 |
| Small city preference | 0.006 | 0.012 | 0.531 |
| Indiana preference | 0.225 | 0.215 | 0.795 |
| Outside Indiana preference | 0.214 | 0.160 | 0.158 |
| Eastern preference | 0.168 | 0.223 | 0.163 |
| Western preference | 0.237 | 0.191 | 0.256 |
| Observations | 173 | 256 | |

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: 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 | 173 | 259 | |

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 7: Parent Characteristics

| | Non-Participants | Participants | P-Value |
|---|---|---|---|
| PARENT EDUCATION | | | |
| Mother did not go to college | 0.163 | 0.149 | 0.702 |
| Father did not go to college | 0.213 | 0.206 | 0.852 |
| Mother attended college | 0.096 | 0.142 | 0.148 |
| Father attended college | 0.107 | 0.195 | 0.013** |
| Mother graduated from college | 0.736 | 0.697 | 0.381 |
| Father graduated from college | 0.669 | 0.580 | 0.062* |
| Mother attended graduate school | 0.230 | 0.222 | 0.842 |
| Father attended graduate school | 0.247 | 0.256 | 0.840 |
| Parent Income | 120,343 | 107,185 | 0.176 |
| CO-SIGN LOAN | | | |
| definitely not | 0.083 | 0.143 | 0.223 |
| probably not | 0.111 | 0.126 | 0.760 |
| might or might not | 0.139 | 0.151 | 0.816 |
| probably yes | 0.417 | 0.277 | 0.047** |
| definitely yes | 0.250 | 0.303 | 0.437 |
| FINANCIAL DECISION INVOLVEMENT | | | |
| not involved | 0.103 | 0.0880 | 0.731 |
| somewhat influenced | 0.167 | 0.328 | 0.011** |
| strongly influenced | 0.436 | 0.408 | 0.697 |
| made my decisions for me | 0.231 | 0.128 | 0.057* |
| Observations | 178 | 261 | |

The parent income, loan co-sign, and financial decision involvement questions were added to the second wave of the survey. The observation counts for these questions are 125 participants and 78 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 8: Selection into the Income Share Agreement (Administrative Data)

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| Sophomore | 0.0274 | 0.1537 | 0.1913 | 0.3036* |
| | (0.1169) | (0.1316) | (0.1297) | (0.1773) |
| Junior | 0.0420 | 0.0955 | 0.1071 | 0.1013 |
| | (0.0743) | (0.0809) | (0.0801) | (0.0963) |
| Female | 0.0660 | 0.0474 | 0.0463 | 0.0409 |
| | (0.0446) | (0.0458) | (0.0461) | (0.0627) |
| Black | -0.1044 | -0.1027 | -0.1061 | -0.1030 |
| | (0.0669) | (0.0647) | (0.0665) | (0.0776) |
| Hispanic | 0.0881 | 0.0905 | 0.0893 | 0.1165 |
| | (0.0742) | (0.0745) | (0.0745) | (0.0921) |
| Asian | -0.1205* | -0.0826 | -0.0892 | -0.0797 |
| | (0.0704) | (0.0708) | (0.0696) | (0.0907) |
| First-Generation Student | 0.0025 | 0.0085 | 0.0079 | 0.0204 |
| | (0.0398) | (0.0414) | (0.0416) | (0.0494) |
| Transfer Student | -0.0356 | -0.0215 | -0.0206 | -0.0728 |
| | (0.0738) | (0.0755) | (0.0754) | (0.0906) |
| Non-Native English | 0.0382 | 0.0695 | 0.0651 | 0.1041 |
| | (0.0864) | (0.0813) | (0.0808) | (0.0811) |
| Prior Year GPA, Relative | 0.0483 | 0.0439 | 0.0437 | 0.0501 |
| | (0.0297) | (0.0303) | (0.0305) | (0.0329) |
| SAT Math | 0.0003 | 0.0003 | 0.0003 | 0.0001 |
| | (0.0003) | (0.0003) | (0.0003) | (0.0004) |
| SAT Verbal | -0.0005* | -0.0005* | -0.0004* | -0.0001 |
| | (0.0002) | (0.0003) | (0.0003) | (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 | -0.1465*** | -0.1497*** | -0.1493*** | -0.1823*** |
| | (0.0488) | (0.0491) | (0.0495) | (0.0577) |
| Prior ISA Participant | 0.2601*** | 0.2440*** | 0.2433*** | 0.1720** |
| | (0.0669) | (0.0681) | (0.0670) | (0.0815) |
| 2017-2018 Academic Year | 0.1449*** | 0.1491*** | 0.1466*** | 0.1448** |
| | (0.0545) | (0.0552) | (0.0553) | (0.0651) |
| Major FE | No | No | No | Yes |
| Observations | 692 | 668 | 668 | 692 |
| R-squared | 0.120 | 0.131 | 0.132 | 0.277 |

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

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| Prior-year GPA, relative | 0.0054 | 0.0110 | 0.0816 | 0.0378 |
| | (0.0453) | (0.0583) | (0.0731) | (0.1303) |
| Income Share Percentage | -0.0768 | -0.2081* | 0.0189 | 0.0088 |
| | (0.0663) | (0.1077) | (0.1084) | (0.2621) |
| Major Avg Salary ($1,000s) | -0.0048 | -0.0469*** | 0.0013 | -0.0058 |
| | (0.0034) | (0.0083) | (0.0045) | (0.0305) |
| Debt aversion index | -0.0018 | -0.0024 | 0.0154* | 0.0161 |
| | (0.0048) | (0.0070) | (0.0083) | (0.0166) |
| Number of credit cards | -0.0399* | -0.0541 | -0.0070 | -0.0400 |
| | (0.0236) | (0.0337) | (0.0332) | (0.0804) |
| Married within 7 years | -0.0011 | -0.0007 | -0.0004 | 0.0002 |
| | (0.0009) | (0.0011) | (0.0015) | (0.0022) |
| Salary expectation ($1,000s) | -0.0016 | 0.0006 | 0.0015 | 0.0026 |
| | (0.0015) | (0.0019) | (0.0019) | (0.0033) |
| Large city preference | -0.0850* | -0.1417** | -0.1576** | -0.2037 |
| | (0.0474) | (0.0645) | (0.0763) | (0.1353) |
| Time preference - lump sum | 0.1059 | 0.0571 | -0.0427 | -0.0360 |
| | (0.0948) | (0.1345) | (0.2618) | (0.3881) |
| Father attended college, did not graduate | 0.1588** | 0.2409** | 0.1926 | 0.2251 |
| | (0.0729) | (0.1070) | (0.1162) | (0.2678) |
| Parent income ($1,000s) | | | -0.0006 | -0.0006 |
| | | | (0.0007) | (0.0013) |
| Co-sign loan - probably yes | | | -0.1198 | -0.0909 |
| | | | (0.0887) | (0.1670) |
| Parents somewhat influence finances | | | 0.0631 | -0.0053 |
| | | | (0.0787) | (0.1465) |
| Major FE | No | Yes | No | Yes |
| Observations | 413 | 413 | 184 | 184 |
| R-squared | 0.160 | 0.397 | 0.221 | 0.556 |

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 10: Effect of ISA Participation on GPA and Salary

| | (1) $GPA_t$ | (2) $GPA_{t+1}$ | (3) Salary |
|---|---|---|---|
| **ISA Participant** | **0.0443** | **0.0271** | **-3481.54** |
| | **(0.0442)** | **(0.1141)** | **(3005.75)** |
| Prior Year GPA, Relative | 0.5861*** | 0.3340*** | 2246.98 |
| | (0.0338) | (0.0828) | (2369.35) |
| SAT Math | 0.0010*** | 0.0017* | -27.99 |
| | (0.0004) | (0.0009) | (34.78) |
| SAT Verbal | 0.0001 | -0.0003 | 50.42 |
| | (0.0003) | (0.0008) | (37.00) |
| Funding Amount ($1,000s) | 0.0084** | 0.0114 | -128.66 |
| | (0.0033) | (0.0084) | (198.84) |
| Major Avg Salary ($1,000s) | 0.0310 | 0.0235 | 779.06* |
| | (0.0210) | (0.0301) | (424.45) |
| Major FE | Yes | Yes | Yes |
| Observations | 657 | 208 | 101 |
| R-squared | 0.515 | 0.591 | 0.894 |

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. 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